1-1-2011

Predictors of Student Outcomes in Developmental Math at a Public Community and Technical College

Linda Darlene Hunt
hunt@marshall.edu

PREDICTORS OF STUDENT OUTCOMES IN DEVELOPMENTAL MATH AT A PUBLIC COMMUNITY AND TECHNICAL COLLEGE

A Dissertation submitted to
the Graduate College of
Marshall University

In partial fulfillment of
the requirements for the degree of
Doctor of Education

Curriculum and Instruction
by
Linda Darlene Hunt

Approved by
Dr. Carl Johnson, Chairperson
Dr. Paula Lucas
Dr. Laura Adkins
Dr. Linda Hankins

Marshall University
December 2011

ABSTRACT

With the wide range of abilities of community college students, proper course placement is crucial. Therefore, having better predictors of success can help improve placement of students for their achievement. This study analyzed student predictors, instructor predictors, and classroom predictors in relation to student final exam score and student final grade in Elementary Algebra and Intermediate Algebra classes. Student predictors included gender, ACT math score, SAT math score, community college enrollment, math pretest score, and ASC grade. Instructor predictors included gender, employment status, Mozart music use, and ALEKS software use. Classroom predictors included time of day, number of class meetings per week, and class size. The Elementary Algebra and Intermediate Algebra data sets were analyzed with simple and stepwise multiple regression as well as simple and stepwise binary logistic regression.

The study of specific predictors that impact student achievement in developmental mathematics revealed the following. When analyzed individually, Elementary and Intermediate Algebra shared ACT Math score, community college enrollment, and math pretest score as predictors of final exam score. When analyzed individually, Elementary and Intermediate Algebra shared ACT Math score, math pretest score, and ASC grade as predictors of final grade. When analyzed in combinations, Elementary and Intermediate Algebra shared ACT Math score and math pretest score as common predictors of final exam score. When analyzed in combinations, Elementary and Intermediate Algebra shared math pretest score and ASC grade as common predictors of final grade.

DEDICATION

Math has never been easy for me; I've always had to work at it. I think this helps me relate to my developmental mathematics students who struggle to understand. This dissertation is dedicated to all of the teachers along the way who had the patience to make sure I finally got it. A special thanks goes to the elementary school teachers who worked diligently at teaching long division and to my dad for helping me with homework, especially how to remember my nines in the multiplication table. I was blessed to have a strong math curriculum in high school and teachers such as Jerry Schultz who continued to help me even when I was no longer his official student. I continued to be blessed in college with great teachers such as James Allison, Mary Ellen Komorowski, and David Brown who spent many office hours helping me with homework and extra exercises I wanted to do. A special thank you goes to Bob Bickel who started helping me in graduate school in 1992 and who encouraged me to complete my dissertation. None of my accomplishments would be possible if it weren't for my third grade teacher Alta McNinch who helped me learn to read. If it hadn't been for her, I would have never been able to read to learn. Mostly, I'd like to dedicate this to my developmental mathematics students for whom I work diligently the way my teachers worked for me.

ACKNOWLEDGMENTS

First, I'd like to acknowledge my dissertation committee: Carl Johnson, who served as chair into his retirement; Paula Lucas, who served as my minor chair; Laura Adkins, who assisted with all aspects of the design and analysis of data; and Linda Hankins, who helped me with my minor comprehensive exams on math anxiety. Special acknowledgments go to my friend Gemmie who really is a gem and my colleague Pam Bird Duelley, aka vent sister and proofreader extraordinaire. Thanks to David Childress, Jim Fox, and Sherri Ritter for their technical assistance with formatting.

Second, I'd like to acknowledge my fellow doctoral students who inspired and supported me through the coursework and dissertation process.

Third, I'd like to acknowledge my work colleagues for their inspiration: my longtime friend Kay Thompson for telling me this is something I must complete; my Delta Kappa Gamma sorority sister Dr. Barbara Walters for relighting my fire when I'd all but given up; my college president Dr. Greg Adkins, academic dean Dr. Janie Kitchen, and my division chair Dr. Keith Brammell, who had faith that I'd complete my dissertation.

Fourth, I'd like to acknowledge my best friend Mike Beck, Ph.D., who helped me every step of the way with unending support.

Fifth, I'd like to acknowledge my parents for their variety of support.

Finally, and most importantly, I acknowledge God because "With God all things are possible" (Mark 10:27)!

QUOTATION

My favorite quotation is from Jesse Stuart's (1949) book *A Thread That Runs So True*:

> And I am firm in my belief that a teacher lives on and on through his students. I will live if my teaching is inspirational, good, and stands firm for good values and character training. Tell me how can good teaching ever die? Good teaching is forever and the teacher is immortal. (p. 7)

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

PREDICTORS OF STUDENT OUTCOMES IN DEVELOPMENTAL MATH AT A COMMUNITY AND TECHNICAL COLLEGE

CHAPTER ONE

INTRODUCTION

Today there is much interest in the preparation of students for postsecondary education. People focused on this issue range from philanthropists Bill and Melinda Gates (Jaschik, 2008) to the President of the United States (Obama, 2009). The Gates Foundation is worried about "poor graduation and retention rates" (Jaschik, 2008) while President Obama is concerned about remediating basic mathematics skills and finding out what is preventing students from being successful.

According to the American Mathematical Association of Two-Year Colleges, AMATYC (Writing Team and Task Force of the Standards for Introductory College Mathematics Project, 1995, p. ix), "Of 1,295,000 students studying mathematics in two-year college mathematics departments, 724,000 (56%) were studying at the remedial level. By contrast, in four-year college and university mathematics departments, 261,000 (15% of the mathematics enrollment) were studying at the remedial level."

The National Center for Education Statistics, NCES, reports that in the fall of 2000, 71% of two- and four-year postsecondary institutions offered remedial courses in mathematics (Parsad & Lewis, 2003). Additionally, in the fall of 2000, 22% of entering freshmen enrolled in remedial mathematics classes (Parsad & Lewis, 2003). McCabe notes that "sixty-two percent of remedial education students are deficient in mathematics…" (2000, p. 41). Clery and Topper (2008, p. 1) asserted that convincing students who require developmental coursework to enroll in the requisite courses without delay, "and then doing everything possible to help them succeed, will improve degree completion rates" because approximately half of students fail to complete their developmental courses.

As noted in the study by Parsad and Lewis (2003), nearly three-fourths of the institutions in the United States provided courses in developmental mathematics with almost one quarter of entering freshmen enrolling in these courses. This occurred at a cost to the nation of one billion dollars (Saxon & Boylan, 2001). Clearly, the issue of students being ill-prepared for college-level mathematics is a serious problem. Because student success will encourage retention rates, predictors of student achievement will be useful in enhancing the success of all students (Heath, 1995; Huber, 2006). A method to predict the success of these students could help save considerable time and money. In this study, the association between potential predictors (student characteristics, instructor characteristics, and classroom characteristics) and the student outcomes (as measured by their final exam scores as well as their final grades) were investigated.

Definition of Key Terms

Key terms in this study include the following: developmental mathematics, outcomes, potential predictors, and the community and technical college for this study. Developmental mathematics includes Elementary Algebra and Intermediate Algebra. Outcomes are defined as the students' final grades and students' final exam scores. Potential predictors are in three categories: student (gender, ACT Math score, SAT Math score, college, math pretest, and ASC grade), instructor (gender, employment status, Mozart for Your Mind tape use, and ALEKS software use), and classroom (time of day, number of class meetings per week, and class size). The Marshall University Community and Technical College was the institutional site for this study. More detailed definitions follow.

Developmental Mathematics

Traditionally, developmental mathematics, which cannot be applied toward post-secondary degree requirements or graduation, has included arithmetic, elementary algebra, intermediate algebra, and geometry. For the purpose of this study, developmental mathematics is restricted to Elementary Algebra and Intermediate Algebra that are prerequisite skills for college-level mathematics. This is consistent with the definition used in the field of developmental mathematics (Parsad & Lewis, 2003). Although some of the literature still uses the term remedial mathematics, developmental mathematics is the preferred term (Saxon & Boylan, 2001) and was the term used in this study. Note that in the following descriptions from the 1999 – 2001 Marshall University Undergraduate Catalog (Marshall Community and Technical College, 2001) the preferred term, developmental mathematics, is used.

Elementary Algebra

> MAT 096 Developmental Mathematics. 4 hrs. CR/NC.
>
> To help students develop mathematical and elementary algebra skills with labs. Topics include fractions, decimals, percents, real numbers,

equations, algebraic expressions, and ratios and proportion. The graduation requirement is increased four hours for students who complete this course. (PR: ASSET or ACT; CR: ASC 099 1 hr.)

Intermediate Algebra

MAT 097 Developmental Algebra. 4 hrs. CR/NC.

To help students develop algebra skills. Topics include factoring, rational expressions, quadratics, logarithms, graphing, systems of equations/inequalities. Graduation requirement is increased four hours for students upon completion of course. (PR: MAT 096 or ASSET or ACT score; CR: ASC 099 1 hr.)

Outcomes

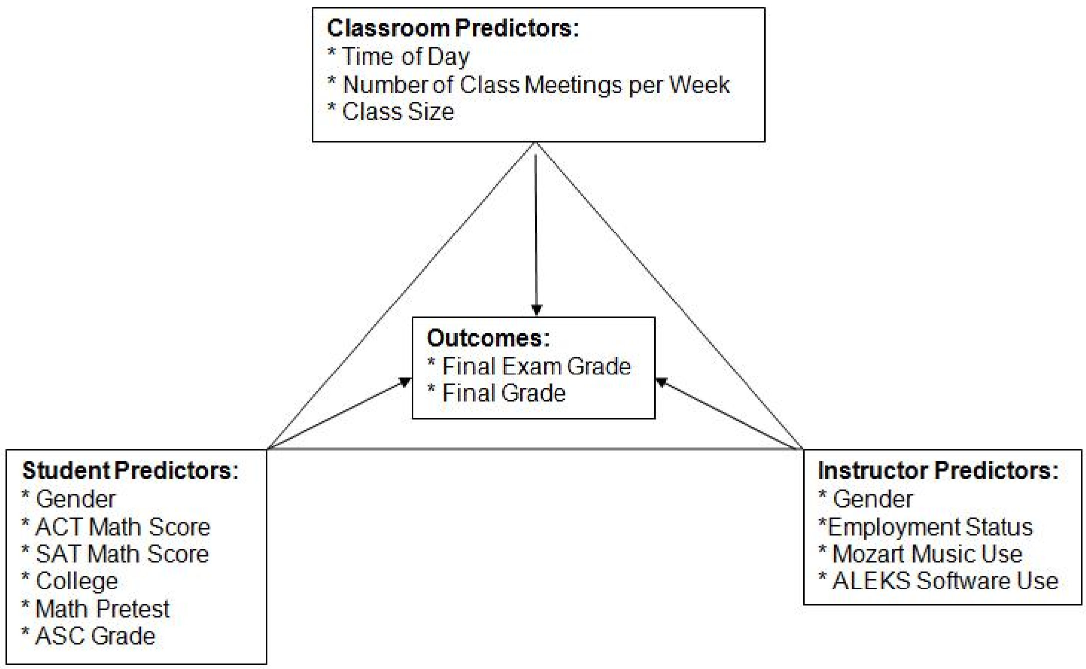
Two types of outcomes were predicted. One was the student's final grade for the class. The other was the student's grade on the final exam.

Potential Predictors

Although there are a multitude of possible predictors for success, this researcher chose 13 potential predictors. The 13 potential predictors fell into three categories. They included student characteristics, instructor characteristics, and classroom characteristics. Student potential predictors were gender, ACT Math score, SAT Math score, college in which student was enrolled (Community College compared to other colleges on the University campus), math pretest, and Academic Skills Center (ASC) grade (Credit/No Credit). The ASC was a form of supplemental instruction. Four instructor potential predictors were gender, employment status (full time or part time), use of Mozart for Your

Mind tape, and use of ALEKS software. Three classroom potential predictors included time of day, number of class meetings per week, and class size. Figure 1 shows the interaction between the independent and dependent variables.

Figure 1 Predictors of Student Success



A list of the independent variables (possible predictors) with their category and the source of their data can be found in Table 1.

Table 1 Independent Variables

Potential Predictor	Category	Source of Data
Gender	Student	Student Record
ACT Math Score	Student	Student Record
SAT Math Score	Student	Student Record
College	Student	Student Record
Math Pretest	Student	In-house test
ASC Grade	Student	Student Record
Gender	Instructor	Dept. Records
Employment Status	Instructor	Dept. Records
Mozart for Your Mind Tape Use	Instructor	Instructor
ALEKS Software Use	Instructor	Instructor
Time of Day	Classroom	Class Schedule
No. of Meetings per Week	Classroom	Class Schedule
Class Size	Classroom	Class Schedule

Community and Technical College

The site of this study was Marshall University Community and Technical College (MUCTC), which has now become Mountwest Community and Technical College (MCTC), located in Huntington, West Virginia. At the time this study was conducted, MUCTC was a two-year public community and technical college located on the Marshall University campus where students could earn associate degrees. At that time, MUCTC provided all of the developmental course offerings for Marshall University.

Problem Statement

This study selected 13 characteristics of developmental mathematics students and related them to student achievement. Through multiple regression, models were developed to predict the final exam score as well as final grade based on characteristics of developmental mathematics students, their instructors, and classrooms.

Before specifying a predictive model, stepwise regression was used to reduce the number of predictors to a smaller, more manageable number of independent variables. The data are a deidentified set of existing records for elementary and intermediate algebra students for the fall 2001 semester at Marshall University Community and Technical College (MUCTC). Therefore, this work was exempt from human subject research requirements (see Appendix A).

Purpose of the Study

The purpose of this study was to analyze specific independent variables for their ability in predicting student achievement in developmental mathematics. With this information, decisions can be made to improve the student success rate in developmental mathematics.

Research Questions

Each of the following research questions was considered separately for Elementary Algebra and for Intermediate Algebra.

Research Question One

When taken individually, which independent variables for student characteristics, instructor characteristics, and classroom characteristics predict the dependent variable of the student's final exam score, and to what extent?

Research Question Two

When taken individually, which independent variables for student characteristics, instructor characteristics, and classroom characteristics predict the dependent variable of the student's final grade, and to what extent?

Research Question Three

When taken in combinations, which independent variables for student characteristics, instructor characteristics, and classroom characteristics predict the dependent variable of the student's final exam score, and to what extent?

Research Question Four

When taken in combinations, which independent variables for student characteristics, instructor characteristics, and classroom characteristics predict the dependent variable of the student's final grade, and to what extent?

In two of the research questions, students' scores on the departmental comprehensive multiple choice final exams were used as the dependent variable. In the other two research questions, the students' final grades (Credit/No Credit) were used as the dependent variable. The departmental policy stated that 25% of the student's final grade was comprised of the final exam. By using final grades as the dependent variable, the remaining part of the students' grades (75%) was influenced by the instructors' choices. See Appendices B and C for copies of the

Elementary and Intermediate Algebra departmental syllabi for full descriptions of the instructors' choices in the remaining 75% of the students' grades. For this study, all analyses were performed using the final exam score (which is a numerical value from 0 to 100) and then all analyses were repeated using the final course grade (which is a dichotomous variable).

Significance of the Study

The significance of analyzing predictors of student achievement in developmental mathematics is important in light of the number of college students who require remediation in basic math skills. Students with a wide range of abilities attend college, including students who experience difficulty achieving success in developmental mathematics (Armington, 2002).

Procedure

This study utilized an ex-post facto research design with data from a deidentified set of existing records for elementary and intermediate algebra students from the fall 2001 semester at Marshall University Community and Technical College. The analysis used step-wise regression and multiple regression to determine whether student factors (gender, ACT Math score, SAT Math score, college, math pretest, and ASC grade), instructor factors (gender, employment status, Mozart music use, and ALEKS software use) and classroom factors (time of day, number of class meetings per week, and class size) served as predictors of student achievement, both individually and in combinations.

Risks and Potential Benefits of the Research

There was no risk of identifying specific students used in this study because the results were not reported per individual student, instructor, or classroom. The potential benefits of the research are to learn what independent variables can predict student outcomes in developmental mathematics, thereby adding to the body of literature and providing suggestions for further research.

Assumptions of the Study

The researcher made no assumptions about class rank or number of times the student had attempted to complete a course. However, it was assumed that students had graduated from high school or had a GED.

Complete Inclusion/Exclusion Criteria

Missing data commonly occur when analyzing data. PASW Statistics GradPack (Version 18) was used for the multiple regression analysis, and this software uses list-wise deletion; therefore, a student's information is deleted when there are missing data.

Summary

The purpose of this study was to identify specific predictors of student outcomes in developmental mathematics classes. In this study, developmental mathematics consisted of Elementary Algebra and Intermediate Algebra which were prerequisite skills for college-level mathematics. Thirteen potential predictors were selected from three different categories: student characteristics, instructor characteristics, and classroom characteristics. Multiple regression and binary logistic regression were used to identify characteristics that predict student outcomes. These potential predictors were analyzed individually and in combinations. Final exam scores as well as final grades were used as dependent variables in this study.

CHAPTER TWO

REVIEW OF THE RELATED LITERATURE

The literature of the following three areas was considered: student outcomes, potential predictors of student outcomes, and regression analyses of these outcomes. They will be considered separately in that order.

Student Outcomes

Grades were frequently the student outcome studied. Kenison (1986), McFadden (1986), Faro-Schroeder (1995), and Penny (1996) used student grades in remedial/developmental mathematics as the outcome. Fleming (2003) and Shalyefu (2004) used student grades in Beginning/Elementary Algebra as the outcome. Baxter and Smith (1998), Sandruck (2003), Fike (2005) as well as Fike and Fike (2007) used student grades in Intermediate Algebra as the outcome. Stephens (2005) used student grades in Elementary and Intermediate Algebra as the outcome.

Lawrence (1988) defined outcomes as a dichotomy (i.e., earning a grade of A or B in Basic Algebra was successful, whereas earning a C, D, or NC was considered unsuccessful). Long (2003) also defined outcomes as a dichotomy; earning a grade of A, B, C, or pass was successful while earning a D, F, W, or making progress but must re-enroll was considered unsuccessful. Echenique (2007) also used dichotomous outcomes; earning a grade of A, B, or C in developmental math was successful, while earning a D, F, W, X, or AU was unsuccessful. Another type of dichotomy was studied by Sundeen (2000, p. v) who looked at outcomes in two ways: first, “the normalized difference between pretest and posttest scores,” and second, the math course retention rate.

In addition to studying final grade as an outcome, Sandruck (2003) and Shalyefu (2004) also viewed outcome as a dichotomy. Sandruck (2003) viewed success as students earning an A, B, or C; otherwise, they were counted as unsuccessful. Shalyefu viewed students whose final course grade was 80% or above as successful, whereas students whose final course grade was less than 80% or who dropped out were unsuccessful.

Bershinsky (1993) defined outcomes in remedial math as a trichotomy completion (with an A, B, C, or S), unsuccessful completion (with a D, F, or U), or noncompletion (due to dropping or withdrawing). Similarly, Autrey (1998) defined outomes in developmental math as a trichotomy: completion (with an A, B, or C), nonsuccessful completion (with a D or F), or noncompletion (with a W or F due to nonattendance). Another type of trichotomy was used by Marwick (2002, p. iii) who analyzed outcomes in terms of math course completion, math course grade, “and persistence to enroll in a subsequent mathematics course.” Yet another type of trichotomy was utilized by Summerlin (2003) who used final class grades, the Texas Assessment of Skills Program test score, and success in the first college math course after remediation.

Haehl (2007) defined outcome as a trichotomy for her multinomial regression. Two of the three categories involved grades. The three categories were Pass (grade of A, B, or C), Fail (grade of D or F), and withdrawal from the course. She also used a dichotomy in which earning a final grade of A, B, or C was defined as pass whereas earning a D or F was defined as fail. Incompletes were removed from Haehl's study.

Standardized test scores were utilized as outcomes in several studies. The Descriptive Tests of Mathematical Skills in Elementary Algebra Skills scores served as Betshahbazadeh's (2001) dependent variable. Krzemien (2003) used the pretest-posttest gain score of the Asset Numerical Skills Test. For Huber (2006), the Asset Test score for Algebra I was the dependent variable that defined outcomes.

Roueche and Roueche (1999) were proponents of using departmental test scores to determine student outcomes. Walters (2003) used the final exam score on departmental tests in developmental math classes as her dependent variable. Carter (2004) utilized the pretest-posttest (both departmental tests) gain score in Basic Math as her dependent variable. In studies by Fleming (2003) and Keleher (2005), the final departmental exam score in Beginning/Elementary Algebra was the dependent variable. The final departmental exam score in Intermediate Algebra was the dependent variable for Spradlin and Ackerman (2010).

Potential Predictors of Student Outcomes

Various criteria have been used as potential predictors of student outcomes. These criteria fall into three categories as follows: student-level, instructor-level, and classroom-level predictors. They will be considered in order.

Student-level Potential Predictors

Student-level predictors are those predictors that are specific to an individual student. These included student gender, ACT Math score, SAT Math score, college, math placement/pretest score, and supplemental instruction.

Student Gender

Depending on the study, student gender was either a significant or non-significant predictor of developmental mathematics achievement. In studies by Hudson, McPhee, and Petrosko (1993), Barker (1994), Mitchell (1999), Little (2002), Fike (2005), Echenique (2007), Fike and Fike (2007), Donovan and Wheland (2008), as well as Spradlin and Ackerman (2010), females achieved higher developmental scores in mathematics than males.

Conversely, Shalyefu (2004) and Knowlton (2011) found females achieved lower developmental scores in mathematics achievement than males. MdFadden (1986), Goolsby, Dwinell, Higbee, and Bretscher (1988), Lawrence (1988), Burgess (1992), Bershinsky (1993), Penny (1996), Penny and White (1998), Hutson (1999), Sundeen (2000), Hoyt and Sorensen (2001), Krzemien (2003), Sandruck (2003), Summerlin (2003), Shonkwiler (2004), Keleher (2005), Huber (2006) and Taylor (2006) discovered gender to be a non-significant predictor of developmental mathematics achievement.

Walker and Plata (2000, p. 25) wrote, “Fewer than the expected number of males failed fundamental math and elementary algebra. Females failed fundamental math at less than the expected rate but failed elementary and intermediate algebra in greater than expected numbers.” Echenique (2007) calculated that females (70.3%) were more than twice as successful as males (29.7%) in successful completion of their developmental mathematics course. Similarly, Haehl (2007, p. 64) cited in Basic Math, “females were almost twice as likely as males to pass versus fail,” but gender was not a significant predictor of achievement in Introductory Algebra.

The majority gender plays a role in developmental math. Based on her classroom visits, Waycaster (2002) observed that the majority gender had higher class participation. For example, if a class had a majority of females, the females had higher class participation.

Another relationship involves majority gender and course level. Long (2003) noted an inverse relationship between gender majority and course level. For example, females comprised 70%, 62%, 54%, and 46% of Arithmetic, Prealgebra, Beginning Algebra, and Intermediate Algebra classes, respectively.

ACT Math Score

Bershinsky (1993), Baxter and Smith (1998) as well as Hutson (1999) showed ACT Math score to be a non-significant predictor of success. Hudson, McPhee, and Petrosko (1993, p. 10) quoted that “although male students had significantly higher ACT mathematics and placement test scores, female students earned higher grades in mathematics courses.” Stephens (2005), recorded no significant correlation between a student’s final grade in Elementary Algebra and ACT Math score. However, he found a significant correlation (.322 with $p < .001$) between a student’s final grade in Intermediate Algebra and ACT

Math score. Donovan and Wheland (2008) revealed ACT Math score to be significant.

> We have found that the ACT Mathematics and COMPASS Domain I (Algebra) Placement scores both correlate well with success in the Intermediate Algebra course and that, although females have lower placement test scores than males, they have a higher success rate in the course. (Donovan & Wheland, 2008, p. 2)

Shonkwiler (2004) used the College Board's concordance table to convert SAT Math scores to ACT Math scores. She acknowledged ACT Math score to be a significant predictor (p = .01) of student grade in first college-level math course after completing developmental math. Stephens (2005) converted SAT scores to "equivalent" ACT scores; how the conversion was made was not disclosed. Dorans (1999, p. 14), principal measurement specialist at Educational Testing Service, states that even though there is a correlation between the ACT Math and the SAT Math, and a concordance has been developed, they "should not be used interchangeably." He contends that different skills are being tested in each standardized test. For example, the SAT Math covers reasoning in arithmetic, algebra, and geometry, while the ACT Math covers pre-algebra, elementary algebra, intermediate algebra, coordinate geometry, plane geometry, and trigonometry.

SAT Math Score

Kenison's (1986) private college and Lawrence's (1988) university studies ascertained SAT Math score to be a significant predictor of developmental mathematics student achievement. In their regression analyses, both used grades as their dependent variable; Kenison's (1986) level of significance was $p = .0219$, while Lawrence's (1988) level of significance was $p < .01$.

McFadden (1986) concluded that SAT Math score was not a significant predictor of developmental math course grade. Keleher (2005) found that SAT Math score was not a significant predictor of final exam score in Elementary Algebra. The SAT Math score was used for placement into Intermediate Algebra in Taylor's (2006) study, rather than being one of her independent variables.

In Howland's study comparing self-paced, small classes, and large classes, he converted ACT scores to SAT scores using a conversion chart "prepared by the Chief of Naval Education and Training, United States Navy, Pensacola, Florida" (1991, pp. 71-72). Again, Dorans (1999) at the Educational Testing Service states that ACT and SAT scores are not interchangeable.

College

Long's (2003) data source included major, but major was not one of her independent variables. Taylor's (2006) study included participants from three colleges and two universities. The college students formed the control group which received traditional lecture instruction, and the university students formed the experimental group which received self-paced computer instruction. However, Taylor (2006) did not compare the students within their respective institutions.

Math Placement/Pretest Score

Several researchers used math placement tests or math pretests as their predictor variables. Baxter and Smith (1998) as well as Hutson (1999) indicated that placement test scores were non-significant predictors of developmental mathematics students' achievement. Conversely, studies by Lawrence (1988) and Little (2002) have shown in-house placement test scores to be significant predictors of students' achievement. Similarly, Shalyefu (2004) has shown in-house pretest scores to be significant predictors of students' achievement. In her study, Carter (2004) used pretest-posttest gain score but demonstrated no significant difference in her control group, which was a traditional lecture course, and her experimental group, which combined lecture with ALEKS software.

Little's (2002) in-house placement test, known as the Algebra Basic Skills Test (ABST) had 25 questions. This multiple-choice test had four choices and was administered on the first day of class. The results of the test could be used to change placement. Little (2002, pp. 8-9) makes the following summary, "Given that the majority of the students enrolled in Introductory Algebra for the Fall semester of 2001 took the computerized in-house placement test, it can serve as a common measure for prior mathematics achievement for these students."

Supplemental Instruction

The literature reports that institutions often utilize some form of supplemental instruction in their classes. For example, Penny (1996) suggested including student support services as an independent variable to explain differences in student achievement. It was also asserted that andragogy which included discussion, out-of-class tests, as well as use of calculators, manipulatives, and "…discovery-interactions with the instructor…" (Baxter & Smith, 1998, p. 278) were significant predictors for Intermediate Algebra grades. Little (2002, p. 86) said, "Quantity of instruction should not only be measured by the amount of time in class, but also by the time spent out of class in computer labs, tutoring sessions, study skills courses, or other intervention programs" in her suggestions for future research.

According to Casazza and Silverman (1996, p. 109), "…when tutoring is delivered by trained tutors, it is the strongest correlate of student success; however, when tutors are not trained, there is no correlation with academic performance." Webster (2005, p. v) stated "Students who participated in tutoring at the math tutoring center had much closer to an equal chance of passing the course than students who did not participate in interventions." Conversely, Barker (1994, pp. x-xi), proposed that studying in a math lab and viewing math videos "were associated with lower achievement."

Instructor-level Potential Predictors

Instructor-level predictors are those factors that are specific to a particular instructor. These include instructor gender, instructor employment status, instructor's use of music in class, and instructor requiring use of computer software.

Instructor Gender

Penny (1996), Penny and White (1998), and Hewitt (2001) accounted for female instructors' positive effect on the final course grades of developmental mathematics students. Although Waycaster (2002) observed that the majority student gender had higher class participation (i.e., if a class had a male majority, the males had higher class participation) she observed two exceptions. In one class, there were a majority of males with a female instructor and a higher participation by female students. In another class, there were a majority of females with a male instructor and a higher participation by male students.

Instructor Employment Status

In studies in which instructor employment status was used as a predictor of developmental mathematics students' success, Burgess (1992) and Penny (1996) contended that part-time instructors had a significant positive effect on developmental mathematics student achievement whereas Fike (2005) as well as Fike and Fike (2007) named employment status to be a non-significant predictor of developmental mathematics students' success.

Maxwell (1997, p. 271) stated that "although students earn higher grades from part-time instructors who teach remedial courses, they do less well in mainstream math courses than those who complete remedial courses taught by full-time math teachers." Conversely, Hewitt (2001) disclosed that although developmental mathematics students earned a greater percent of passing grades (A, B, or C) from their adjunct instructors, they do the same in college-level mathematics courses compared to the developmental mathematics students taught by full-time mathematics instructors.

Music

It has been suggested that listening to music may help students perform better on math tests. Betshahbazadeh (2001) compared students who listened to 15 minutes of Mozart's music before a standardized exam, students who listened to 15 minutes of Tejano music before a standardized exam, and students who did not listen to music before a standardized exam. The standardized exam was "The Descriptive Tests of Mathematics Skills in Elementary Algebra Skills from the College Board's Multiple Assessment Programs and Services" (Betshahbazadeh, 2001, p. iv). He surmised that listening to music before an exam did not impact performance.

Walters (2003) compared the final exam results of students who listened to music during the final exam to students who did not listen to music during the final exam. She too showed that there was no difference between the experimental and control groups.

Computer Software Use

Krzemien (2003) pointed out that students who had a lecture-discussion Basic Arithmetic course had a significantly higher gain score on their pretest-posttest Asset Numerical Skills Test than students who had only computer-based instruction. Conversely, Sandruck (2003, p. 94) made the distinction that 78% of only Computer-Based Instruction students passed Intermediate Algebra compared to 66% of Teacher-Led Instruction; however, "this difference was not statistically significant for this sample."

The ALEKS Web site defines ALEKS: "**A**ssessment and **LE**arning in **K**nowledge **S**paces is a Web-based, artificially intelligent assessment and learning system (What is ALEKS?, 2010)." For Beginning Algebra students, Fleming (2003) denoted no statistical difference between grades for Beginning Algebra students who learned with ALEKS and those who learned in a traditional lecture format. However, when final exam scores were used as the dependent variable, Fleming (2003) noticed that students experiencing Beginning Algebra with traditional instruction earned higher final exam scores compared to students using ALEKS as their mode of instruction.

For Intermediate Algebra students, Carter (2004) as well as Spradlin and Ackerman (2010) agreed that there was no statistically significant difference between students in the lecture group and students who received lecture and computer-assisted instruction outside of class. Taylor (2006) presented no statistical difference between Intermediate Algebra students who learned with ALEKS and Intermediate Algebra students who learned in a traditional lecture setting.

Potential Classroom-level Predictors

Classroom-level predictors are those predictors that are specific to the classroom and are part of the learning environment. These included class time of day, number of class meetings, and class size. Each will be considered separately.

Class Time of Day

Although the focus of the study by Burgess (1992) was adjunct instructors compared to full-time instructors, he also studied classroom factors such as daytime students compared to nighttime students. He argued that, compared to full-time instructors, adjunct instructor daytime Introductory Algebra students had a greater chance of completion and had a greater chance of taking Intermediate Algebra. Conversely, Sandruck (2003) designated a negative correlation between daytime students and final grade in Intermediate Algebra.

Although daytime sections and nighttime sections were mentioned by Stephens (2005), data on this variable were not collected. In his recommendations for future research, he suggested using time of day as a factor. Fike (2005) also made specific mention of adding class time of day to the predictors in his suggestions for further research.

Number of meetings per week

Fike (2005) considered the number of class meetings to be a significant predictor of student achievement. In his study, Intermediate Algebra students who met once a week for a total of 150 minutes performed better than students who met twice a week for 75 minutes each time. Conversely, Sundeen (2000) examined no difference in student achievement between students who had a class that met twice a week compared to students who had a class that met three times per week. In a study by Sandruck (2003), day classes met two, three, or four times per week while evening classes met twice a week. However her predictor was time of day rather than number of class meetings.

According to Dr. Hunter Boylan (personal communication, July 10, 2000), Director of the National Center for Developmental Education, “A class that meets five days per week will have a higher absence rate than a class that meets three days per week. This situation could be corrected with a well-enforced attendance policy.” These statements are based on Boylan’s visits to college campuses and his interpretations of their statistical data. Conversely, keeping course credit hours constant at five credit hours, Waycaster (2002) observed classes meeting two, three, four, and five days per week; class meetings that included a break at the halfway point had poor attendance after the break.

Carter (2004) mentioned that one control and one treatment group met three days a week while another control and treatment group met two days a week. However, she did not use number of class meetings as one of her independent variables in her study of supplementing lecture with ALEKS software.

Class Size

Howland’s (1991) study compared three groups: self-paced/self-study, small (less than 30 students) classes, and large (between 200 and 300 students) classes and found significant differences between total credit hours earned to date and overall GPA. The self-paced/self-study students were the worst performers who, on average, completed 13.1 credit-hours and earned a 0.857 GPA. On average, students in large classes completed 19.8 credit-hours and earned a 1.555 GPA, while students in small classes completed 29.4 credit-hours and earned a 1.598 GPA.

Baxter and Smith (1998) as well as Little (2002) were in agreement on class size as non-significant. Baxter and Smith's (1998) study involved four groups: small (32 students) traditional class, large (100 students) traditional class, small (32 students) class with daily quizzes and 10 hourly exams outside of class, and a large (240 students) class which included a workshop with discovery learning using calculators and manipulatives. Little (2002) reported a mean class size of 34 with a standard deviation of 7. Her minimum class size was 19 while her maximum was 50.

Smith, O'Hear, Baden, Hayden, Gorham, Ahuja, and Jacobsen (1996) made the following recommendation about class size.

> The bigger the class, the less the opportunity to engage students, the greater the opportunity to use the lecture method, the easier for students to remain loners. Sections of 20 are far more likely to produce significant involvement than sections of 40. (p. 41)

Although Waycaster (2002) observed class size ranging from 12 – 30 students, she did not report on the success of these students in relation to the size of their class.

Regression Analyses

Several researchers (see Appendix D) have used regression to study achievement predictors in developmental mathematics. The simplest regression is linear regression, which involves fitting a line to a set of data so that the equation of the line will predict the outcome. According to Allen and Bennett (2010, p. 177), the purpose of multiple regression is, "To examine the linear relationship between one continuous criterion (or dependent) variable, and two or more predictor (or independent) variables. Predictor variables can be either continuous or dichotomous." Logistic regression is a type of multiple regression. Binary logistic regression is used when there are two possible outcomes (such as pass or fail), and multinomial logistic regression is used when there are more than two possible categorical outcomes such as the trichotomies that were discussed at the beginning of this chapter: pass, fail, and fail due to nonattendance.

According to Allen and Bennett (2010, p. 185) in multiple regression, "R^2 represents the proportion of variance in the criterion that can be accounted for by the predictor variables in combination." The higher the value of R^2, the better the multiple regression equation is at modeling the relationship between the significant independent variables and the dependent variable.

In Kenison's (1986) study of a private nonprofit co-ed business college, R^2 = 17%. This means that 83% of the variation in remedial mathematics grades cannot be explained by high school grade point average (p = .0096) and SAT Math scores (p = .0219), which were significant independent variables. She suggested exploring other predictors such as age, self-discipline, determination, gender, motivation, learning style, and attitude toward mathematics to explain the variation.

In Lawrence's (1988) study of university students, R^2 = 25%. This means that 75% of the variation in Basic Algebra grades cannot be explained by the significant (p < .01) independent variables of placement test scores, SAT Math scores, and high school grade point average. Although she gave recommendations for further study, such as replicating her study, she gave no suggestions for additional predictor variables.

In Penny's (1996) study of four-year institutions, R^2 = 16% means teacher attributes predict students' performance in developmental mathematics. This means that 84% of the variation in grades cannot be explained by the significant independent variables of employment status and teacher gender. Penny (1996) also found R^2 to be 21% for student attributes predicting students' performance in developmental mathematics, meaning that 79% of the variation in grades cannot be explained by the significant independent variables of race, age, and enrollment status. In the conclusion of the study, Penny (1996) states

> The unexplained variance in the model suggests that there are other variables that were not included in the model that may explain the variance in students' performance in developmental mathematics…a revised model could include variables such as student preparation, goals and institutional commitments and characteristics, faculty-student ratio, and student support services. These variables may account for the unexplained variance. (pp. 72-73)

In Little's (2002) study of urban community college students, R^2 = 40%. This means that 60% of the variation in introductory algebra grades cannot be explained by the significant ($p < .01$) independent variables of cumulative college grade point averages, math prerequisite status, in-house placement test, student gender, math attitude, race, or instructor. She suggested exploring other independent variables such as high school math course grade point average, high school class rank, high school grade point average, learning styles, learning environments, interaction between students, interaction between students and instructor, interaction between students and the institution, instructor andragogy, instructor grading policies, instructor qualifications, and instructor experience. Furthermore, she suggested using departmental exams as the dependent variable because "…more standardized grading practices might help alleviate some of the inconsistency in grading procedures and some of the research limitations associated with relying on final grades as the dependent variable" (p. 88)

For first college-level math course after completing developmental math, Shonkwiler (2004) found R^2 to be 17%. This means that 83% of the variation in final grades cannot be explained by the significant independent variables of Math 1 grade (p = .01), ACT Math score (p = .01), and high school grade point average (p = .004).

In Fike's (2005) study of community college students, R^2 = 5%. This means that 95% of the variation in Intermediate Algebra grades cannot be explained by his independent variables of number of class meetings (p = .031), race (p = .029), gender (p = .036), or age (p < .001).

Stephens (2005) used stepwise multiple regression in his study of state university students. For Elementary Algebra, R^2 = 25.6% means that 74.4% of the variation in Elementary Algebra grades cannot be explained by his independent variables, which are the number of high school math classes at or above Algebra I and overall high school grade point average. For Intermediate Algebra, R^2 = 17.2%, means 82.8% of the variation in Intermediate Algebra grades cannot be explained by his significant independent variables, which are ACT Math score and overall high school grade point average.

Haehl (2007) used multinomial logistic regression, so R^2 is not reported. For Basic Math, Haehl (2007) found that 7% of the total variance in Basic Math grade was attributed to Compass Reading score, Compass Math score, ethnicity, and gender. For students in Introductory Algebra, 19% of the variance in the Introductory Algebra grade could be predicted by Basic Math grade.

The eight researchers above surmised that independent variables were missing from their analyses. They thought model specification error was due to lacking appropriate predictors to explain some of the variance.

Summary

The researcher reviewed literature concerning definitions of student outcomes, potential predictors of student outcomes, and types of regression analyses. Student outcomes were defined in the literature several ways. Studies reviewed used grades, dichotomy, trichotomy, completion, persistence, Asset Test score for Algebra I, pretest-posttest gain score of the ASSET Numerical Skills Test, Descriptive Tests of Mathematics Skills in Elementary Algebra Skills, and the final exam score on a departmental test. Potential predictors of student outcomes or independent variables included variables at the student level, the instructor level, and the classroom level. Student-level variables such as gender, ACT Math score, SAT math score, college in which student is enrolled, math placement/pretest score, and forms of supplemental instruction were discussed. Instructor-level variables of gender, employment status, use of music, and use of computer software were reviewed. Classroom-level variables of time of day, number of meetings per week, and class size were also reviewed. Regression analyses reviewed included linear regression, multiple regression, multinomial logistic regression, and logistic regression.

CHAPTER 3

METHODOLOGY

This study utilized an ex-post facto research design (Kerlinger, 1986; Tuckman, 1988). Rather than designing an experiment to match the data, the data were analyzed after the study was designed, in order to determine what impact the predictors had on the outcome.

Course Descriptions

Elementary and Intermediate Algebra were four credit hour/five contact hour courses because one of the credit hours was considered to be a lab hour that met for two contact hours. Both Elementary and Intermediate Algebra incorporated lecture and cooperative learning activities. Students were assigned homework from their respective textbooks: *Principles of Elementary Algebra with Applications* (Nustad & Wesner, 1991a) and *Principles of Intermediate Algebra with Applications* (Nustad & Wesner, 1991b). In addition, students were required to register for a co-requisite course, ASC 099: Independent Study Skills, a one hour credit/no credit course.

In addition to the co-requisite course, ASC 099, developmental algebra courses also included an in-class lab component. The students were charged a lab fee to cover the cost of the departmentally-developed lab manuals and lab materials. The lab manuals included the syllabi which included course objectives and a weekly course outline, a math study skills section, study sheets on vocabulary and main concepts, hands-on/cooperative learning activities, problem sheets for videos, puzzles, and final exam review questions.

A minimum of five lab activities were chosen for use by the instructors from the departmentally-developed lab manuals. These manuals drew on cooperative learning activities from a similar text by the authors Harry L. Nustad and Terry H. Wesner: *Cooperative Learning for the College Mathematics Classroom: Elementary Algebra* (1996a), and *Cooperative Learning for the College Mathematics Classroom: Intermediate Algebra* (1996b). Both books were written by Signe Kastberg. Data were not collected for the lab variable.

In-class math lab activities included study skills, manipulatives, and games. In addition, the labs included small-group analyses of common student errors, critical thinking, and real-life application problems. Some instructors incorporated technology into their labs by using graphing calculators and computer software.

Placement

Students were placed into developmental mathematics classes based on their ACT Math scores. An ACT Math score between 12 and 15 placed a student in Elementary Algebra, while a score between 16 and 18 placed a student in Intermediate Algebra.

Student Outcomes

Although there were common elements to the syllabi for Elementary and Intermediate Algebra, instructors varied in how they computed final grades. The number of tests, as well as their percent of the final grade, differed. A number of hands-on mathematics activities from departmentally-developed manuals comprised between 10 and 15 percent of the final grade. Students were required to complete a minimum of five activities from the aforementioned manual. Thus, the number of activities, as well as the percent of the final grade, varied. Daily work or quizzes were optional and were worth between zero and five percent of the final grade. Thus, daily work or quizzes, as well as their percent, were optional in computing the final grade. The common comprehensive departmental final exam represented 25% of the student's final grade. Students who earned a 75% or higher final average received Credit (CR); otherwise, they received No Credit (NC). Part of this study's purpose was to examine the impact of the instructors' decisions on the remaining 75% part of students' grades.

Elementary Algebra and Intermediate Algebra at MUCTC were designated as Credit or No Credit. Credit was awarded when a student's overall average was a 75% or above; otherwise, the student earned No Credit. In this study, the final grade was coded as a dummy variable, credit was coded as a 1, and noncredit was coded as a 0. The final exam score was based on a 100 point scale. This provided more detail in analysis than a simple Credit / No Credit system. The final exam score was coded as a number between 0 and 100.

Potential Predictors of Student Outcomes

The potential predictors of student outcomes investigated were grouped in one of the following categories: student, instructor, or classroom. Each category of predictor is considered in detail below.

Potential Student-level Predictors

The potential student-level predictors used in this study included student gender, ACT Math score, SAT Math score, college, math pretest score, and ASC grade. Each will be considered separately.

Student Gender

Student gender, coded as a dummy variable, was gathered from department records. Females were coded as 0 and males were coded as 1.

ACT Math scores

SAT Math scores were not converted to ACT Math scores. The ACT Math score was coded as a number between 6 and 22. These data were obtained from student records.

SAT Math Score

ACT Math scores were not converted to SAT Math scores. The SAT Math score was coded as a number between 200 and 530. These data were obtained from student records.

College

In this study, community college students were compared with students in other colleges from Marshall University. College, coded as a dummy variable, was obtained from department records. Community College students were coded as 1 and University students were coded as 0.

Math Pretest

The MUCTC pretests were based on the “Pretest of Prerequisite Skills” from the texts *Elementary Algebra: A Prerequisite for Functions* (Abney, Mowers, Calland, & Crowley, 1999), and *Intermediate Algebra: An Introduction to Functions Through Applications* (Abney, Crowley, Mowers, & Calland, 1999). They were administered on the first day of class. The data were collected to determine if there was a correlation between pretest scores and final exam scores (see Appendix E). The 20 question objectives along with descriptive statistics for both the Elementary Algebra and Intermediate Algebra pretests may be found in appendices F through K. Due to security issues, the pretests are not included in the appendices.

Supplemental Instruction

MUCTC's ASC course was a form of supplemental instruction. ASC 099: Independent Study Skills was a one hour, Credit/No Credit, co-requisite course for Elementary Algebra as well as Intermediate Algebra. In order for students to receive credit, they had to spend at least 15 hours (approximately one hour per week) in the Academic Skills Center (ASC) during the semester. At the ASC, students watched instructional videos by Elayn Martin-Gay (Videotape series to accompany Nustad and Wesner, Principles of Elementary Algebra with Applications, 2nd ed., 1991, 1990a; Videotape series to accompany Principles of Intermediate Algebra with Applications, 2nd. ed., 1991, 1990b) which accompanied their text, used computer tutorials, worked cooperatively with other students, or received assistance from mathematics tutors.

Potential Instructor-level Predictors

Potential instructor predictors for student outcomes included gender, employment status, use of Mozart for Your Mind tape, and use of ALEKS software. Each is considered separately below.

Instructor Gender

Instructor gender came from department records and was coded as a dummy variable. It was coded the same as student gender, 1 for males and 0 for females.

Instructor Employment Status

Instructor employment status was taken from department records and was coded as a dummy variable. Full-time instructors were coded as a 0 and adjunct instructors were coded as 1.

Mozart for Your Mind Tape Use

One instructor played the tape Mozart for Your Mind (1990) before, between, and after classes. Music tape use was coded as a dummy variable. Using the tape was coded as a 1, and not using the tape was coded as a 0.

ALEKS Software Use

Software use was coded as a dummy variable. Using the software was coded as a 1, and not using the software was coded as a 0.

Potential Classroom-level Predictors

Potential classroom predictors of student outcomes included class time of day, number of class meetings, and class size. Each will be described separately.

Time of Day

Although the beginning time of class was in the original data set, in order to simplify the categorical variable, the classes were coded as a dichotomous variable (i.e., a.m. or p.m. classes). Classes starting between 8 a.m. and noon were considered to be a.m. classes and were coded as 1 whereas classes starting between 12:15 p.m. and 6:30 p.m. were considered p.m. classes and were coded as 0.

Number of Class Meetings

For the Elementary Algebra data set, the number of class meetings was two, four, or five times per week. For the Intermediate Algebra data set, the number of class meetings ranged from two to five times per week.

Class Size

Class size was coded according to the number of students who took the pretest on the first day of class. Class size ranged from 11 to 44 students.

Research Design

The census of all developmental mathematics students from the fall 2001 semester from MUCTC was used. Additionally, the Elementary and Intermediate Algebra groups were compared for similarities and differences in predicting final exam scores and final grades using stepwise regression and binary logistic regression to analyze potential predictors of student achievement individually, as well as in combinations.

Data Collection

The following student data were collected from student records: gender, ACT Math score, SAT Math score, college in which student was enrolled, and ASC grade. The departmentally-developed pretest and final exam scores were obtained from the SAS reports from Marshall University. The instructor data, gender, and employment status were garnered from departmental records. The classroom data for time of day, number of class meetings, and class size were extracted from the class schedule.

One full-time instructor used the Mozart for Your Mind tape in one of her Elementary Algebra and two of her Intermediate Algebra classes. One full-time, male instructor used ALEKS in two of his Intermediate Algebra classes.

Instrumentation

In addition to ACT Math and SAT Math scores, four departmentally-developed, multiple-choice assessments were used. Elementary Algebra and Intermediate Algebra each used 20-question pretests which were administered and scored electronically on the first day of class. Therefore, no make-up tests were given which resulted in missing data. Students had no more than 45 minutes to complete the pretest.

The Elementary Algebra final exam had 50 questions, which were drawn from two textbook supplements: the book *Quiz Item File* (Nustad & Wesner, 1987a), the book *Test Item File* (Nustad & Wesner, 1987b) and MUCTC faculty. The Intermediate Algebra final exam had 40 questions which were drawn from the textbook supplement *Test Item File* and *Quiz Item File* (Smith H. M., 1987), MUCTC faculty, and Marshall University faculty. The questions for the two pretests and the two final exams were multiple choice with four possible answer choices for each question. Because the final exam was approximately twice as long as the pretests, students had two hours to complete the final exam. The final exam was administered during final exam week.

These departmentally-developed pretests and final exams are criterion-referenced (objective-referenced) tests, with scores representing the percent of questions answered correctly. Due to security issues, copies of these assessments are not included in the appendices. The pretest skills being tested for Elementary and Intermediate Algebra are included in Appendices H and K. The Elementary and Intermediate Algebra topics, number of class days, and number of questions on the final exam are included in Appendices P and Q.

Departmentally-Developed Test Validity

The pretests and final exams possessed criterion validity because the questions were written by math instructors. The Elementary Algebra and Intermediate Algebra pretests and final exams were written by full-time Elementary Algebra and Intermediate Algebra instructors. The Intermediate Algebra final exam also had questions written by Marshall University full-time mathematics faculty. Therefore, they possess content validity. Additionally, content outlines were created for the pretests and final exams, which was another way to ensure content validity. The Elementary Algebra and Intermediate Algebra pretests also have concurrent validity, which relates achievement on the pretest with achievement on the Math portion of the ACT.

Data Analysis

The data were analyzed using linear regression, stepwise regression, multiple regression, and binary logistic regression using PASW Statistics GradPack (Version 18) (2009). The first and third research questions were analyzed with multiple regression due to the final exam score being a continuous dependent variable. The second and fourth research questions employed binary logistic regression due to the dependent variable (final grade) being a dichotomy. A summary of the coding of the independent variables can be found in Table 2.

Table 2 Independent Variables

Predictor	Category	Coded as
Gender	Student	1 for males, 0 for females
ACT Math Score	Student	a number between 6 and 22
SAT Math Score	Student	a number between 200 and 530
College	Student	1 for community college student, 0 otherwise
Math Pretest	Student	a number between 5 and 90
ASC Grade	Student	1 for Credit, 0 for No Credit
Gender	Instructor	1 for males, 0 for females
Employment Status	Instructor	1 for adjuncts, 0 for full time
Mozart Tape	Instructor	1 for tape use, 0 for not using tape
ALEKS Software	Instructor	1 for software use, 0 for not using software
Time of Day	Classroom	1 for a.m., 0 for p.m.
Number of meetings/wk	Classroom	a number between 2 and 5
Class size	Classroom	a number between 11 and 49

A summary of the coding of the dependent variables can be found in Table 3.

Table 3 Student Dependent Variables

Variable	Coded as
Final Exam	a number between 0 and 100
Final Grade	1 for Credit, 0 for No Credit

Errors in Hypothesis Testing

Two types of incorrect decisions occur in hypothesis testing. A Type I error occurs when a true null hypothesis is rejected whereas a Type II error occurs when a false null hypothesis is erroneously accepted. In this study, a Type I error corresponds to acknowledging the independent variables (student, classroom, or instructor) as being predictors of the student's final exam score or final grade when in fact they are not predictors. A Type II error corresponds to not acknowledging the independent variables (student, classroom, or instructor) as being predictors of the final exam score or final grade when in fact they are.

Level of significance

The level of significance, as denoted by α, is the maximum probability of making a Type I error. In this study, $\alpha = .05$. This corresponds to a 5% chance of making a Type I error.

Limitations

Care should be taken when generalizing this study to other institutions such as private institutions or institutions offering a different developmental mathematics curriculum. Students in this study may be more representative of the Appalachian region of the country as opposed to students from urban areas.

Additionally, MUCTC was a community and technical college located on a university campus.

Because the dependent variables in this study included final exam score and final grade, only student records that included these two measures could be used in the multiple regression analysis. These reasons may limit the generalizability of this study.

Summary

The data groups are Elementary Algebra and Intermediate Algebra students from MUCTC for the fall 2001 semester. The data were collected from student records, Marshall University SAS reports, departmental records, and class schedules. Students were placed in Elementary Algebra and Intermediate Algebra by their ACT Math and SAT Math scores, although this was not strictly enforced. Students who were not properly placed were informed on the first day of class that they needed to drop the incorrect course and add the correct course. Some students were not able to add the correct class to their schedules, so they stayed in their incorrect placement. The instrumentation included departmentally developed pretests and final exams. Departmentally-developed pretests and final exams exhibit criterion validity, content validity, and concurrent validity. The data were analyzed using PASW Statistics GradPack (Version 18). Type I and Type II errors in hypothesis testing were defined and related to this study. The level of significance was chosen as $\alpha = .05$. Limitations of this study are due to missing data. This study analyzed data using multiple regression and binary logistic regression.

CHAPTER 4

FINDINGS

The major purpose of this study was to analyze specific predictors that impact student achievement in developmental mathematics. The data group used in this study was comprised of 11 sections of Elementary Algebra with a total of 198 students and 28 sections of Intermediate Algebra with a total of 526 students for the fall 2001 semester. The study identified characteristics of developmental mathematics students as related to achievement. Through multiple regression, models were developed to predict the final exam score as well as final grade based on characteristics of developmental mathematics students, their instructors, and classrooms.

Research Questions

Each of the following research questions will be discussed separately in this chapter for Elementary Algebra and for Intermediate Algebra.

Research Question One

When taken individually, which independent variables for student characteristics, instructor characteristics, and classroom characteristics predict the dependent variable of the student's final exam score, and to what extent?

Research Question Two

When taken individually, which independent variables for student characteristics, instructor characteristics, and classroom characteristics predict the dependent variable of the student's final grade, and to what extent?

Research Question Three

When taken in combinations, which independent variables for student characteristics, instructor characteristics, and classroom characteristics predict the dependent variable of the student's final exam score, and to what extent?

Research Question Four

When taken in combinations, which independent variables for student characteristics, instructor characteristics, and classroom characteristics predict the dependent variable of the student's final grade, and to what extent?

Discussion of Research Questions

Each of the four research questions was considered separately for Elementary Algebra and Intermediate Algebra. The research questions are restated along with their results. Descriptive statistics for the predictors and outcomes can be found in Appendix R. Final course grades for Elementary and Intermediate Algebra were broken down in terms of the percent of passing and failing grades. For student gender, the number and percent were given for both courses. A distribution of math ACT scores was given for both groups of students. A comparison was given for number of students who had both SAT and ACT math scores verses the number of students who had only a math SAT score. The number of Elementary and Intermediate Algebra student community college enrollment was presented in terms of percent. Detailed pretest result summaries and descriptive statistics are included in Appendices F through K. ASC final course grades were explained in terms of number and percent of passing and failing grades.

Tables for instructor-level potential predictors compared the number and percent of instructors in terms of gender, employment status, Mozart music use, and ALEKS software use. Potential classroom-level predictors compared the number and percent of sections in terms of a.m., p.m., and self-paced as well as number of class meetings. Additionally, the ranges were given for class size.

Discussion of Research Question One

When taken individually, which independent variables for student characteristics, instructor characteristics, and classroom characteristics predict the dependent variable of the student's final exam score, and to what extent?

Because the final exam score is a continuous variable, simple regression was used to analyze the data. Simple regression results with final exam score as the dependent variable for Elementary Algebra is detailed in Table 4. Statistically significant predictors are in bold. Interpretation of the results follows. SPSS output is included in Appendix S.

Table 4 Elementary Algebra Simple Regression

Predictor	R	R^2	F (sig.)	Constant (sig.)	B (sig.)
Student					
Gender	.035	.001	.204 (.652)	65.582 (.000)	-.985 (.652)
ACT Math	**.238**	**.057**	**7.616 (.007)**	**28.430 (.032)**	**2.465 (.007)**
SAT Math	.067	.004	.036 (.854)	73.473 (.173)	-.027 (.854)
MUCTC Student	**.174**	**.030**	**5.223 (.024)**	**67.792 (.000)**	**-4.879 (.024)**
Pretest	**.370**	**.137**	**26.489 (.000)**	**52.349 (.000)**	**.307 (.000)**
ASC Grade	.036	.001	.214 (.644)	66.500 (.000)	-1.547 (.644)
Instructor					
Gender	.147	.022	3.687 (.057)	63.615 (.000)	4.285 (.057)
Adjunct	**.192**	**.037**	**6.373 (.013)**	**62.659 (.000)**	**5.366 (.013)**
Mozart Use	.042	.002	.296 (.587)	64.863 (.000)	1.537 (.587)
Classroom					
a.m.	.018	.000	.051 (.821)	65.056 (.000)	.511 (.821)
No. of Meetings	**.172**	**.030**	**5.121 (.025)**	**71.618 (.000)**	**-1.82 (.025)**
Class Size	.106	.011	1.896 (.170)	60.972 (.000)	.122 (.170)

Simple regression results with final exam score as the dependent variable for Intermediate Algebra is detailed in Table 5. Statistically significant predictors are in bold. Interpretation of the results follows. SPSS output is included in Appendix S.

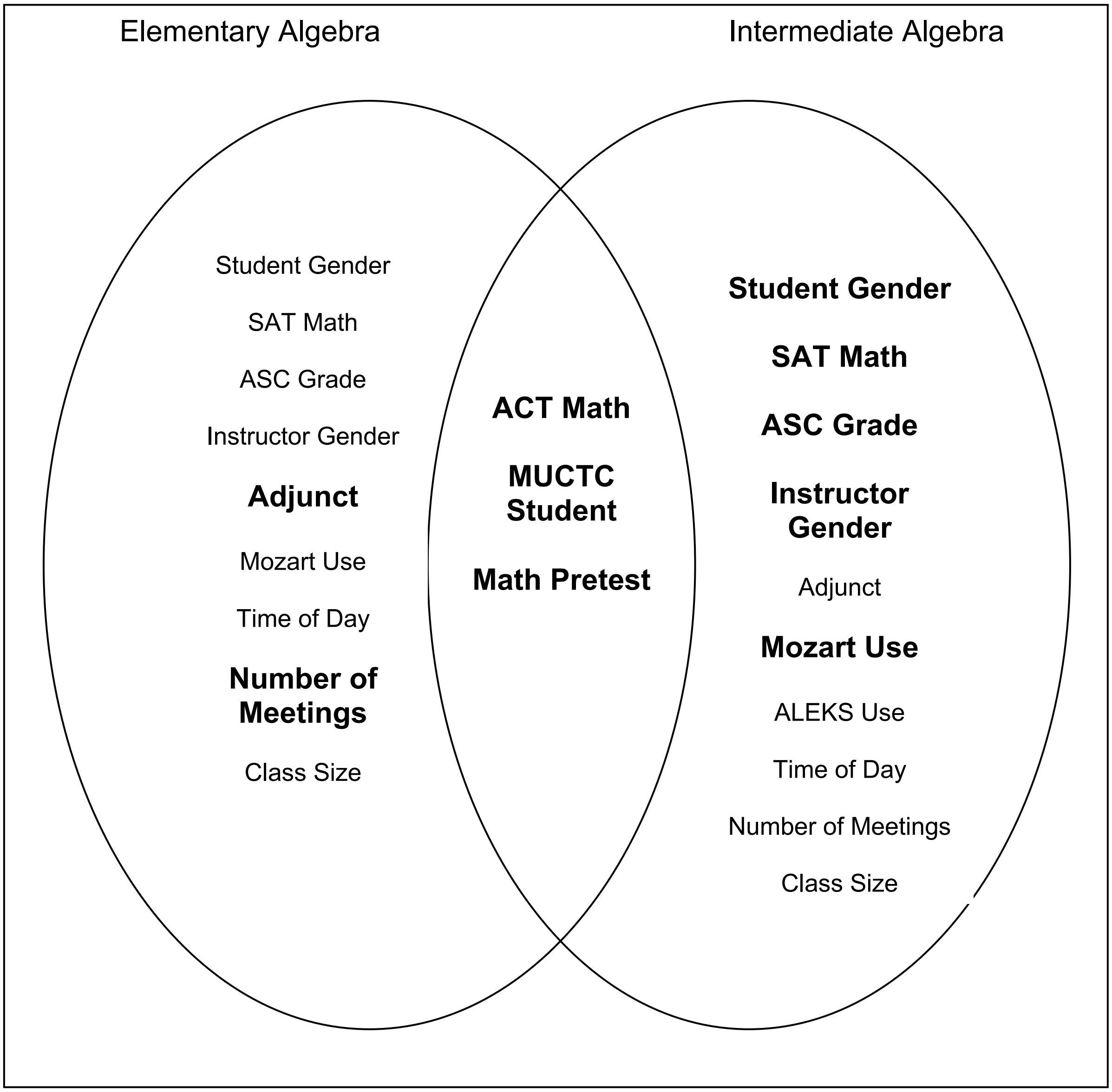
In each of these simple regressions, there is only one predictor. Thus, R represents the simple correlation between a predictor variable and the final exam score. The value of R^2 accounts for the percent of variation in the final exam score explained by the predictor. For example, in Elementary Algebra, the predictor variable ACT math score, the value of $R^2 = .057$, means that ACT math score can account for 5.7% of the variation in final exam score. The constants and B values provide the coefficients for the regression equations. Again, using Elementary Algebra, ACT math score predictor, predicted Final Exam Score = 2.465(ACT Math Score) + 28.430. The interpretation of this equation is that for each point that the ACT math score increases, the final exam score increases by 2.465 points.

Table 5 Intermediate Algebra Simple Regression

Predictor	R	R^2	F (sig.)	Constant (sig.)	B (sig.)
Student **Gender**	**.149**	**.022**	**11.425 (.001)**	**70.214 (.000)**	**-4.327 (.001)**
ACT Math	**.240**	**.058**	**28.724 (.000)**	**18.577 (.047)**	**2.96 (.000)**
SAT Math	**.285**	**.081**	**5.493 (.022)**	**30.707 (.065)**	**.092 (.022)**
MUCTC Student	**.088**	**.008**	**4.018 (.046)**	**69.108 (.000)**	**-3.248 (.046)**
Pretest	**.294**	**.087**	**40.966 (.000)**	**55.026 (.000)**	**.294 (.000)**
ASC Grade	**.170**	**.029**	**15.179 (.000)**	**62.583 (.000)**	**6.942 (.000)**
Instructor **Gender**	**.098**	**.010**	**4.980 (.026)**	**69.412 (.000)**	**-3.006 (.026)**
Adjunct	.017	.000	.147 (.701)	68.732 (.000)	-.479 (.701)
Mozart Use	**.124**	**.015**	**8.111 (.005)**	**67.872 (.000)**	**5.594 (.005)**
ALEKS Use	.036	.001	.686 (.408)	68.607 (.000)	-2.561 (.408)
Classroom a.m.	.020	.000	.196 (.658)	68.422 (.000)	.578 (.658)
No. of Meetings	.068	.005	2.380 (.124)	66.176 (.000)	.759 (.124)
Class Size	.085	.007	3.776 (.053)	63.314 (.000)	.202 (.053)

Elementary Algebra and Intermediate Algebra share three statistically significant student predictor variables: ACT math scores, Marshall University Community and Technical College (MUCTC) students, and math pretest. Additionally, Elementary Algebra had instructor employment status of part time and number of class meetings as statistically significant predictors. In addition to the student predictors of ACT math score, MUCTC students, and math pretest, Intermediate Algebra also had student gender, SAT math score, and ASC grade as statistically significant predictors. For Intermediate Algebra instructor employment status was not a statistically significant predictor, but instructor gender and use of Mozart music were statistically significant predictors. Although Elementary Algebra had number of class meetings as a significant predictor, none of the classroom predictors was statistically significant for Intermediate Algebra. The relationship of commonalities and differences between statistically significant predictors in Elementary Algebra and Intermediate Algebra can be best shown via a Venn diagram as shown in Figure 2. Statistically significant predictors are in bold.

Figure 2 Elementary Algebra and Intermediate Algebra Simple Regression Commonalities and Differences



Discussion of Research Question Two

When taken individually, which independent variables for student characteristics, instructor characteristics, and classroom characteristics predict the dependent variable of the student's final grade, and to what extent?

Because the dependent variable, student’s final grade, was pass fail, simple binary logistic regression was used to answer research question two. The results for Elementary Algebra and Intermediate Algebra are detailed in Tables 6 and 7. Statistically significant predictors are in bold. Interpretation of the results follows. Exp (B) is the factor that one multiplies the odds by when the predictor is increased by one. SPSS output is included in Appendix T.

Table 6 Elementary Algebra Simple Binary Logistic Regression

Predictor	B	Sig.	Exp (B)
Student			
Gender	.003	.990	1.003
ACT Math	**.327**	**.031**	**1.386**
SAT Math	.005	.602	1.005
MUCTC Student	-.332	.213	.717
Pretest	**.036**	**.000**	**1.037**
ASC Grade	**2.177**	**.000**	**8.818**
Instructor			
Gender	**.738**	**.009**	**2.092**
Adjunct	**.933**	**.001**	**2.541**
Mozart Use	**-1.063**	**.003**	**.345**
Classroom			
a. m.	**-.675**	**.017**	**.509**
Number of Meetings	**-.330**	**.002**	**.719**
Class Size	-.001	.902	.999

There is a slightly different interpretation of significant continuous variables compared to significant dichotomous variables; thus, the continuous variables will be interpreted first, followed by the interpretation of the dichotomous variables. For ACT Math score, the odds ratio of 1.386 means that one unit increase in the ACT Math score increases the odds of an Elementary

Algebra student passing the course by 38.6%.For the Pretest score, the odds ratio of 1.037 means that one unit increase in the Pretest score increases the odds of an Elementary Algebra student passing the course by 3.7%. For Number of Meetings, the parameter value of .719 means that one unit increase in the number of class meetings decreases the odds of passing Elementary Algebra by 28.1%.

The interpretation of the dichotomous variables follows. The ASC Grade, shows that the odds of passing Elementary Algebra for a student who earned a passing grade in the ASC co-requisite increased by nearly 9 fold compared to students who failed the ASC co-requisite. The Teacher Gender variable shows that the odds of passing Elementary Algebra for a student taking the class from a male instructor increased by over two times compared to the odds for a student taking Elementary Algebra from a female instructor. The Adjunct faculty variable shows that the odds of passing Elementary Algebra for a student taking the class from an adjunct faculty member increased by over 2.5 times compared to the odds for a student taking the class from a full-time faculty member. The Mozart Use variable shows that the odds of an Elementary Algebra student passing the course for a student who listened to Mozart music in the minutes before and after class decreased by 65.5% compared to the odds for a student who did not listen to Mozart music before and after class. The variable a.m. shows that the odds of passing Elementary Algebra for a student taking the class between 8 a.m. and noon decreased by 49.1% compared to the odds for a student taking the class between12:15 p.m. 6:30 p.m.

Table 7 Intermediate Algebra Simple Binary Logistic Regression

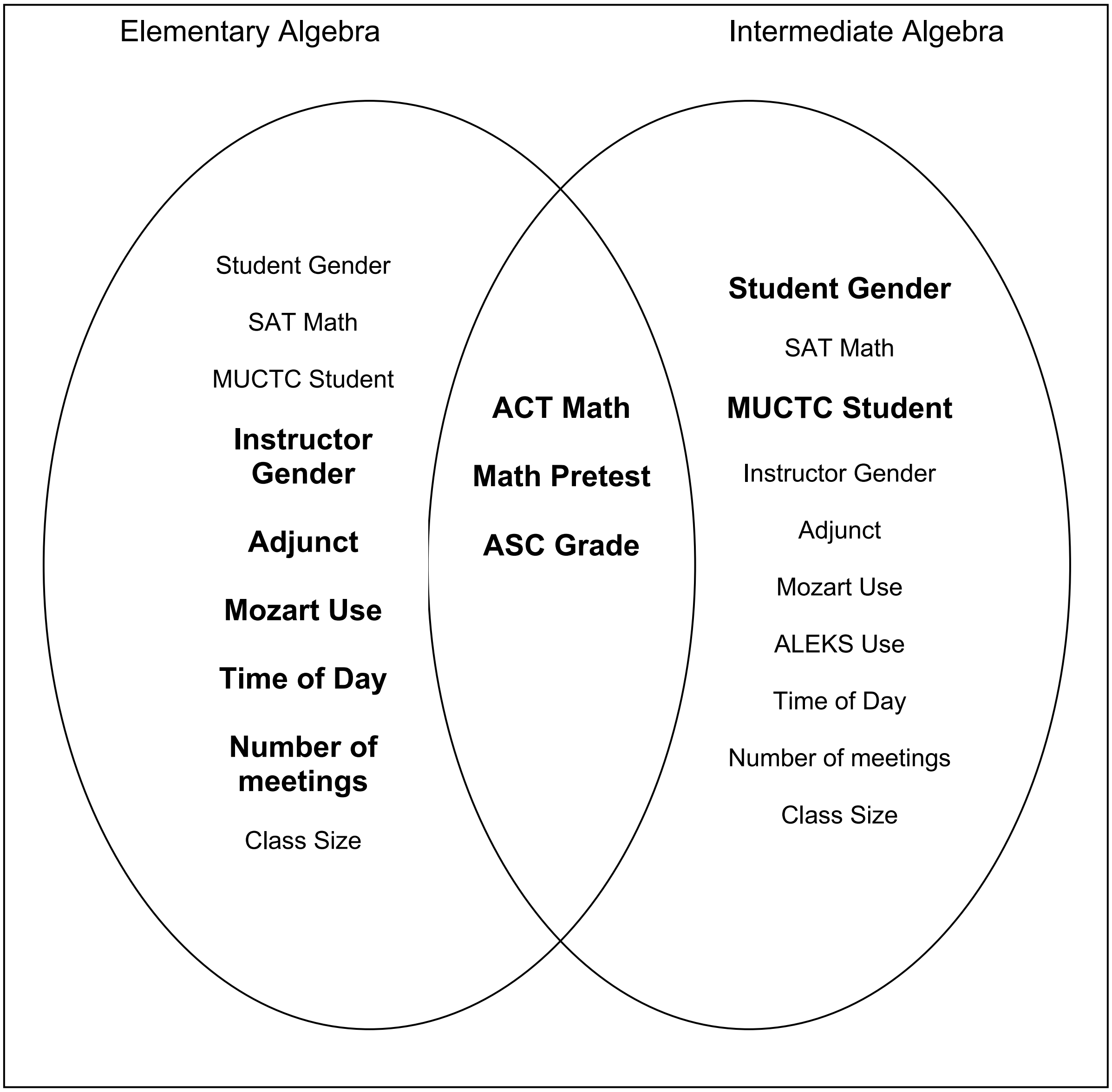
Predictor	B	Sig.	Exp (B)
Student			
Gender	**-.746**	**.000**	**.474**
ACT Math	**.448**	**.000**	**1.565**
SAT Math	.003	.559	1.003
MUCTC Student	**-.857**	**.000**	**.425**
Pretest	**.034**	**.000**	**1.034**
ASC Grade	**2.662**	**.000**	**14.321**
Instructor			
Gender	.182	.303	1.199
Adjunct	.-.206	.210	.814
Mozart Use	-.424	.092	.654
ALEKS Use	-.460	.146	.632
Classroom			
a. m.	.002	.991	1.002
Number of Meetings	.063	.345	1.065
Class Size	.011	.413	1.011

As mentioned previously, there is a slightly different interpretation of significant continuous variables compared to significant dichotomous variables, thus, the continuous variables will be interpreted first, followed by the interpretation of the dichotomous variables. For ACT Math score, the odds ratio of 1.565 means that one unit increase in the ACT Math score increases the odds of an Intermediate Algebra student passing the course by 56.5%. For the Pretest score, the odds ratio of 1.034 means that one unit increase in the Pretest score increases the odds of an Intermediate Algebra student passing the course by 3.4%.

The interpretation of the dichotomous variables follows. The Student Gender variable shows that the odds of passing Intermediate Algebra for a male student decreased by 52.6% compared to the odds of passing Intermediate Algebra for a female student. The MUCTC Student variable shows that the odds of passing Intermediate Algebra for community college students decreased by 57.5% compared to the odds of passing Intermediate Algebra for other students attending Marshall University. The ASC grade, shows that the odds of passing Intermediate Algebra for a student who earned a passing grade in the ASC co-requisite increased more than 14 times compared to students who failed the ASC co-requisite.

Elementary Algebra and Intermediate Algebra share three statistically significant student predictor variables: ACT Math score, math pretest, and ASC grade. Elementary Algebra had five additional significant predictors: the instructor characteristics of instructor gender, instructor employment status, instructor's use of Mozart music, and the classroom characteristics of classes meeting between 8 a.m. and noon, and number of class meetings. Intermediate Algebra had two additional statistically significant student predictors: student gender and MUCTC student. The relationship of commonalities and differences between statistically significant predictors in Elementary Algebra and Intermediate Algebra can be best shown via a Venn diagram as shown in Figure 3. Statistically significant predictors are in bold.

Figure 3 Elementary Algebra and Intermediate Algebra Simple Binary Logistic Regression Commonalities and Differences



Discussion of Research Question Three

When taken in combinations, which independent variables for student characteristics, instructor characteristics, and classroom characteristics predict the dependent variable of the student's final exam score, and to what extent?

To obtain a multiple regression equation, statistically significant predictors for simple regressions for Elementary Algebra and Intermediate Algebra were tried in combinations. For Elementary Algebra, the statistically significant predictors from the simple regression were added to the model starting with the two most statistically significant predictors of math pretest and ACT math score. The results are in Table 8. Statistically significant predictors are in bold.

Table 8 Elementary Algebra Multiple Regression with Math Pretest and ACT Math Score

R	R^2	F (sig.)	Constant (sig.)	Pretest B (sig.)	ACT B (sig.)
.377	**.142**	**10.415 (.000)**	**26.810 (.034)**	**.264 (.001)**	**1.844 (.037)**

These results yield the following equation:

predicted final exam score = .264math pretest + 1.844ACT math score + 26.810. The interpretation of this equation is that holding the ACT math score constant, each point the math pretest increases, the final exam score increases by .264 points. Similarly, holding the math pretest score constant, for each point the ACT math score increases, the final exam score increases by 1.844 points. The value of R^2 = .142 means that math pretest and ACT math score account for 14.2% of the variation in final exam score, which is an improvement over the simple regression models.

Next the instructor employment status predictor was added to the two other statistically significant predictors of math pretest and ACT math score. The results are in Table 9. Statistically significant predictors are in bold.

Table 9 Elementary Algebra Multiple Regression with Math Pretest, ACT Math Score and Adjunct

R	R^2	F (sig.)	Constant (sig.)	Pretest B (sig.)	ACT B (sig.)	Adjunct B (sig.)
.430	**.185**	**9.457 (.000)**	**19.474 (.124)**	**.232 (.002)**	**2.260 (.010)**	**6.100 (.011)**

These results yield the following equation:

predicted final exam score =

.232math pretest + 2.260ACT math score + 6.100adjunct + 19.474.

The interpretation of this equation is that holding the ACT math score and Adjunct constant, each point the math pretest increases, the final exam score increases by .232 points. Similarly, holding the math pretest score and adjunct predictors constant, for each point the ACT math score increases, the final exam score increases by 2.260 points. Finally, holding the math pretest and ACT math scores constant, students who had an adjunct instructor had an increase of 6.100 points in their final exam scores. The value of R^2 = .185 means that math pretest, ACT math score, and instructor employment status account for 18.5% of the variation in final exam score, which is an improvement over both the simple regression models and the multiple regression equation with two predictor variables.

Adding the community college predictor to the three statistically significant predictors of math pretest, ACT math score, and adjunct, did not yield a statistically significant result. Adding the number of class meetings to the three statistically significant predictors of math pretest, ACT math score, and adjunct, did not yield a statistically significant result. The complete SPSS output for these multiple regressions can be found in Appendix U.

The multiple regression assumptions are discussed in Appendix U. In summary, the sample sizes were large enough because for each regression $N > 50 + 8k$, where k is the number of predictors. Although in each case the maximum Mahalanobis distance was greater than the critical chi-square value for the degrees of freedom equal to the number of predictors at $\alpha = .001$, the maximum Cook's distance was always less than one meaning outliers should not be a concern. Tolerance and VIF (variable inflation factor) are used to measure multicollinearity (high correlations between predictor variables). In each case the Tolerance was < 0.1 and VIF (the inverse of Tolerance) was < 5 which means that multicollinearity was not a problem. For each multiple regression, the Normal P-P Plot of Regression Standardized Residuals had points that clustered fairly close to the line which means that the residuals are normally distributed. For each case, the scatterplot of Regression Standardized Residual against

Regression Standardized Predicted Value showed no pattern, which means the assumptions of normality, linearity, and homoscedsaticity of the residuals has been met.

For Intermediate Algebra the statistically significant predictors from the simple regression were added to the model starting with the two most statistically significant predictors of math pretest and ACT math score. The results are in Table 10. Statistically significant predictors are in bold.

Table 10 Intermediate Algebra Multiple Regression with Math Pretest and ACT Math Score

R	R^2	F (sig.)	Constant (sig.)	Pretest B (sig.)	ACT B (sig.)
.342	**.117**	**25.902 (.000)**	**20.067 (.050)**	**.271 (.000)**	**2.136 (.001)**

These results yield the following equation:

predicted final exam score = .271math pretest + 2.136ACT math score + 20.067. The interpretation of this equation is that holding the ACT math score constant, for each point the math pretest increases the final exam score increases by .271 points. Similarly, holding the math pretest score constant, for each point the ACT math score increases, the final exam score increases by 2.136 points. The value of R^2 = .117 means that the math pretest and ACT math score account for 11.7% of the variation in final exam score, which is an improvement over the simple regression models.

Next the ASC grade predictor was added to the other two statistically significant predictors of math pretest and ACT math score. The results are in Table 11. Statistically significant predictors are in bold.

Table 11 Intermediate Algebra Multiple Regression with Math Pretest, ACT Math Score, and ASC Grade

R	R^2	F (sig.)	Constant (sig.)	Pretest B (sig.)	ACT B (sig.)	ASC B (sig.)
.377	**.142**	**21.389**	**15.716**	**.273**	**2.059**	**6.407**
		(.000)	**(.126)**	**(.000)**	**(.001)**	**(.002)**

These results yield the following equation:

predicted final exam score =

.273math pretest score + 2.059ACT math score + 6.407ASC grade + 15.716.

The interpretation of this equation is that holding the ACT math score and ASC grade constant, each point the math pretest increases, the final exam score increases by .273 points. Similarly, holding the math pretest score and ASC grade predictors constant, for each point the ACT math score increases, the final exam score increases by 2.059 points. Finally, holding the math pretest and ACT math scores constant, students who earned a pass rather than a fail as their ASC grade had an increase of 6.407 points in their final exam scores. The R^2 = .142 means that math pretest, ACT math score, and ASC grade account for 14.2% of the variation in the final exam score, which is an improvement over both the simple regression models and the multiple regression equation with two predictor variables.

Next the student gender predictor was added to the three other statistically significant predictors of math pretest, ACT math score, and ASC grade. The results are in Table 12. Statistically significant predictors are in bold.

Table 12 Intermediate Algebra Multiple Regression with Math Pretest, ACT Math Score, ASC Grade, and Student Gender

R	R^2	F (sig.)	Constant (sig.)	Pretest B (sig.)	ACT B (sig.)	ASC B (sig.)	Gender B (sig.)
.409	**.168**	**19.029 (.000)**	**17.532 (.084)**	**.269 (.000)**	**2.068 (.001)**	**6.158 (.002)**	**-3.678 (.010)**

These results yield the following equation:

predicted final exam score =

.269math pretest + 2.068ACT math score + 6.158ASC grade -3.678student gender + 17.532.

The interpretation of this equation is similar to the interpretation of the previous two equations. It is interesting to note that holding all variables constant except for student gender, that males' predicted final exam scores will be 3.678 points lower than females' final exam scores (gender is a dichotomous variable in which male was coded as 1). The value of R^2 = .168 means that math pretest, ACT math score, ASC grade, and student gender account for 16.8% of the variation in final exam score. This is an improvement over the previous two regression equations.

Finally the Mozart use predictor was added to the other four statistically significant predictors of math pretest, ACT math score, ASC grade, and student gender. The results are in Table 13. Statistically significant predictors are in bold.

Table 13 Intermediate Algebra Multiple Regression with Math Pretest, ACT Math Score, ASC Grade, Student Gender, and Mozart Use

R	R^2	F	Constant	Pretest B	ACT B	ASC B	Gender B	Mozart B
.423	**.179**	**16.469**	**16.521**	**.267**	**2.101**	**6.062**	**-3.574**	**4.862**
		(.000)	**(.102)**	**(.000)**	**(.001)**	**(.003)**	**(.012)**	**(.021)**

These results yield the following equation:

predicted final exam score = .267math pretest + 2.101ACT math score + 6.062ASC grade - 3.574student gender + 4.862Mozart use + 16.521.

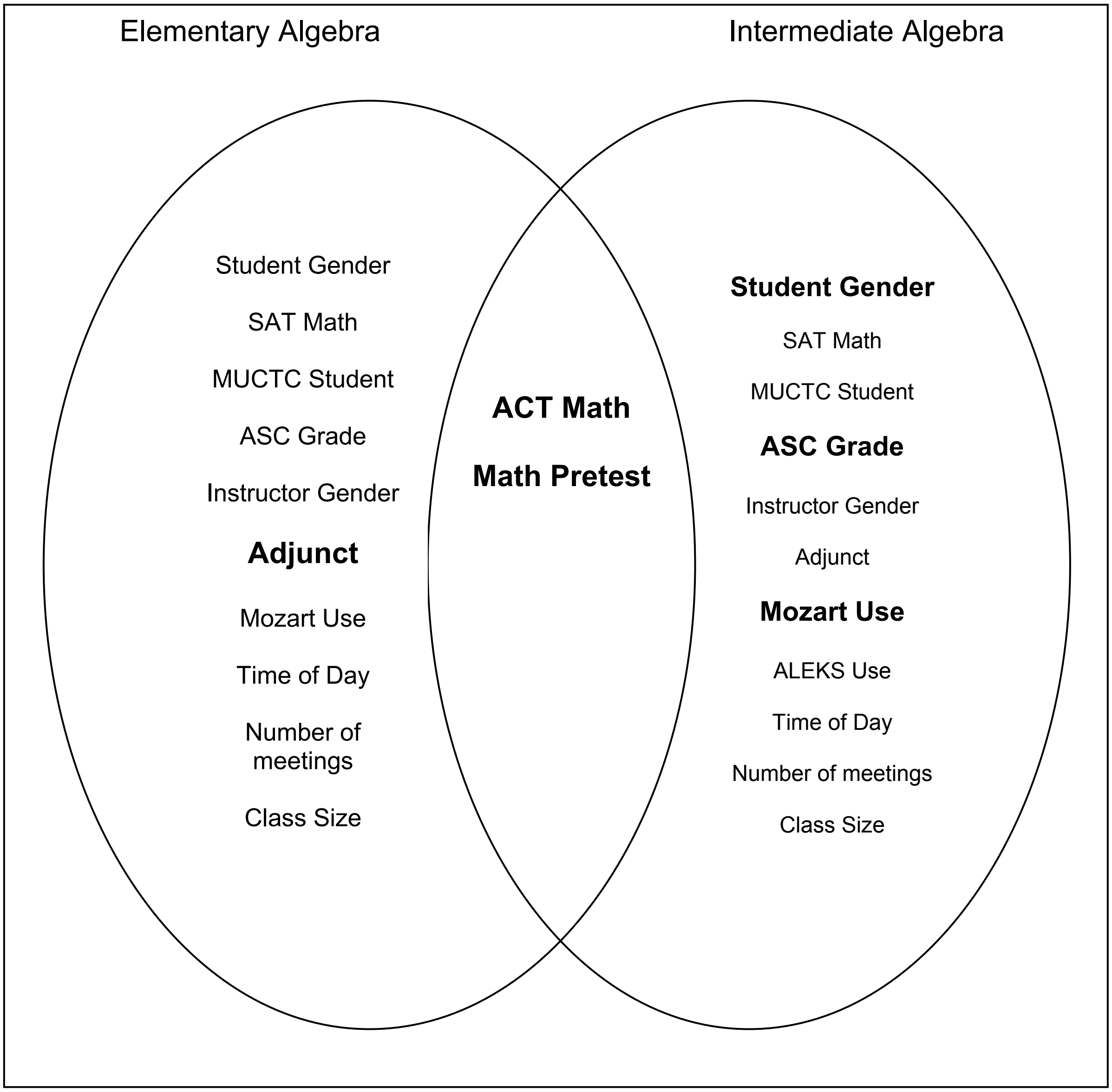
The interpretation of this equation is similar to the interpretation of the previous three equations. It is interesting to note that holding all variables constant except for Mozart use means that students who listened to Mozart music before and after class had predicted final exam scores that were 4.862 higher than students who did not listen to Mozart music before or after class. It is important to note that there were only 27 cases for this equation. The value of R^2 = .179 means that math pretest, ACT math score, ASC grade, student gender, and Mozart use account for 17.9% of the variation in final exam score, which is an improvement over the multiple regression equation with four predictor variables.

Adding the SAT math score to the five statistically significant predictors of math pretest, ACT math score, ASC grade, student gender, and Mozart use did not yield a statistically significant result. Adding the instructor gender to the aforementioned five statistically significant predictors did not yield a statistically significant result. Finally, adding the community college predictor to the five statistically significant predictors did not yield a statistically significant result. . The complete SPSS output for these multiple regressions can be found in Appendix V.

The multiple regression assumptions are discussed in Appendix V. In summary, the sample sizes were large enough because for each regression $N > 50 + 8k$, where k is the number of predictors. Although in each case the maximum Mahalanobis distance was greater than the critical chi-square value for the degrees of freedom equal to the number of predictors at $\alpha = .001$, the maximum Cook's distance was always less than one meaning outliers should not be a concern. Tolerance and VIF (variable inflation factor) are used to measure multicollinearity (high correlations between predictor variables). In each case the Tolerance was < 0.1 and VIF (the inverse of Tolerance) was < 5 which means that multicollinearity was not a problem. For each multiple regression, the Normal P-P Plot of Regression Standardized Residuals had points that clustered fairly close to the line which means that the residuals are normally distributed. For each case, the scatterplot of Regression Standardized Residual against Regression Standardized Predicted Value showed no pattern which means the assumptions of normality, linearity, and homoscedsaticity of the residuals has been met.

Elementary Algebra and Intermediate Algebra share two statistically significant student predictor variables math pretest and ACT math score. The relationship of commonalities and differences between statistically significant predictors in Elementary Algebra and Intermediate Algebra can be best shown via a Venn diagram as shown in Figure 4. Statistically significant predictors are in bold.

Figure 4 Elementary Algebra and Intermediate Algebra Multiple Regression Commonalities and Differences



Discussion of Research Question Four

When taken in combinations, which independent variables for student characteristics, instructor characteristics, and classroom characteristics predict the dependent variable of the student's final grade, and to what extent?

To obtain a multiple binary logistic regression equation, the statistically significant predictors for simple binary regressions for Elementary Algebra and Intermediate Algebra were tried in combinations. For Elementary Algebra, the statistically significant predictors from the simple binary logistic regression were added to the model starting with the two most statistically significant predictors of math pretest and ASC grade. The results are in Table 14. Statistically significant predictors are in bold.

Table 14 Elementary Algebra Multiple Binary Logistic Regression with Math Pretest and ASC Grade

Predictor	B	Sig.	Exp (B)
Math Pretest	**.048**	**.000**	**1.049**
ASC Grade	**2.439**	**.000**	**11.464**
Constant	**-3.315**	**.000**	**.036**

For math pretest, the odds ratio of 1.049 means that one unit increase in the math pretest score increases the odds of an Elementary Algebra student passing the course by 4.9%. The ASC grade shows that the odds of passing Elementary Algebra for a student who earned a passing grade in the ASC co-requistite increased by 11.464 times compared to students who failed the ASC co-requisite.

Next the instructor employment status predictor was added to the two other statistically significant predictors of math pretest and ASC grade. The results are in Table 15. Statistically significant predictors are in bold.

Table 15 Elementary Algebra Multiple Binary Logistic Regression with Math Pretest, ASC Grade, and Instructor Employment Status

Predictor	B	Sig.	Exp (B)
Math Pretest	**.045**	**.000**	**1.046**
ASC Grade	**2.993**	**.000**	**19.952**
Instructor Employment Status	**1.659**	**.000**	**5.255**
Constant	**-4.398**	**.000**	**.014**

The interpretation of math pretest and ASC grade are similar to previous statements. The adjunct faculty variable shows that the odds of passing Elementary Algebra for a student taking the class from an adjunct faculty member increased by 5.255 times compared to the odds for a student taking a class from a full-time faculty member.

Next the number of class meetings was added to the three statistically significant variables. The results are in Table 16. Statistically significant predictors are in bold.

Table 16 Elementary Algebra Multiple Binary Logistic Regression with Math Pretest, ASC Grade, Instructor Employment Status, and Number of Meetings

Predictor	B	Sig.	Exp (B)
Math Pretest	**.049**	**.000**	**1.050**
ASC Grade	**3.079**	**.000**	**21.747**
Instructor Employment Status	**1.015**	**.018**	**2.760**
Number of Meetings	**-.433**	**.007**	**.649**
Constant	**-2.577**	**.003**	**.076**

The interpretation of math pretest, ASC grade, and instructor employment status are as previously stated. For number of meetings, the parameter value of .649 means that one unit increase in the number of class meetings decreases the odds of passing Elementary Algebra by 35.1%.

Next the Mozart use predictor was added to the four other statistically significant predictors. The results are in Table 17. Statistically significant predictors are in bold.

Table 17 Elementary Algebra Multiple Binary Logistic Regression with Math Pretest, ASC Grade, Instructor Employment Status, Number of Meetings, and Mozart Use

Predictor	B	Sig.	Exp (B)
Math Pretest	**.049**	**.000**	**1.050**
ASC Grade	**3.054**	**.000**	**21.199**
Instructor Employment Status	**.879**	**.048**	**2.408**
Number or Meetings	**-.349**	**.042**	**.705**
Mozart Use	-.674	.175	.510
Constant	**-2.676**	**.002**	**.069**

Note that Mozart use is not statistically significant. The Mozart use predictor was removed from the model.

Next the instructor gender predictor was added to the four statistically significant predictors of math pretest, ASC grade, instructor employment status, and number of class meetings. The results are in Table 18. Statistically significant predictors are in bold.

Table 18 Elementary Algebra Multiple Binary Logistic Regression with Math Pretest, ASC Grade, Instructor Employment Status, Number of Meetings, and Instructor Gender

Predictor	B	Sig.	Exp(B)
Math Pretest	**.048**	**.000**	**1.050**
ASC Grade	**3.090**	**.000**	**21.974**
Instructor Employment Status	**1.213**	**.006**	**3.365**
Number of Meetings	-.271	.126	.762
Instructor Gender	**.949**	**.025**	**2.584**
Constant	**-3.530**	**.000**	**.029**

Note that number of meetings is not statistically significant so it is removed from the model. The instructor gender variable shows that the odds of passing Elementary Algebra for a student taking the class from a male instructor increased by 2.584 times compared to the odds for a student taking Elementary Algebra from a female instructor.

Next the time of day predictor was added to the model. The results are in Table 19. Statistically significant predictors are in bold.

Table 19 Elementary Algebra Multiple Binary Logistic Regression with Math Pretest, ASC Grade, Instructor Employment Status, Instructor Gender, and Time of Day

Predictor	B	Sig.	Exp (B)
Math Pretest	**.053**	**.000**	**1.055**
ASC Grade	**3.223**	**.000**	**25.095**
Instructor Employment Status	**1.471**	**.001**	**4.352**
Instructor Gender	**1.229**	**.002**	**3.417**
Time of Day	**-.871**	**.025**	**.418**
Constant	**-4.623**	**.000**	**.010**

The time of day predictor shows that the odds of passing Elementary Algebra for a student taking the class between 8 a.m. and noon decreased by 58.2% compared to the odds for a student taking the class between 12:15 p.m. and 6:30 p.m.

Next ACT math score was added to the model. It was not statistically significant, so it was deleted from the model. SPSS output is included in Appendix W. The assumptions for binomial logistic regression are the same as the assumptions for multiple regression.

For Intermediate Algebra, the five statistically significant predictors from the simple binary logistic regression were all less than .001 so they were all added to the model. The results are in Table 20. Statistically significant predictors are in bold.

Table 20 Intermediate Algebra Multiple Binary Logistic Regression with Student Gender, ACT Math Score, Community College Student, Math Pretest, and ASC Grade

Predictor	B	Sig.	Exp (B)
Student Gender	-.419	.085	.658
ACT Math Score	**.288**	**.010**	**1.334**
Community College Student	**-.604**	**.038**	**.547**
Math Pretest Score	**.027**	**.003**	**1.027**
ASC Grade	**2.527**	**.000**	**12.512**
Constant	**-6.666**	**.000**	**.001**

Note that all of the predictors are statistically significant except for student gender, so it was removed from the model. The results are summarized in Table 21. Statistically significant predictors are in bold.

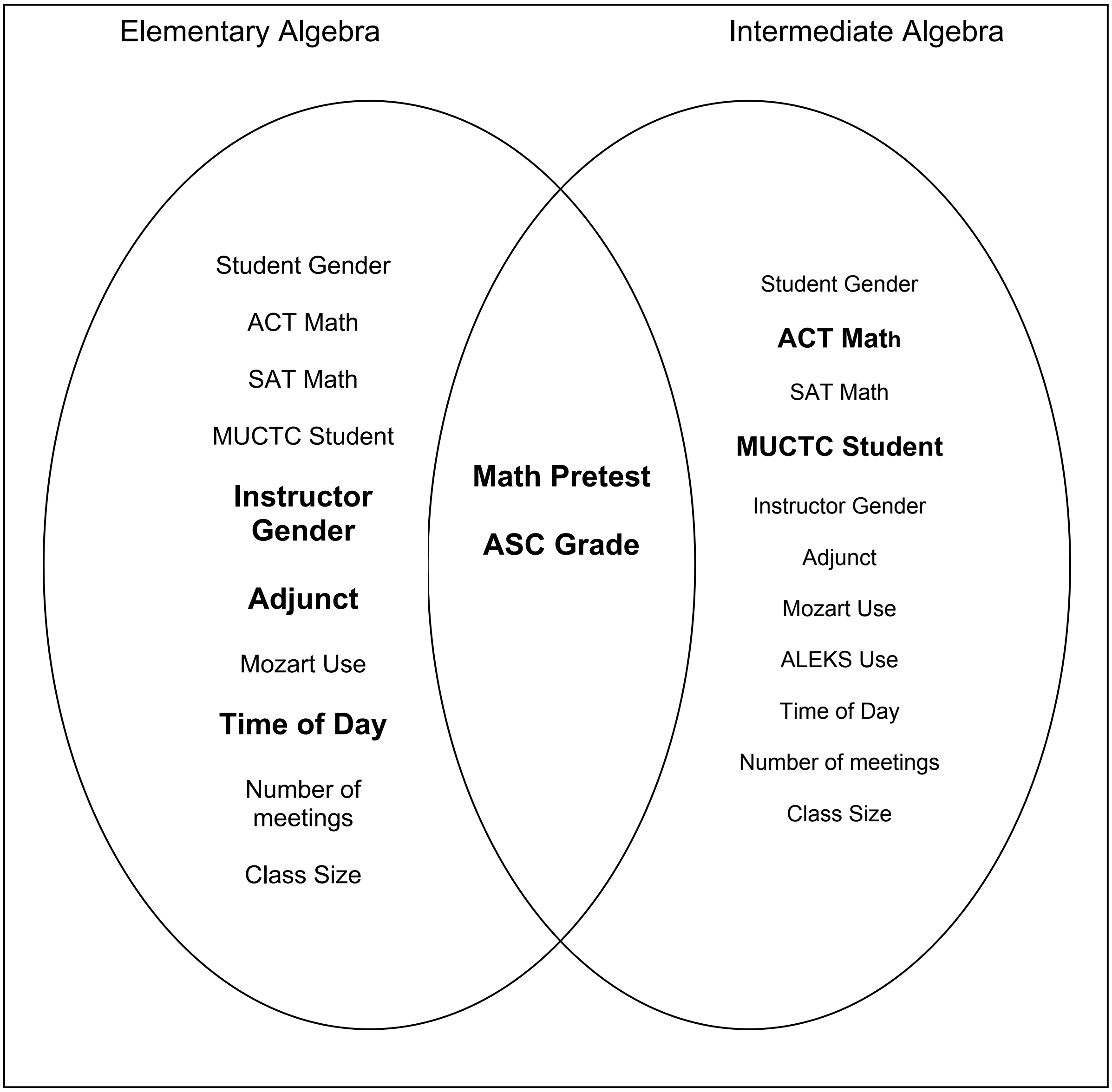
Table 21 Intermediate Algebra Multiple Binary Logistic Regression with ACT Math Score, Community College Student, Math Pretest, and ASC Grade

Predictor	B	Sig.	Exp (B)
ACT Math Score	**.292**	**.009**	**1.339**
Community College Student	**-.681**	**.018**	**.506**
Math Pretest Score	**.027**	**.002**	**1.028**
ASC Grade	**2.579**	**.000**	**13.183**
Constant	**-6.935**	**.000**	**.001**

The interpretation of this model follows. Holding all of the predictors constant except for ACT Math Score, the odds ratio of 1.339 means that one unit increase in the ACT Math score increases the odds of an Intermediate Algebra student passing the course by 33.9%. Holding all of the predictors constant except for community college student means the odds of passing Intermediate Algebra for community college students decreased by 49.4% compared to the odds of passing Intermediate Algebra for other students attending Marshall University. Holding all the predictors constant except for math pretest score means the odds ratio of 1.028 means that one unit increase in the math pretest score increases the odds of an Intermediate Algebra student passing the course by 2.8%. Holding all the predictors constant except for ASC grade means that the odds of passing Intermediate Algebra for a student who earned a passing grade in the ASC co-requisite increased 13.183 times compared to students who failed the ASC co-requisite.

Elementary Algebra and Intermediate Algebra share two statistically significant student predictor variables: Math Pretest and ASC Grade. The relationship of commonalities and differences between statistically significant predictors in Elementary Algebra and Intermediate Algebra can be best shown via a Venn diagram as shown in Figure 5. Statistically significant predictors are in bold. SPSS output is included in Appendix X. The assumptions for binomial logistic regression are the same as the assumptions for multiple regression.

Figure 5 Elementary Algebra and Intermediate Algebra Multiple Binary Logistic Regression Commonalities and Differences



Summary

The study of specific predictors that impact student achievement in developmental mathematics revealed the following:

1. When taken individually ($\alpha = .05$), the student characteristics of ACT math score, community college students, and math pretest were statistically significant predictors of student's final exam score for both Elementary Algebra and Intermediate Algebra. Additionally, Elementary Algebra had the instructor characteristic of adjunct ($p = .013$) and the classroom predictor of number of class meetings ($p = .025$) as statistically significant predictors. Intermediate Algebra had additional statistically significant student predictors of gender ($p = .001$), SAT math ($p = .022$), ASC grade ($p < .001$). Intermediate Algebra had additional statistically significant instructor predictors of gender ($p = .026$) and Mozart music use ($p = .005$).

2. When taken individually ($\alpha = .05$), the student characteristics of ACT math score, math pretest, and ASC grade were statistically significant predictors of student's final grade (pass/fail) for both Elementary Algebra and Intermediate Algebra. Additionally, Elementary Algebra had the instructor characteristics of gender ($p = .009$), adjunct ($p = .001$), and Mozart music use ($p = .003$) as well as the classroom characteristics of time of day ($p = .017$) and number of class meetings ($p = .002$) as statistically significant predictors of student's final grade. Intermediate Algebra had additional statistically significant student predictors of gender ($p < .001$) and community college student ($p < .001$).

3. When taken in combinations ($\alpha = .05$), the student characteristics of ACT math score and math pretest were statistically significant predictors of student's final exam score for both Elementary Algebra and Intermediate Algebra. Additionally, Elementary Algebra had the instructor characteristic of adjunct ($p = .011$) as a statistically significant predictor of final grade. Intermediate Algebra had two additional student predictors, gender ($p = .012$) and ASC grade ($p = .003$), and one additional instructor predictor Mozart music use ($p = .021$) as statistically significant predictors of student's final grade.

4. When taken in combinations ($\alpha = .05$), the student characteristics of math pretest and ASC grade were statistically significant predictors of student's final grade for both Elementary Algebra and Intermediate Algebra. Additionally, Elementary Algebra had statistically significant instructor predictors of gender ($p = .002$) and adjunct ($p = .001$) and the classroom predictor of time of day ($p = .025$). Intermediate Algebra had two additional statistically significant student predictors of ACT math score ($p = .009$), and community college student ($p = .018$).

CHAPTER 5

SUMMARY

With the wide range of abilities of community college students, proper course placement is crucial. Therefore, having better predictors of success can help improve placement of students for their achievement. This study analyzed student predictors, instructor predictors, and classroom predictors in relation to student final exam score and student final grade in Elementary Algebra and Intermediate Algebra classes. Student predictors included gender, ACT math score, SAT math score, community college enrollment, math pretest score, and ASC grade. Instructor predictors included gender, employment status, Mozart music use, and ALEKS software use. Classroom predictors included time of day, number of class meetings per week, and class size. A review of the literature was conducted on the two outcome measures of final exam score and final grade as well as the 13 predictor variables. The Elementary Algebra and Intermediate Algebra data sets were analyzed with simple regression, simple binary logistic regression, stepwise multiple regression, and stepwise binary logistic regression.

The study of specific predictors that impact student achievement in developmental mathematics revealed the following. When analyzed individually, for Elementary Algebra, ACT math score, community college enrollment, math pretest, instructor employment status, and number of class meetings were statistically significant as predictors of final exam scores. When analyzed individually, for Intermediate Algebra, ACT math score, community college enrollment, math pretest, student gender, SAT math score, ASC grade, instructor gender, and Mozart music use were statistically significant predictors of final exam scores.

When analyzed individually, for Elementary Algebra, ACT math score, math pretest, ASC grade, instructor gender, instructor employment status, Mozart music use, time of day, and number of class meetings were statistically significant predictors of final grade. When analyzed individually, for Intermediate Algebra, ACT math score, math pretest, ASC grade, student gender, and community college enrollment were statistically significant predictors of final grade.

When analyzed in combinations, for Elementary Algebra, ACT math score, math pretest and instructor employment status were statistically significant predictors of final exam score. When analyzed in combinations, for Intermediate Algebra, ACT math score, math pretest, student gender, ASC grade, and Mozart music use were statistically significant predictors of final exam score.

When analyzed in combinations, for Elementary Algebra, math pretest, ASC grade, instructor gender, instructor employment status, and time of day were statistically significant predictors of final grade. When analyzed in combinations, for Intermediate Algebra, math pretest, ASC grade, ACT math score, and community college enrollment were statistically significant predictors of final grade.

Conclusions

The inhouse-developed math pretest was the strongest predictor of student math achievement. It was significant individually and in combinations for

Elementary Algebra and Intermediate Algebra for all four research questions involving simple regression, simple binary logistic regression, multiple regression, and multiple binary logistic regression. ACT math score was a strong predictor of student math achievement. It was a statistically significant predictor for both Elementary Algebra and Intermediate Algbebra for the first three research questions involving simple regression, simple binary logistic regression, and multiple regression. In both the simple binary logistic regression and the multiple binary logistic regression ASC grade was a statistically signigicant predictor for both Elementay Algebra and Intermediate Algebra. For research question one, involving simple regression, the fact that a student was a community college student was a statistically significant predictor of achievement.

Because math pretest was the strongest predictor of final exam score and final grade, instructors should consider administering this test to all students and interpreting the results. For example, students with a high Elementary Algebra pretest score could be moved up to Intermediate Algebra whereas students with a low Intermediate Algebra pretest score could be moved down to Elementary Algebra.

The student's ACT math score was the second strongest preditor. Although Dorans (1999) at the Educational Testing Service states that ACT and SAT scores are not interchangeable, a concordance could be used for students with an SAT score, but no ACT score, to complete a data set.

The ASC grade (credit/no credit) was the third strongest predictor of final grade. Students who passed the ASC co-requisite had odds of passing

Elementary Algebra or Intermediate Algebra varying from 8, 13, 14, or 25 times compared to students who failed the ASC co-requisite. The ASC co-requisite was a form of supplemental instruction in which students spent at least an hour per week in the Academic Skills Center (ASC). At the ASC, students could watch videos that accompanied their texts, receive tutoring, or work in small groups doing homework.

It is interesting to note that community college students in both Elementary Algebra and Intermediate Algebra performed worse on their respective final exams. Elementary Algebra students, on average, scored 4.879 points lower than their university counterparts. On average, Intermediate Algebra students scored 3.248 points lower than other students at the university.

Recommendations for Further Research

Better predictors are needed for these models. Because the R^2 values were 18.5% and 17.9%, for Elementary and Intermediate Algebra respectively, there are predictors missing that would explain approximately 80% of the outcome measure. Age, high school GPA, financial need, student enrollment type (part-time/full-time), reading ability (as measured by ACT or SAT) are some of the many predictors that could be explored. Another way results could be improved would be to increase the sample size. For example, rather than studying a semester, study an academic year.

APPENDICES

Appendix A: Letter of Exemption from Institutional Review Board

MARSHALL UNIVERSITY

www.marshall.edu

Office of Research Integrity

June 29, 2010

Linda Hunt
450 Private Drive 10463
Proctorville, OH 45669

Dear Ms. Hunt:

This letter is in response to the submitted abstract concerning your study to analyze factors that impact student success in developmental math. After assessing the abstract it has been deemed not to be human subject research and therefore exempt from oversight of the Marshall University Institutional Review Board (IRB). The Code of Federal Regulations (45CFR46) has set forth the criteria utilized in making this determination. Since the information in this study is a deidentified data set of existing records it is not considered human subject research. If there are any changes to the abstract you provided then you would need to resubmit that information for review and determination.

I appreciate your willingness to submit the abstract for clarification. Please feel free to contact the Office of Research Integrity if you have any questions regarding future protocols that may require IRB review.

Sincerely,

Bruce F. Day, Th.M., CIP
Director
Office of Research Integrity

WE ARE... MARSHALL™

401 11th Street, Suite 1300 • Huntington, West Virginia 25701 • Tel 304/696-7320
A State University of West Virginia • An Affirmative Action/Equal Opportunity Employer

Appendix B: Elementary Algebra Syllabus

MATH 096
COURSE OVERVIEW SHEET

COURSE TITLE: DEVELOPMENTAL MATH

COURSE NUMBER: MAT 096

SEMESTER AND YEAR:

Section:

Time:

REQUIRED TEXT:

Principles of Elementary Algebra With Applications by Nustad and Wesner, 2nd edition

REQUIRED MATERIALS: Lab Manual

ADDITIONAL MATERIALS:

COMPUTER REQUIREMENTS:

INSTRUCTOR:

Name:

Office:

Office Hours:

Telephone:

E-Mail Address:

COURSE DESCRIPTION:

Math 096: A course designed to improve students' skills in: algebraic expressions, integers, fractions, decimals, real numbers, first-degree equations, ratio, proportion, and percent. Emphasis will be placed on skill mastery in preparation for future math courses.

CREDITS:

MAT 096 is a four credit hour course which counts toward full-time enrollment status and financial aid eligibility, but does not count toward the number of hours required in any college degree program. The graduation requirement is increased four hours for students who complete this course.

PREREQUISITES: Placement in MAT 096 is determined by ASSET/ACT score 12 - 15

COREQUISITE:

ASC 099: Independent Study Skills - A 1 hour CR/NC course to be taken concurrently with MAT 096. This consists of at least 15 hours in the Academic Skills Center for the semester.

LEARNER OUTCOMES/OBJECTIVES

See attached.

ASSESSMENT/EVALUATION OF LEARNER OUTCOMES

1. MAT 096 is a not-for-credit course which is provided as a service by the college to those who have been out of school for a while or whose ACT/SAT scores prevented enrollment in a Freshman math course. This course is designed to offer those students an opportunity to brush up on their math skills and become better prepared for success in MAT 097 or subsequent college courses requiring solid math skills.

2. Students will demonstrate their understanding of the mathematical skills outlined in the general description of the course. This mastery of skills will be demonstrated by evaluation of tests, math labs, a common comprehensive final exam, and possibly daily work/quizzes (depending on instructor).

3. Students will demonstrate their knowledge of material on tests. There will be at least five and no more than nine tests. These tests will constitute 60% to 65% of the final grade.

4. Students will demonstrate and practice toward skill mastery through math labs and possibly daily work (depending on instructor). Labs will constitute10% to 15% of the final grade. Students will complete a minimum of five activities from the lab manual. Daily work/quizzes will constitute 0% to 5% of the final grade.

5. Since MAT 096 is a not-for-credit course, students will not receive a conventional letter grade (A, B, C, D, F), but will instead receive a final grade of “CR” (Credit) or “NC” (No Credit) for the course.

6. Students will demonstrate course mastery through a common comprehensive final exam. The final exam will constitute 25% of the final grade. Students will be given one opportunity to take the exit exam.

7. The grades from the six areas described above will determine whether students pass the course. Students must have at least a 75% final average to receive credit (CR) for the course. Students who have a final average of less than 75% will not receive credit (NC) for the course. Those who receive a grade of “NC” must repeat MAT 096 and earn a “CR” before being allowed to advance to MAT 097.

8. There is no extra credit available in this course.

DAILY WORK AND POINTS

There will sometimes be an assignment due for each class session to ensure student preparation and class participation. Sometimes, there also will be in-class work completed for credit.

OUTSIDE ASSIGNMENTS (HOMEWORK)

Outside assignments will consist of all exercises listed on the assignment sheet. These assignments are the MINIMUM. You may need to do more; to study review sections; to use materials in the Academic Skills Center; to get help from another student, teacher or tutor; etc. Each student is expected to do the problems, check the answers (in the back of the book), and ask questions about any problems to which the solutions are unclear. These problems normally will NOT be collected but are useful in the building of a solid foundation of knowledge.

CHEATING

Academic cheating will NOT be tolerated. Review procedures as outlined in the Student Handbook. Do not pretend to get an education...

GRADING POLICY

The following grading scale is standard for this course in the Community and Technical College:

CR = Grade for the course earned by a student with at least a 75% final ave.

NC = Grade for the course earned by a student with less than a 75% final ave.

These requirements will be met from the eight categories outlined in the evaluation/assessment sections.

DUE DATES:

See attached syllabus.

MAKE-UP WORK POLICY

TESTS

Tests cannot be made up unless prior arrangements have been made with the instructor. You must call me if you will be absent. The missed exam is arranged at the instructor's convenience.

Excused absences will be accepted for the following reasons only:

1. An illness that requires seeing a physician; a written medical excuse must be provided to me on the day that you return to class in order for the absence to be considered excused. I will call the doctor's office to verify each excuse.

2. The death of a parent, guardian, sibling, spouse, grandparent, aunt, uncle, or child. Provide an obituary or program from the funeral upon your return to class.

3. A Marshall University excused absence; field trip letter from instructor - sports event letter from coach.

DAILY WORK AND LABS

There is **NO** make-up work for daily work missed. The instructors have built in some flexibility allowing for an occasional missed daily grade; no exceptions will be made. Also, the number of possible points for daily work will vary from instructor to instructor.

CLASS ATTENDANCE POLICY

The fact that classes are scheduled is evidence that attendance is important and students should, therefore, maintain regular attendance if they are to attain maximum success in the pursuit of their studies. Daily grades will be checked at most class sessions, so accumulated absences will affect grades. ***There is no make-up for daily work. Absent students are responsible for all information and assignments given by the instructor.***
The student is expected to be in class on time and to stay for the entire class. (This is no more than an employer would ask of an employee.)
This syllabus is a contract. Attendance in this class implies acceptance of these policies.

DAILY/WEEKLY OUTLINE:

See attached syllabus.

CLASSROOM ETIQUETTE

MAT 096 is a course that is designed to cover a great deal of material in a short period of time. It is therefore necessary that this course be offered to all students in an "Equal Opportunity" classroom where all students are entitled to the opportunity to do their best work without unnecessary and distracting disruptions. It is for the common good that all students come to class prepared for the day's activities and ready to concentrate and participate fully. *Students are asked to refrain from sleeping, doing homework, excessive talking, unnecessary trips outside the classroom, or showing disrespect for their instructor or classmates. In order to preserve a quiet classroom environment, all pagers, cell phones, electronic games, radios, tape or CD players, wrist watches with alarms, or other devices that generate sound must be turned off when you enter the classroom.* Disruption of class, whether by latecomers, noisy devices or inconsiderate behavior, will not be tolerated. Behavior problems will be referred to the assistant provost's office for appropriate action. Expulsion from the class is a possible result of this meeting.

INSTRUCTOR'S RESPONSIBILITIES

The role of the instructor will be one involving the explanation of new material and review of previously discussed material when questions are raised by students after they have attempted to do the material as an outside assignment.

STUDENT'S RESPONSIBILITIES

The student's responsibilities are a major consideration in this course. After material has been discussed during a class session, it is the student's responsibility to complete the outside assignment(s) associated with the material prior to the next class meeting so that material that remains unclear may be re-explained during the next class meeting. IN ADDITION, the student is expected to read through the NEW MATERIAL that is scheduled to be presented that class period so that the material will be generally familiar and so that preliminary questions may be asked.

ADDITIONAL GUIDELINES

Students may have coffee/soft drinks in class but should not use any smoke-less tobacco products. No Whining!!

Revised 6 June 2001 by Linda Hunt

LEARNER OUTCOMES / OBJECTIVES

Numbers and the Number Line

1. Determine which of two numbers is greater
2. Find absolute value

Addition of Real Numbers

3. Add real numbers

Subtraction of Real Numbers

4. Subtract real numbers
5. Add and subtract in order from left to right

Multiplication of Real Numbers

6. Multiply real numbers

Division of Real Numbers

7. Perform division of real numbers
8. Perform division involving 0

Properties of Real Numbers and Order of Operations

9. Perform multiple operations in the proper order
10. Use exponents

Algebraic Notation and Terminology

11. Identify terms in an expression
12. Identify like terms
13. Use the distributive property
14. Combine like terms
15. Write an algebraic expression
16. Remove grouping symbols

Evaluating Algebraic Expressions

17. Evaluate an algebraic expression
18. Evaluate a formula
19. Write an algebraic expression

Addition and Subtraction Property of Equality

20. Determine if a given number is a root of an equation
21. Use the addition and subtraction property of equality
22. Simplify equations
23. Solve for an unknown
24. Check your answer

Multiplication and Division Property of Equality

25. Use the multiplication and division property of equality to form equivalent equations where the coefficient of the unknown is 1
26. Check your answer

Solving Linear Equations

27. Solve linear equations
28. Check your answers

Verbal Problems

29. Write an equation for a verbal problem
30. Solve for the unknown quantities

Solving Literal Equations and Formulas

31. Solve literal equations and formulas for a specified variable

Solving Linear Inequalities - The Addition and Subtraction Property of Inequalities

32. Graph inequalities
33. Graph compound inequalities
34. Solve inequalities
35. Solve compound inequalities
36. Write inequality statements for word statements

Solving Linear Inequalities - The Multiplication & Division Property of Inequalities

37. Solve linear inequalities in one variable using the multiplication and division property of inequalities
38. Solve linear inequalities in one variable using the addition and subtraction along with the multiplication and division properties of inequalities
39. Set up an inequality for a word problem and then solve it

Exponents - I

40. Write a product in exponential form
41. Multiply factors with like bases
42. Raise a group of factors to a power
43. Raise a power to a power
44. Raise a fraction to a power

Algebraic Addition and Subtraction

45. Identify like terms
46. Perform addition and subtraction of algebraic expressions
47. Remove grouping symbols

Products of Algebraic Expressions

48. Multiply monomials
49. Multiply a monomial with a multinomial
50. Multiply multinomials
51. Use the special products of the square of a binomial or the difference of two squares

Exponents - II

52. Perform division involving exponents
53. Perform operations involving negative exponents
54. Perform operations involving zero as an exponent

Scientific Notation

55. Express a number in scientific notation
56. Convert a number from scientific notation to standard form
57. Do computations using scientific notation

Ratio and Proportion

58. Write ratios
59. Reduce ratios
60. Write proportions
61. Solve proportions for the unknowns
62. Set up proportions to solve problems

Ordered Pairs and the Rectangular Coordinate System

63. Determine whether or not an ordered pair is a solution of a given equation
64. Find the value of one variable, given the value of the other variable
65. Plot ordered pairs in the rectangular coordinate plane
66. Plot ordered pair solutions of linear equations

Graphs of Linear Equations

67. Plot the graph of linear equations using ordered pairs
68. Find the x- and y-intercepts of a linear equation
69. Plot the graph of linear equations using the x- and y-intercepts
70. Plot graphs of the equations y = a constant and x = a constant

The Slope of a Line

71. Find the slope of a line given two points on the line
72. Determine the slope of a horizontal and vertical line

The Equation of a Line

73. Write the equation of a line in standard form
74. Find the equation of a line knowing the slope and a point or two points on the line
75. Find the slope and y-intercept of a line knowing the equation of the line
76. Graph a linear equation in two variables using the slope and y-intercept
77. Graph a linear equation in two variables using the slope and a point on the line
78. Find the equation of a line given the slope and the y-intercept
79. Determine whether two lines are parallel

Principal Roots

80. Find the principal square root of a perfect-square integer
81. Find the principal root of a number

MATH 096 WEEKLY OUTLINE AND OBJECTIVES

The labs suggested may be replaced by your instructor. The pace and order in which the content and course objectives are covered may also vary from your instructor's pace and order.

Week 1

A. Pretest
B. Schedule a time for a member of the ASC staff to visit your class during the first week
C. Explain course overview and syllabus
D. Senses to Learn and Math Study Skills
E. M & M lab to review fractions, decimals, and percents
F. Section 1-1 (Numbers and the Number Line)
    a. Determine which of 2 numbers is greater
    b. Find absolute value

Week 2

A. Integer Addition with Algebra Tiles Worksheet in lab manual
B. Adding Integers Exploration with Integer Counters in lab manual
C. Section 1-2 (Addition of Real Numbers)
D. Section 1-3 (Subtraction of Real Numbers)
    a. Add and subtract in order from left to right.
E. Integer subtraction review sheet, Subtracting Integers Exploration & checkbook cooperative activity in lab manual

Week 3

A. Multiplying Integers Exploration in lab manual
B. Section 1-4 (Multiplication of Real Numbers)
C. Section 1-5 (Division of Real Numbers)
    a. Perform division involving 0
D. Section 1-6 (Properties of Real Numbers and Order of Operations)
    a. Perform multiple operations in the proper order
    b. Use exponents
E. Cross Number Puzzle in lab manual
F. Integer Puzzle in lab manual
G. Understanding Exponents and Order of Operations Cooperative Activities in lab manual
H. Order of Operations lab in lab manual
I. Order of Operations Review sheet in lab manual

Week 4

A. Polynomial addition and subtraction using algebra tiles in lab manual

B. Section 1-7 (Algebraic Notation and Terminology)
  a. Identify terms in an expression
  b. Identify like terms
  c. Use the distributive property
  d. Combine like terms
  e. Write an algebraic expression
  f. Remove grouping symbols

C. Understanding Algebraic Addition and Subtraction cooperative activity in lab manual

D. Section 1-8 (Evaluating Algebraic Expressions)
  a. Evaluate a formula
  b. Write and algebraic expression

E. Evaluation Formulas lab in lab manual

Week 5

A. Test on Chapter 1 (Operations with Real Numbers and Intro to Algebra)

B. Section 2-1 (Addition and Subtraction Property of Equality)
  a. Determine if a given number is a root of an equation.
  b. Simplify equations
  c. Solve for an unknown
  d. Check your answer

C. Section 2-2 (Multiplication and Division Property of Equality)

D. Section 2-3 (Solving Linear Equations)

E. Equation puzzle in lab manual

Week 6

A. Section 2-4 (Verbal Problems)
  a. Write an equation for an application problem
  b. Solve for the unknown quantities

B. Section 2-5 (Solving Literal Equations and Formulas)

C. Section 2-6 (Solving Linear Inequalities – Addition & Subtraction Property)
  a. Graph inequalities
  b. Graph compound inequalities
  c. Solve compound inequalities
  d. Write inequality statements for word statements

Week 7

A. Section 2-7 (Solving Linear Inequalities – Multiplication & Division Property)
   a. Set up an inequality for a word problem and then solve it

B. Test on Chapter 2 (Solving Equations and Inequalities)

C. Exponent Manipulatives Activity in lab manual

Week 8

A. Section 3-1 (Exponents – I)
   a. Write a product in exponential form
   b. Multiply factors with like bases
   c. Raise a group of factors to a power
   d. Raise a power to a power
   e. Raise a fraction to a power

B. Section 3-2 (Algebraic Addition and Subtraction)
   a. Identify like terms
   b. Perform addition and subtraction of algebraic expressions.
   c, Remove grouping symbols

C. Section 3-3 (Products of Algebraic Expressions)
   a. Multiply monomials
   b. Multiply a monomial with a multinomial
   c. Multiply multinomials
   d. Use the special product of the square of a binomial
   e. Use the special product of the difference of two squares

D. Multiplying Polynomials in Table Form in lab manual

E. Section 3-4 (Exponents - II)
   a. Perform division involving exponents
   b. Perform operations involving negative exponents
   c. Perform operations involving zero as an exponent

Week 9

A. Understanding Polynomials and Exponents cooperative activity in lab manual

B. Understanding Multiplication of Polynomials cooperative activity in lab manual

C. Section 3-5 (Scientific Notation)
   a. Express a number in scientific notation
   b. Convert a number from scientific notation to standard form
   c. Do computations using scientific notation

D. Test on Chapter 3 (Algebraic Expressions)

Week 10

A. Ordered Pairs and the Rectangular Coordinate System lab
B. Can we predict a person's height from their arm length activity
C. Section 7-1 (Ordered Pairs and the Rectangular Coordinate System)
   a. Determine whether or not an ordered pair is a solution of a given equation
   b. Find the value of one variable given the value of the other variable
   c. Plot ordered pairs in the rectangular coordinate plane
   d. Plot ordered pair solutions of linear equations
D. 7-1 plotting points activity in lab manual

Week 11

A. Section 7-2 (Graphs of Linear Equations)
   a. Plot the graphs of linear equations using ordered pairs
   b. Find the x- and y-intercepts of a linear equation
   c. Plot the graph of linear equations using the x- and y-intercepts
   d. Plot the graphs of the equations y = a constant and x = a constant
B. Section 7-3 (The Slope of a Line)
   a. Find the slope of a line given two points on the line
   b. Determine the slope of a horizontal and vertical line
C. Understanding Slope cooperative activity
D. Section 7-4 (The Equation of a Line)
   a. Write the equation of a line in standard form
   b. Find the equation of a line knowing the slope and a point of 2 points on the line
   c. Find the slope and y-intercept of a line knowing the equation of the line
   d. Graph a linear equation in two variables using the slope and y-intercept
   e. Graph a linear equation in two variables using the slope and a point on the line
   f. Find the equation of a line given the slope and y-intercept
   g. Determine whether two lines are parallel
E. Understanding the Equation of a Line cooperative activity

Week 12

A. Test on Chapter 7 (Linear Equations in Two Variables)
B. Section 5-4 (Ratio and Proportion)
    a. Write ratios
    b. Reduce ratios
    c. Write proportions
    d. Solve proportions for the unknowns
    e. Set up proportions to solve problems

Week 13

A. Section 9-1 (Principal Roots)
    a. Find the principal square root of a perfect-square integer
    b. Find the principal root of a number
B. Test on Sections 5-4 and 9-1

Week 14

A. Review for Final Exam
B. Make Up work

Week 15

A. Find out from your instructor where your final exam will be
B. Finish reviewing for the final exam

Appendix C: Intermediate Algebra Syllabus

MATH 097
COURSE OVERVIEW SHEET

COURSE TITLE: DEVELOPMENTAL ALGEBRA

COURSE NUMBER: MAT 097

SEMESTER AND YEAR:

Section:

Time:

REQUIRED TEXT:

Principles of Intermediate Algebra With Applications by Nustad and Wesner, 2nd edition

REQUIRED MATERIALS:

Lab Manual

ADDITIONAL MATERIALS:

COMPUTER REQUIREMENTS:

INSTRUCTOR:

Name:

Office:

Office Hours:

Telephone:

E-Mail Address:

COURSE DESCRIPTION:

Math 097: A course designed to improve students' skills in:
first-degree equations and inequalities, polynomials, rational expressions, exponents, roots, and radicals, quadratic equations, linear equations in two variables, systems of linear equations, functions, exponential and logarithmic functions. Emphasis will be placed on skill mastery in preparation for future math courses.

CREDITS:

MAT 097 is a four credit hour course that counts toward full-time enrollment status and financial aid eligibility, but does not count toward the number of hours required in any college degree program. The graduation requirement is increased four hours for students who complete this course.

PREREQUISITES:

Placement in MAT 097 is determined by ACT score (16 – 18) or math placement test score.

COREQUISITE:

ASC 099: Independent Study Skills - A 1 hour CR/NC course to be taken concurrently with MAT 097. This consists of at least 15 hours in the Academic Skills Center for the semester.

ASSESSMENT/EVALUATION OF LEARNER OUTCOMES

1. MAT 097 is a course that is provided as a service by the college to those who have been out of school for a while or whose ACT/SAT scores prevented enrollment in a freshman math course. This course is designed to offer those students an opportunity to brush up on their math skills and become better prepared for success in subsequent college courses requiring solid math skills.

2. Students will demonstrate their understanding of the mathematical skills outlined in the general description of the course. This mastery of skills will be demonstrated by evaluation of tests, math labs, a common comprehensive final exam, and possibly daily work/quizzes (depending on instructor).

3. Students will demonstrate their knowledge of material on tests. There will be at least five and no more than nine tests. These tests will constitute 60% to 65% of the final grade.

4. Students will demonstrate and practice toward skill mastery through math labs and possibly daily work (depending on instructor). Labs will constitute 10% to 15% of the final grade. Students will complete a minimum of five activities from the lab manual. Daily work/quizzes will constitute 0% to 5% of the final grade.

5. Students will not receive a conventional letter grade (A, B, C, D, F), but will receive a final grade of “CR” (Credit) or “NC” (No Credit) for the course.

6. Students will demonstrate course mastery through a common comprehensive final exam. The final exam will constitute 25% of the final grade. Students will be given one opportunity to take the exit exam.

7. The grades from the six areas described above will determine whether students pass the course. Students must have at least a 75% final average to receive credit (CR) for the course. Students who have a final average of less than 75% will not receive credit (NC) for the course. Those who receive a grade of “NC” must repeat MAT 097 and earn a “CR” before being allowed to advance to their next math course.

8. There is no extra credit available in this course.

DAILY WORK AND POINTS

There will sometimes be an assignment due for each class session to ensure student preparation and class participation. Sometimes, there also will be in-class work completed for credit.

OUTSIDE ASSIGNMENTS (HOMEWORK)

Outside assignments will consist of all exercises listed on the assignment sheet. These assignments are the MINIMUM. You may need to do more; to study review sections; to use materials in the Academic Skills Center; to get help from another student, teacher or tutor; etc. Each student is expected to do the problems, check the answers (in the back of the book), and ask questions about any problems to which the solutions are unclear. These problems normally will NOT be collected but are useful in the building of a solid foundation of knowledge.

CHEATING

Academic cheating will NOT be tolerated. Review procedures as outlined in the Student Handbook. Do not pretend to get an education...

GRADING POLICY

The following grading scale is standard for this course in the CTC:

CR = Grade for the course earned by a student with at least a 75% final average
NC = Grade for the course earned by a student with less than a 75% final average.

These requirements will be met from the six categories outlined in the evaluation/assessment sections.

MAKE-UP WORK POLICY

TESTS

Tests cannot be made up unless prior arrangements have been made with the instructor. Your instructor must be notified if you will be absent. The missed exam is arranged at the instructor's convenience.

Excused absences will be accepted for the following reasons only:

1. An illness that requires seeing a physician; a written medical excuse must be provided to the instructor on the day that you return to class in order for the absence to be considered excused. A call to the doctor's office to verify each excuse may be made by the instructor.

2. The death of a parent, guardian, sibling, spouse, grandparent, aunt, uncle, or child. Provide an obituary or program from the funeral upon your return to class.

3. A Marshall University excused absence; field trip letter from instructor – sports event letter from coach.

DAILY WORK AND LABS

There is **NO** make-up work for daily work missed. The instructors have built in some flexibility allowing for an occasional missed daily grade; no exceptions will be made. Also, the number of possible points for daily work will vary from instructor to instructor.

CLASS ATTENDANCE POLICY

The fact that classes are scheduled is evidence that attendance is important and students should, therefore, maintain regular attendance if they are to attain maximum success in the pursuit of their studies. Daily grades will be checked at most class sessions, so accumulated absences will affect grades. ***There is no make-up for daily work. Absent students are responsible for all information and assignments given by the instructor.*** *The student is expected to be in class on time and to stay for the entire class. (This is no more than an employer would ask of an employee.)* This syllabus is a contract. Attendance in this class implies acceptance of these policies.

CLASSROOM ETIQUETTE

MAT 097 is a course that is designed to cover a great deal of material in a short period of time. It is therefore necessary that this course be offered to all students in an "Equal Opportunity" classroom where all students are entitled to the opportunity to do their best work without unnecessary and distracting disruptions. It is for the common good that all students come to class prepared for the day's activities and ready to concentrate and participate fully. *Students are asked to refrain from sleeping, doing homework, excessive talking, unnecessary trips outside the classroom, or showing disrespect for their instructor or classmates. In order to preserve a learning classroom environment, all pagers, cell phones, electronic games, radios, tape or CD players, wrist watches with alarms, or other devices that generate sound must be turned off when you enter the classroom.* Disruption of class, whether by latecomers, noisy devices or inconsiderate behavior, will not be tolerated. Behavior problems will be referred to the division director's office for appropriate action. Expulsion from the class is a possible result of this meeting.

INSTRUCTOR'S RESPONSIBILITIES

The role of the instructor will be one involving the explanation of new material and review of previously discussed material when questions are raised by students after they have attempted to do the material as an outside assignment.

STUDENT'S RESPONSIBILITIES

The student's responsibilities are a major consideration in this course. After material has been discussed during a class session, it is the student's responsibility to complete the outside assignment(s) associated with the material prior to the next class meeting so that material that remains unclear may be re-explained during the next class meeting. IN ADDITION, the student is expected to read through the NEW MATERIAL scheduled for that class period so that the material will be generally familiar and so that preliminary questions may be asked.

ADDITIONAL GUIDELINES

Students may have coffee/soft drinks in class but should not use any smoke-less tobacco products. No Whining!!

Revised 16 August 2001 by Linda Hunt and Jon Blatt

Math 097 Objectives

2-1 Solving Equations

a. Solve linear equations by applying the addition and multiplication properties of equality.

b. Determine when a linear equation has no solution.

c. Check solution.

d. Write algebraic expressions for verbal statements.

2-2 Formulas and Literal Equations

a. Solve formulas and literal equations for the specified variable in terms of the other variables.

2-3 Verbal Problems

a. Translate verbal sentences into equations.

b. Solve for the unknown quantities.

2-4 Linear Inequalities

a. Solve linear inequalities.

b. Solve compound inequalities.

c. Represent the solution set of an inequality in set-builder notation or graphical notation.

2-5 Equations Involving Absolute Value

a. Solve an absolute value equation.

3-5 Greatest Common Factors and Factoring By Grouping

a. Factor the GCF from a polynomial.

b. Factor a four-term polynomial by grouping.

3-6 Factoring Trinomials of the Form $x^2 + bx + c$ and Perfect Square Trinomials

a. Recognize when the trinomial $x^2 + bx + c$ will factor and when it will not.

b. Factor trinomials of the form $x^2 + bx + c$.

c. Factor perfect square trinomials.

3-7 Factoring Trinomials of the Form $ax^2 + bx + c$

a. Recognize when the trinomial $ax^2 + bx + c$ will factor and when it will not.

b. Factor trinomials of the form $ax^2 + bx + c$.

3-8 Other Methods of factoring

a. Factor the difference of two squares.

4-1 Fundamental Properties of Rational Expressions

a. Determine the domain of a rational expression.

b. Reduce a rational expression to its lowest terms.

4-2 Multiplication and Division of Rational Expressions

a. Multiply rational expressions.

b. Divide rational expressions.

4-3 Addition and Subtraction of Rational Expressions

a. Find the LCD of a set of two or more rational expressions.

4-6 Equations Containing Rational Expressions

a. Solve a rational equation in one variable.

4-7 Problem Solving with Rational Equations

a. Set up and solve work problems.

b. Set up and solve uniform motion problems.

5-1 Roots and Rational Exponents

a. Find the principal root of a number

b. Express expressions with rational exponents in radical form.

c. Express radicals in rational exponent form.

5-2 Operations with Rational Exponents

a. Apply the properties of exponents to rational exponents.

5-3 Simplifying Radicals - I

a. Simplify radicals by using the product property for radicals.

b. Multiply radicals with the same indices.

c. Simplify radicals by reducing the index of the radical.

5-5 Sums and Differences of Radicals

a. Identify like radicals.

b. Add and subtract like radicals.

6-1 Quadratic Equations and Solution by Factoring and by Extracting Roots

a. Solve a quadratic equation by factoring.

6-3 Solutions of Quadratic Equations by the Quadratic Formula

a. Solve a quadratic equation by using the quadratic formula.

6-4 Applications of Quadratic Equations

a. Substitute and solve physical formulas that are quadratic.

b. Solve verbal problems involving the use of a right angle and the Pythagorean Theorem.

c. Solve verbal problems involving the areas of geometric figures.

d. Solve verbal work problems.

6-5 Equations Involving Radicals

a. Identify extraneous solutions of a radical equation.

b. Find the solution set of a radical equation.

7-1 The Rectangular Coordinate System

a. Find the x- and y-intercepts of a linear equation in two variables.

b. Sketch the graph of a linear equation in two variables.

c. Sketch the graph of $x = k$ and $y = k$.

7-2 The Distance Formula and the Slope of a Line

a. Find the distance between two points in the rectangular coordinate plane.

b. Find the slope of a straight line given two points on the line.

c. Determine if two lines are parallel.

7-3 Finding the Equation of a Line

a. Find the equation of a line using point-slope form.

b. Write the equation of a line in standard form.

c. Write the equation of a line in slope-intercept form.

d. Find the slope, m, and the y-intercept, b, of a line given its equation.

e. Sketch the graph of a linear equation in two variables using the slope and y-intercept.

8-1 Systems of Linear Equations in Two Variables

a. Determine whether an ordered pair is a solution of a system.

b. Solve a system of two linear equations in two variables.

10-1 Relations and Functions

a. Determine if a relation defines a function.

b. Find the domain of a relation.

c. Determine if a given graph of a relation represents a function by using the vertical line test.

10-2 Functional Notation

a. Evaluate f(x) for any value of x given the function f.

11-1 The Exponential Function

a. Sketch the graph of an exponential function.

b. Find the solution set of exponential equations.

11-2 The Logarithm

a. Given an exponential equation, write the equivalent logarithmic equation.

b. Given a logarithmic equation, write the equivalent exponential equation.

c. Evaluate a logarithmic expression.

11-4 The Common Logarithms

a. Find the common logarithm of a number using a calculator.

b. Find the antilogarithm of a number using a calculator.

Revised August 2k

Math 097 Weekly Schedule

Week 1

A. Schedule a time for a member of the ASC staff to come to your class during the first week.
B. Explain course overview and syllabus.
C. 2-1 (Review Linear Equations)
   a. Understanding 3 types of equations cooperative activity from lab manual
D. 2-4 (Linear Inequalities)
   a. First Degree Equations and Inequalities lab from manual
E. 2-5 (Absolute Value Equations)
F. 2-2 (Formulas and Literal Equations)
   a. Understanding Literal Equations activity from lab manual
   b. Errors commonly made by algebra students lab from manual

Week 2

A. 2-3 (Verbal Problems)

Week 3

A. Test on Chapter 2 (First Degree Equations and Inequalities)
B. 3-5 (GCF and Factor by Grouping)
C. 3-6 (Factoring Trinomials – Coefficient of the Squared term is one)
D. 3-7 (Factoring Trinomials – Coefficient of Squared term is not one)
   a. Factoring trinomials when the coefficient of the squared term is not one activity sheet from lab manual

Week 4

A. 3-8 (Factoring the Difference of Two Squares)
B. Factor completely worksheet from lab manual
C. Understanding Equivalent Forms of Polynomials cooperative activity from lab manual
D. Factoring Polynomials worksheet from lab manual
E. 6-1 (quadratic equations and solution by factoring)
F. Understanding Solving Quadratic Equations cooperative activity from lab manual
G. The relationship between the solution set and the factored form of a quadratic equation activity from lab manual

Week 5

A. Test on 3-5, 3-6, 3-7, 3-8, and 6-1
B. 4-1 (Fundamental Properties of Rational Expressions)
    a. Understanding Finding the Domain of a Rational Expression cooperative activity from lab manual
    b. Domains of Rational Expressions activity from lab manual
C. 4-2 (Multiplication and Division of Rational Expressions)
    a. Understanding Multiplying Rational Expressions cooperative activity from lab manual

Week 6

A. 4-3 (Find the LCD for Rational Expressions)
B. 4-6 (Equations Containing Rational Expressions)
C. 4-7 (Problem Solving with Rational Expressions)
    a. Rational Equations - work problems lab from manual

Week 7

A. Test on 4-1, 4-2, 4-3, 4-6, and 4-7
B. 5-1 (Roots and Rational Exponents)
C. 5-2 (Operations with Rational Exponents)
   a. Review of exponent properties from lab manual
   b. Understanding Fractional Exponents cooperative activity from lab manual
D. 5-3 (Simplifying Radicals)
   a. Understanding Simplifying Radicals cooperative activity from lab manual

Week 8

A. 5-5 (Sums and Differences of Radicals)
B. Explore to Learn cooperative activity from lab manual
C. Exponents and Radicals worksheet from lab manual
D. 6-3 (Solutions of Quadratic Equations by the Quadratic Formula)
E. 6-4 (Applications of Quadratic Equations)

Week 9

A. 6-5 (Equations Involving Radicals)

B. Quadratic and Radical Equations lab from manual

C. Test on 5-1, 5-2, 5-3, 5-5, 6-3, 6-4, and 6-5

Week 10

A. 7-1 (The Rectangular Coordinate System)
B. 7-2 (The Distance Formula and the Slope of a Line)
C. 7-3 (Finding the Equation of a Line)
D. Matching Exercise from lab manual
E. Understanding the Equation of a Line from lab manual
F. Graphing lab from manual
G. Finding the equation of a line lab from manual
H. 7-1, 7-2, 7-3 lab from manual

Week 11

A. 8-1 (Systems of Linear Equations in Two Variables)
   a. 8-1 worksheet from lab manual
   b. Practice Worksheet from lab manual
   c. 8-1 lab from manual
B. Test on 7-1, 7-2, 7-3, and 8-1
C. Graphing Functions Worksheet from lab manual
D. Choose the graph to fit data for a physical situation from lab manual
E. Cooperative Learning Activity on functions from lab manual

Week 12

A. 10-1 (Relations and Functions)
B. 10-2 (Functional Notation)
C. **REQUIRED LAB FOR MATH 097 FROM CHAPTER 10: EITHER LABORATORY 8 GRAPHING FUNCTIONS WORKSHEET OR CHOOSING THE GRAPH TO FIT DATA FOR A PHYSICAL SITUATION.**
D. 11-1 (The exponential Function)
   a. The sex riddle from lab manual

Week 13

A. 11-2 (The Logarithm)
   a. Understanding Logarithmic Equations from lab manual
B. 11-4 (The Common Logarithms)
   a. Log lab from manual
C. Review for test on 10-1, 10-2, 11-1, 11-2, 11-4 from lab manual
D. Test on 10-1, 10-2, 11-1, 11-2, and 11-4

Week 14

A. Review for final exam

Week 15

A. Finish reviewing for the final exam

Revised 14 September 2001

Appendix D: Summary of Research Studies on Developmental Mathematics Achievement

mmary of Research Studies on Developmental Mathematics Achievement

searcher te)	Institution (Type)	Analysis (n)	Predictors (p-value)	Dependent Variable (R squared)
nison 86)	College (Private Nonprofit Co-ed Business)	Multiple Regression Stepwise Regression Chi-Square (n = 63)	High School GPA (p = .0096) **SAT Math** (p = .0219)	Remedial Math Grade (R squared = 17%)
wrence 88)	University	Regression Analysis (n = 357)	High School GPA (p < .01) **SAT Math** (p < .01) **In-house Algebra Placement Test** (p < .01)	A or B in Basic Algebra (R squared = 25%)

mmary of Research Studies on Developmental Mathematics Achievement page 2

searcher te)	Institution (Type)	Analysis (n)	Predictors (p-value)	Dependent Variable (R squared)
nny 96)	Four-year Institutions	Stepwise Regression Analysis (n = 1475)	**Adjunct Instructor** ($p < .0001$) **Female Instructor** ($p < .0001$) Student Age ($p < .0001$)	Developmental Math Grade (R squared between 16% and 21%)
xter ith 98)	University	Analysis of Covariance (n = 435)	Andragogy ($p < .05$) Grade in Elementary Math ($p = .0001$)	Intermediate Algebra Grade
tson 00)	College (Two-year Technical Rural)	Multiple Regression (n = 373)	HS GPA ($p = .03$) Math HS GPA ($p = .03$) Age ($p = .01$)	Intermediate Algebra Grade

mmary of Research Studies on Developmental Mathematics Achievement page 3

searcher ate)	Institution (Type)	Analysis (n)	Predictors (p-value)	Dependent Variable (R squared)
e 02)	Community College (Urban)	Multiple Regression (Setwise & Stepwise Forward) (n = 498)	Cumulative College GPA ($p < .01$) Math Prerequisite Status ($p < .01$) **In-House Placement Test** ($p < .01$) **Female** ($p < .01$) Math Attitude ($p < .01$) Asian/Pacific Islanders ($p < .01$) Individual Instructor ($p < .01$)	Final Grade As A Numerical Average (R squared = 40%)

mmary of Research Studies on Developmental Mathematics Achievement page 4

searcher ate)	Institution (Type)	Analysis (n)	Predictors (p-value)	Dependent Variable (R squared)
onkwiler 04)	University	Independent Sample t-tests ANOVA Kruskal-Wallis H-tests Pair Wise Mann-Whitney tests Multiple Regression (n = 744)	Math 1 grade (p = .01) **ACT Math** (p = .01) High School GPA p = .004 **Gender** Ethnicity	Grade in First College-level Math Course After Completing Developmental Math (R squared = 17%)

mmary of Research Studies on Developmental Mathematics Achievement page 5

searcher ate)	Institution (Type)	Analysis (n)	Predictors (p-value)	Dependent Variable (R squared)
e 05)	Community College	Multiple Regression Logistic Regression (n = 534)	**No. of Class Meetings** (p = .031) White (p = .029) **Female** (p = .036) Age (p < .001)	Intermediate Algebra Final Grade (R squared = 5%)
per 06)	Community College	Descriptive Analysis Logistic/Multiple Regression Chi-Square Analysis ANCOVA	-	ASSET Test Score for Developmental Algebra I

mmary of Research Studies on Developmental Mathematics Achievement page 6

searcher te)	Institution (Type)	Analysis (n)	Predictors (p-value)	Dependent Variable (R squared)
enique 07)	Community College (Urban Multi-campus)	Logistic Regression (n = 451)	CPT Math Score (p = .025) CPT Reading Score CPT Writing Score Ethnicity and Age **Gender** (p = .004) Traditional College Student Status Enrollment Status	Developmental Math Grade (When all variables are entered R^2 between 6.5% and 8.8%
			CPT Math Score (p= .026) CPT Reading Score (p= .041) CPT Writing Score Ethnicity and Age **Gender** (p = .002) Traditional College Student Status (p = .004) Enrollment Status	Developmental Math Grade (Forward Sepwise and Backward Stepwise R^2 between 6.3% and 8.5%)

mmary of Research Studies on Developmental Mathematics Achievement page 7

searcher te)	Institution (Type)	Analysis (n)	Predictors (p-value)	Dependent Variable (R squared)
e, e 07)	Community College (Urban Public)	Multiple Regression (n = 1318)	Faculty Education Level (p = .007) **Female** (p = .027) White (p = .025) Age (p < .001)	Intemediate Algebra Final Grades
ehl 07)	Community College (Urban Suburban Multi- campus Metropolitan)	Multinomial Regression Logistic Regression Crosstabs Basic Math DV (n = 3501) p < .01 Intro Algebra DV (n = 1049) p < .01	Ethnicity **Gender** Financial Aid Status Compass Reading Score Numerical Skills Placement Score When IA is the DV, BM is a predictor	DV = Basic Math (7%) DV = Introductory Algebra (19%)

mmary of Research Studies on Developmental Mathematics Achievement page 8

searcher te)	Institution (Type)	Analysis (n)	Predictors (p-value)	Dependent Variable (R squared)
novan eland ebra 08)	University (Public Metropolitan Open- Enrollment)	Analysis of Variance Logistic Regression (n = 1694)	Mean ACT Math (p < .05) Mena ACT Math for Males (p < .001)	C or better in Intermediate

Appendix E: Pretest Administration Memo

Marshall University
Community and Technical College

General Studies Division

Memo

To: Math 096 and 097 Developmental Math Instructors

From: Carol Perry, Director of General Studies Division

Date: 19 August 2001

Re: Pretests

In the past, giving a pretest was at the instructor's discretion. Starting this semester, the MCTC developmental math instructors need to collect statistical information on our developmental math students' prerequisite skills. We are going to see if there is a correlation between pretest scores and final exam scores/completion. Thank you in advance for your cooperation as we strive to serve our students better.

Attached you will find an envelope containing enough copies of the appropriate exam and scantron sheets. Be sure to take scrap paper to give to the students, and collect the scrap paper from the students when they turn in their pretest. We need for each student to bubble in a scantron sheet with their name and their answers to the exam. Additionally, they should write Math 096 or 097 at the top of their scan sheet. **Do not bubble in**: sex, birth date, ID#, or special codes. Please paperclip the 096 and 097 scan sheets to the provided instructor sheet.

There are only 20 questions on each pretest. The pretest must be administered on the first day of class. Although students drop and add the first week of class, we are only going to be concerned with getting scores for students who are present on the first day. Students are not to use calculators on the pretest. After administering the pretest, return the following items to the labeled area below the full-time faculty mailboxes: pretests, completed scan sheets, and unused scan sheets.

The pretests will be scored for you and you will get your results in your mailbox by Monday, August 27. Please do not go over any of the pretest questions, either in class or in your office, with your students since we will use this pretest again. By Monday, August 27, you will be provided with pretest prerequisite skills objective sheets. You may distribute these to your students.

Refer Math 096 students to Chapter R of their text for a review of fractions, decimals, and percents. The M & M lab in the Math 096 lab manual is an excellent way to reinforce fractions, decimals, and percents. Math 097 students should be referred to Chapter 1 sections 2 through 5 and Chapter 3 sections 1 through 4 of the intermediate algebra text. Students may also be referred to the Academic Skills Center to view videos on the skills they are lacking.

CAP:ldh

1

Appendix F: Elementary Algebra Pretest Results

Elementary Algebra Pretest Results as reported by The SAS System
Marshall University Exam Analysis System – EXAM 95
Test Score Analysis 10:01 Tuesday, September 4, 2001

FIRST-GLANCE STATISTICS (for non-blank sheets):

NUMBER of sheets scored……………………………249
MEAN score……………………………………………40.60
MEDIAN score…………………………………………40.00
STANDARD DEVIATION…………………………………..15.90
Obtained LOW score……………………………………5
Obtained HIGH scoe…………………………………..90

SUMMARY:

Number of sheets………………………………………259
Number of sheets with at least one response…………259
Number of sheets with no responses (blank)…………….0
First question……………………………………………...1
Last question……………………………………………20
Number of questions……………………………………20
Sheets with a “No Response”……………………………20
Total “No Response”……………………………………32
Sheets with a “Multiple Response”………………………..5
Total “Multiple Response”…………………………………9

RAW SCORE STATISTICS (for non-blank sheets):

Mean score………………………………………………..8.12
Median score……………………………………………...8.00
Standard deviation………………………………………3.18
Obtained low score………………………………………1
Obtained high score……………………………………18

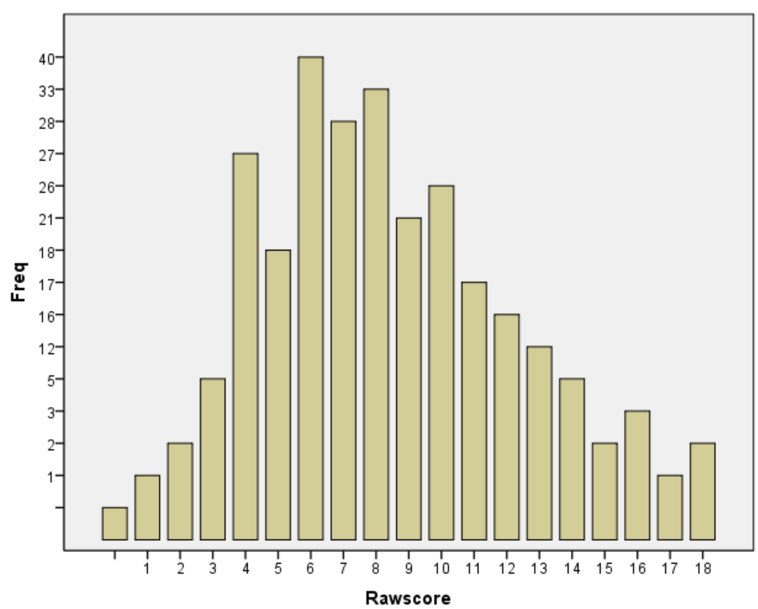
QUANTILES	Raw Score	%
99th percentile	17	85
95th percentile	14	70
90th percentile	12	60
75th percentile (3rd quartile)	10	50
50th percentile (median)	8	40
25th percentile (1st quartile)	6	30
10th percentile	4	20
5th percentile	4	20
1st percentile	2	10

Appendix G: Elementary Algebra Pretest Distribution of Raw Scores

Elementary Algebra Pretest Distribution of Raw Scores from SAS report

Raw Score	Frequency	Cumulative Frequency	Percent	Cumulative Percent
18	2	2	0.77	0.77
17	1	3	0.39	1.16
16	3	6	1.16	2.32
15	2	8	0.77	3.09
14	5	13	1.93	5.02
13	12	25	4.63	9.65
12	16	41	6.18	15.83
11	17	58	6.56	22.39
10	26	84	10.04	32.43
9	21	105	8.11	40.54
8	33	138	12.74	53.28
7	28	166	10.81	64.09
6	40	206	15.44	79.54
5	18	224	6.95	86.49
4	27	251	10.42	96.91
3	5	256	1.93	98.84
2	2	258	0.77	99.61
1	1	259	0.39	100.00

Histogram of the frequency of raw scores for the Elementary Algebra pretest



Appendix H: Elementary Algebra Pretest of Prerequisite Skills

Elementary Algebra Pretest of Prerequisite Skills from SAS report

Question	Skill Being Tested	Percent who answered correctly	(Index of Difficulty)
1	Decimal addition	73%	(27%)
2	Decimal subtraction	54%	(46%)
3	Decimal multiplication	65%	(35%)
4	Decimal division	23%	(77%)
5	Rounding decimals	66%	(34%)
6	Ordering decimals (Choose the largest)	56%	(44%)
7	Order of operations	49%	(51%)
8	Decimal application	33%	(67%)
9	Adding fractions	24%	(76%)
10	Subtracting fractions	31%	(69%)
11	Subtracting mixed numbers	21%	(79%)
12	Multiplying fractions	43%	(57%)
13	Dividing fractions	29%	(71%)
14	Dividing mixed numbers	28%	(72%)
15	Convert a decimal to a percent	27%	(73%)
16	Convert a fraction to a percent	36%	(64%)
17	Convert a percent to a fraction	21%	(79%)
18	Convert a percent to a decimal	33%	(67%)
19	Find the amount in a percent equation	62%	(38%)
20	Find the percent in a percent equation	42%	(58%)

Appendix I: Intermediate Algebra Pretest Results

Intermediate Algebra Pretest Results as reported by the SAS System
Marshall University Exam Analysis System – EXAM 95
Test Score Analysis 14:11 Friday, August 31, 2001

FIRST-GLANCE STATISTICS (for non-blank sheets):

NUMBER of sheets scored……………………………..647
MEAN score……………………………………………..45.38
MEDIAN score…………………………………………..45.00
STANDARD DEVIATION…………………………………14.58
Obtained LOW score……………………………………..5
Obtained HIGH score…………………………………...90

SUMMARY:

Number of sheets………………………………………650
Number of sheets with at least one response…………647
Number of sheets with no responses (blank)…………….3
First question……………………………………………...1
Last question………………………………………………20
Number of questions…………………………………... 20
Sheets with a "No Response"……………………………57
Total "No Response"……………………………………..252
Sheets with a "Multiple Response"………………………..8
Total "Multiple Response"…………………………………8

RAW SCORE STATISTICS (for non-blank sheets):

Mean score………………………………………………...9.08
Median score………………………………………………9.00
Standard deviation………………………………………..2.92
Obtained low score………………………………………..1
Obtained high score……………………………………..18

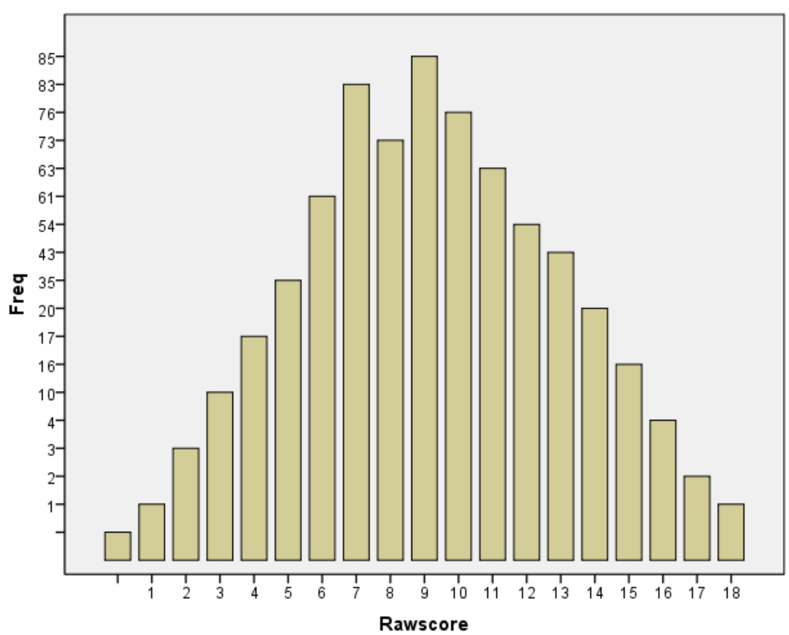
QUANTILES	Raw Score	%
99th percentile	16	80
95th percentile	14	70
90th percentile	13	65
75th percentile (3rd quartile)	11	55
50th percentile (median)	9	45
25th percentile (1st quartile)	7	35
10th percentile	5	25
5th percentile	5	25
1st percentile	3	15

Appendix J: Intermediate Algebra Pretest Distribution of Raw Scores

Intermediate Algebra Pretest Distribution of Raw Scores from SAS report

Raw Score	Frequency	Cumulative Frequency	Percent	Cumulative Percent
18	1	1	0.15	0.15
17	2	3	0.31	0.46
16	4	7	0.62	1.08
15	16	23	2.47	3.55
14	20	43	3.09	6.65
13	43	86	6.65	13.29
12	54	140	8.35	21.64
11	63	203	9.74	31.38
10	76	279	11.75	43.12
9	85	364	13.14	56.26
8	73	437	11.28	67.54
7	83	520	12.83	80.37
6	61	581	9.43	89.80
5	35	616	5.41	95.21
4	17	633	2.63	97.84
3	10	643	1.55	99.38
2	3	646	0.46	99.85
1	1	647	0.15	100.00

Histogram of the frequency of raw scores for the Intermediate Algebra pretest



Appendix K: Intermediate Algebra Pretest of Prerequisite Skills

Intermediate Algebra Pretest of Prerequisite Skills from SAS report

Question	Skill Being Tested	Percent who answered correctly	(Index of Difficulty)
1	Combine like terms	39%	(61%)
2	Solve a linear equation	43%	(57%)
3	Solve a literal equation	52%	(48%)
4	Change an equation of a line from standard form to S-I form	48%	(52%)
5	Zero exponent property	19%	(81%)
6	Like bases add exponents	52%	(48%)
7	Group of factors to a power	77%	(23%)
8	Use scientific notation	52%	(48%)
9	Determine whether an ordered pair is a solution of an equation	41%	(59%)
10	Recognize the equation of a vertical line	25%	(75%)
11	Solve a linear inequality in one variable	38%	(62%)
12	Plot an ordered pair	82%	(18%)
13	Find the perimeter of a rectangle	45%	(55%)
14	Find the slope of a line	21%	(79%)
15	Given y, find x	65%	(35%)
16	Solve an application problem	59%	(41%)
17	Quotient property for exponents	63%	(37%)
18	Square a binomial	13%	(87%)
19	Multiply a binomial times a binomial	46%	(54%)
20	Graph the solution of a linear inequality	41%	(59%)

Appendix L: Elementary Algebra Final Exam Results

Elementary Algebra Final Exam Results as reported by The SAS System
Marshall University Exam Analysis System – EXAM 95
Test Score Analysis 08:32 Monday, December 10, 2001

FIRST-GLANCE STATISTICS (for non-blank sheets):

NUMBER of sheets scored……………………………198
MEAN score………………………………………….64.48
MEDIAN score………………………………………..64.00
STANDARD DEVIATION……………………………...14.14
Obtained LOW score……………………………….....26
Obtained HIGH score………………………………100

SUMMARY:

Number of sheets………………………………………198
Number of sheets with at least one response…………198
Number of sheets with no responses (blank)…………….0
First question……………………………………………...1
Last question……………………………………………….50
Number of questions……………………………………....50
Sheets with a "No Response"……………………………13
Total "No Response"………………………………………16
Sheets with a "Multiple Response"……………………….4
Total "Multiple Response"………………………………….5

RAW SCORE STATISTICS (for non-blank sheets):

Mean score……………………………………………...32.24
Median score…………………………………………32.00
Standard deviation…………………………………7.07
Obtained low score…………………………………..13
Obtained high score………………………………50

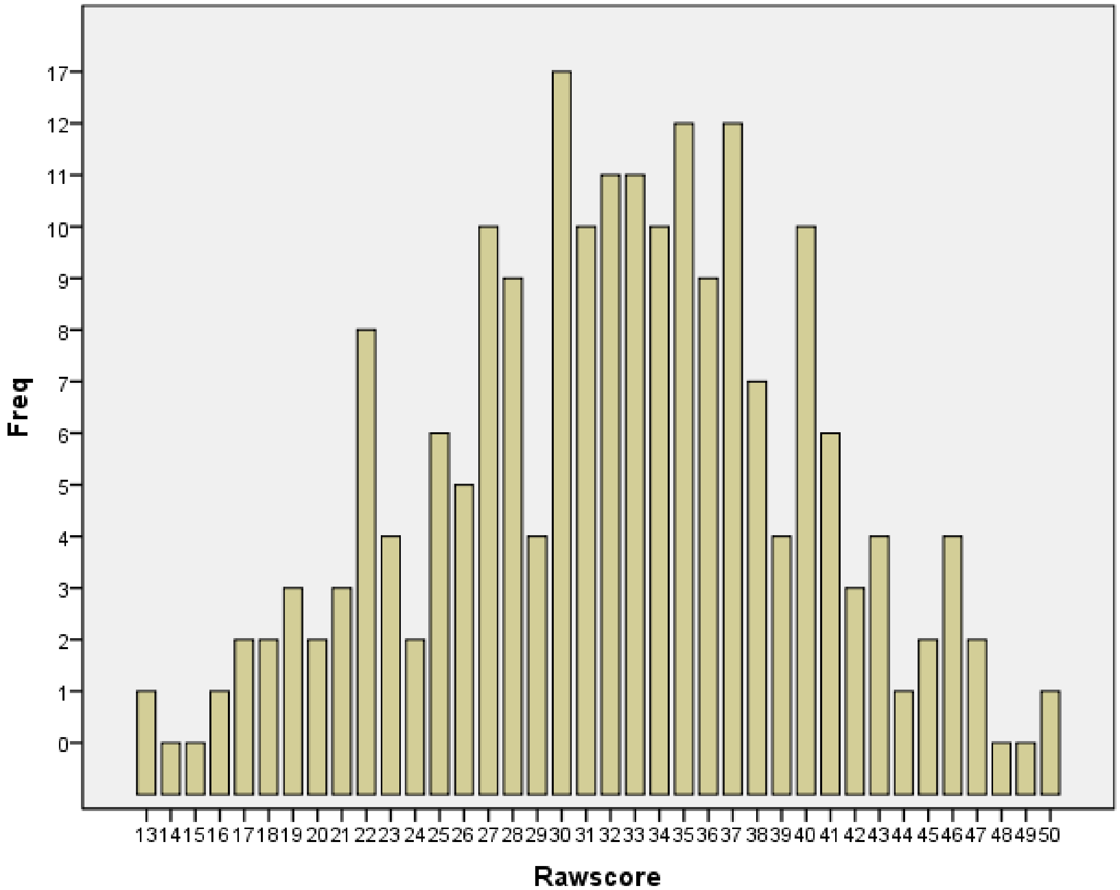
QUANTILES	Raw Score	%
99th percentile	47	94
95th percentile	44	88
90th percentile	41	82
75th percentile (3rd quartile)	37	74
50th percentile (median)	32	64
25th percentile (1st quartile)	28	56
10th percentile	22	44
5th percentile	20	40
1st percentile	16	32

Appendix M: Elementary Algebra Final Exam Distribution of Raw Scores

Elementary Algebra Final Exam Distribution of Raw Scores from SAS report

Raw Score	Frequency	Cumulative Frequency	Percent	Cumulative Percent
50	1	1	0.51	0.51
49	0	1	0.00	0.51
48	0	1	0.00	0.51
47	2	3	1.01	1.52
46	4	7	2.02	3.54
45	2	9	1.01	4.55
44	1	10	0.51	5.05
43	4	14	2.02	7.07
42	3	17	1.52	8.59
41	6	23	3.03	11.62
40	10	33	5.05	16.67
39	4	37	2.02	18.69
38	7	44	3.54	22.22
37	12	56	6.06	28.28
36	9	65	4.55	32.83
35	12	77	6.06	38.89
34	10	87	5.05	43.94
33	11	98	5.56	49.49
32	11	109	5.56	55.05
31	10	119	5.05	60.10
30	17	136	8.59	68.69
29	4	140	2.02	70.71
28	9	149	4.55	75.25
27	10	159	5.05	80.30
26	5	164	2.53	82.83
25	6	170	3.03	85.86
24	2	172	1.01	86.87
23	4	176	2.02	88.89
22	8	184	4.04	92.93
21	3	187	1.52	94.44
20	2	189	1.01	95.45
19	3	192	1.52	96.97
18	2	194	1.01	97.98
17	2	196	1.01	98.99
16	1	197	0.51	99.49
15	0	197	0.00	99.49
14	0	197	0.00	99.49
13	1	198	0.51	100.00

Histogram of the frequency of raw scores for the Elementary Algebra final exam



Appendix N: Intermediate Algebra Final Exam Results

Intermediate Algebra Final Exam Results as reported by The SAS System
Marshall University Exam Analysis System – EXAM 95
Test Score Analysis 09:42 Monday, December 10, 2001

FIRST-GLANCE STATISTICS (for non-blank sheets):

NUMBER of sheets scored……………………………526
MEAN score……………………………………………68.40
MEDIAN score…………………………………………70.00
STANDARD DEVIATION………………………………...14.07
Obtained LOW score……………………………………...20
Obtained HIGH score……………………………………100

SUMMARY:

Number of sheets………………………………………526
Number of sheets with at least one response…………526
Number of sheets with no responses (blank)…………….0
First question………………………………………………...1
Last question………………………………………………40
Number of questions………………………………………40
Sheets with a "No Response"……………………………40
Total "No Response"……………………………………..104
Sheets with a "Multiple Response"………………………..4
Total "Multiple Response"…………………………………5

RAW SCORE STATISTICS (for non-blank sheets):

Mean score…………………………………………………...27.36
Median score………………………………………………28.00
Standard deviation…………………………………………5.63
Obtained low score…………………………………………8
Obtained high score………………………………………40

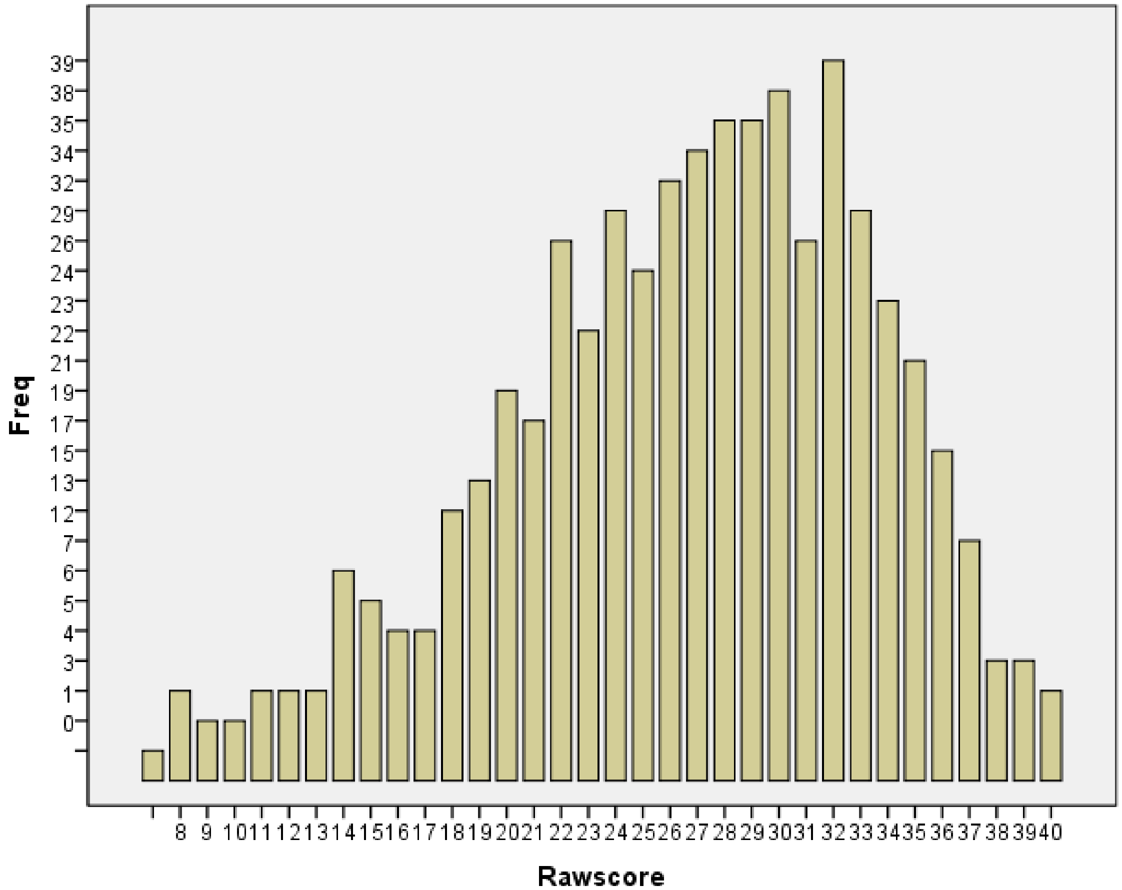
QUANTILES	Raw Score	%
99th percentile	38	95
95th percentile	36	90
90th percentile	34	85
75th percentile (3rd quartile)	32	80
50th percentile (median)	28	70
25th percentile (1st quartile)	23	58
10th percentile	20	50
5th percentile	18	45
1st percentile	14	35

Appendix O: Intermediate Algebra Final Exam Distribution of Raw Scores

Intermediate Algebra Final Exam Distribution of Raw Scores from SAS report

Raw Score	Frequency	Cumulative Frequency	Percent	Cumulative Percent
40	1	1	0.19	0.19
39	3	4	0.57	0.76
38	3	7	0.57	1.33
37	7	14	1.33	2.66
36	15	29	2.85	5.51
35	21	50	3.99	9.51
34	23	73	4.37	13.88
33	29	102	5.51	19.39
32	39	141	7.41	26.81
31	26	167	4.94	31.75
30	38	205	7.22	38.97
29	35	240	6.65	45.63
28	35	275	6.65	52.28
27	34	309	6.46	58.75
26	32	341	6.08	64.83
25	24	365	4.56	69.39
24	29	394	5.51	74.90
23	22	416	4.18	79.09
22	26	442	4.94	84.03
21	17	459	3.23	87.26
20	19	478	3.61	90.87
19	13	491	2.47	93.35
18	12	503	2.28	95.63
17	4	507	0.76	96.39
16	4	511	0.76	97.15
15	5	516	0.95	98.10
14	6	522	1.14	99.24
13	1	523	0.19	99.43
12	1	524	0.19	99.62
11	1	525	0.19	99.81
10	0	525	0.00	99.81
9	0	525	0.00	99.81
8	1	526	0.19	100.00

Histogram of the frequency of raw scores for the Intermediate Algebra final exam



Appendix P: Elementary Algebra Topics, Class Days, and Number of Questions on the Final Exam

Elementary Algebra

Topics	Class Days	Number of Questions on Final Exam
Determine which of 2 numbers is greater	1	1
Find absolute value	1	1
Addition of real numbers	3	1
Subtraction of real numbers	2	2
Multiplication of real numbers	1	1
Division of real numbers	1	2
Exponentiation	1	1
Order of operations	2	1
Combine like terms	1	1
Use the distributive property	1	1
Write an algebraic expression	1	1
Evaluate a formula	1	1
Algebraic addition and subtraction	1	1
Determine if a given number is a root of an equation	1	1
Addition and subtraction property of equality	1	1
Multiplication and division property of equality	1	1
Solve linear equations	1	1
Write an equation for an application problem	1	1
Solve application problems	1	1
Solve inequalities	1	1
Graph compound inequalities	1	1
Solve compound inequalities	1	1
Solve linear inequalities using multiplication and division	1	1
Linear inequality word problems	1	0
Exponent properties	4	7
Products of algebraic expressions	4	4
Scientific notation	1	1
Graph an ordered pair	3	1
Determine whether an ordered pair is a solution to an eqn.	1	1
Given x, find y	1	1
Graph a line	2	2
Graph horizontal and vertical lines	2	2
Given 2 points on a line, find the slope	1	1
Given a point and a slope, find the equation of the line	1	1
Determine whether 2 lines are parallel	1	1
Write and reduce ratios	2	1
Solve proportions	1	1
Find the principal square root of a perfect square	1	0
Find the principal root of a number	1	1

Appendix Q: Intermediate Algebra Topics, Class Days, and Number of Questions on the Final Exam

Intermediate Algebra

Topics	Class Days	Number of Questions on final exam
Solve a linear equation	1	1
Determine when a linear equation has no solution	1	1
Solve a formula for a specified variable	1	1
Translate verbal sentences into equations	1	2
Solve a linear equation verbal problem	1	2
Solve a linear inequality	1	1
Solve a compound inequality	1	1
Solve an absolute value equation	1	1
Factor a greatest common factor from a polynomial	1	1
Factor a four term polynomial by grouping	1	1
Factor a trinomial with leading coefficient equal to 1	1	1
Factor a trinomial with leading coefficient not equal to 1	1	2
Factor the difference of two squares	1	1
Divide rational expressions	1	1
Solve a rational equation in one variable	1	1
Express radicals in rational exponent form	1	1
Simplify an expression with a rational exponent	1	1
Apply exponent properties to rational exponents	1	1
Multiply radicals with the same indices	1	1
Add like radicals	1	1
Solve a quadratic equation by factoring	1	1
Solve a quadratic eqn. by using the quadratic formula	1	1
Find the solution set of a radical equation	1	1
Find the x- and y-intercepts of a linear equation	1	1
Sketch the graph of a linear equation in two variables	1	1
Sketch the graph of a vertical line	1	1
Given two points on a line, find the slope of the line	1	1
Find the distance between two points	1	1
Determine if two lines are parallel	1	1
Given the eqn. of a line, state its slope and y-intercept	1	1
Given two points, write the equation of the line	1	1
Solve a system of linear equations in two variables	1	1
Determine if a graph of a relation is a function	1	1
Determine if a relation defines a function	1	1
Find the domain of a relation	1	1
Find the domain of a rational function	1	1
Given the function f, evaluate f(x) for a value of x	1	1
Find the solution set of an exponential equation	1	1
Evaluate a logarithmic expression	1	1
Transform a logarithmic eqn. into into an exp. eqn.	1	1

Appendix R: Descriptive Statistics for the Predictors and Outcome Variables for Elementary Algebra and Intermediate Algebra

Student Outcomes

Final Exam Grade

The final exam grade results are in appendices L through Q. Appendices L and N contain the final exam results including the means, medians, standard deviations, high scores, low scores, quantiles, raw scores, and percentages, for Elementary Algebra and Intermediate Algebra respectively. Appendices M and O contain the distribution of raw scores including the frequencies, cumulative frequencies, percents, and cumulative percents for Elementary and Intermediate Algebra respectively. Appendices P and Q contain the topics, number of class days, and number of questions on the final exam for Elementary Algebra and Intermediate Algebra respectively.

Final Course Grade

For Elementary Algebra 134 (53.2%) passed, 101 failed (40.1%), and there were 17 missing scores (6.7%). For Intermediate Algebra 450 (66.7%) passed, 221 (33%) failed, and there were two missing scores (0.3%). These data are summarized in the following tables.

Elementary Algebra Final Grades

Grade	N	Percent
Pass	134	53.2%
Fail	101	40.1%
Missing	17	6.7%
Totals	252	100%

Intermediate Algebra Final Grades

Grade	N	Percent
Pass	450	66.7%
Fail	223	33 %
Missing	2	.3%
Totals	675	100%

Potential Predictors of Student Outcomes

Potential predictors of student outcomes occur at the student-level, instructor-level, and classroom-level. They will be considered in order.

Student-level Potential Predictors

Student-level predictors are specific to an individual student which included: student gender, ACT Math score, SAT Math score, college, math pretest score, and supplemental instruction as measured by the ASC grade. These will be considered in order.

Student Gender

The data group used in this study was comprised of 11 sections of Elementary Algebra with a total of 198 students and 28 sections of Intermediate Algebra with a total of 526 students for the fall 2001 semester. Seventy-seven of the 198 Elementary Algebra students (39%) were male, while 91 of the 198 Elementary Algebra students (46%) were female, with the gender data missing for 30 of the 198 Elementary Algebra students (15%). One hundred ninety-five of the 526 Intermediate Algebra students (37%) were male, while 313 of the 526 Intermediate Algebra students (60%) were female, with the gender data missing for 18 of the 526 Intermediate Algebra students (3%). There were more females than males in both classes. These data are summarized in the following tables.

Student Gender for Elementary Algebra

Gender	N	Percent
Males	77	39%
Female	91	46%
Missing	30	15%
Totals	198	100%

Student Gender for Intermediate Algebra

Gender	N	Percent
Males	195	37%
Females	313	60%
Missing	18	3%
Totals	526	100%

ACT Math Score

An ACT Math score between 12 and 15 placed students in Elementary Algebra while an ACT Math score between 16 and 18 placed students in Intermediate Algebra (see syllabi in Appendices B and C). The actual range of ACT Math scores for Elementary Algebra was 10 to 21 while the range for Intermediate Algebra ACT Math scores was 6 to 22. Although "research has consistently shown that mandatory assessment and placement contributes to student success (Boylan, 2002, p. 36)",MUCTC did not enforce their placement policy (Hunt L. D., 2000). Twelve of the Elementary Algebra students were not properly placed while 72 of the Intermediate Algebra students were not properly placed. Sixty-eight of the 72 students should have been enrolled in Elementary Algebra instead of Intermediate Algebra. The ACT Math Scores and the enrollment in each category for Elementary and Intermediate Algebra are summarized in the following tables.

Elementary Algebra Math ACT Scores

Math ACT Score	N
10	2
11	0
12	8
13	12
14	50
15	97
16	6
17	1
18	1
19	0
20	0
21	2
Total	179

The ACT mean, median, and mode for Elementary Algebra was 15. The standard deviation was 1.233, the range was 11, and there were 72 missing pieces of data.

Intermediate Algebra Math ACT Scores

Math ACT Score	N
6	1
7	0
8	0
9	0
10	0
11	0
12	2
13	10
14	15
15	40
16	170
17	205
18	161
19	2
20	0
21	1
22	1
Total	608

The ACT mean, median, and mode for Intermediate Algebra was 17. The standard deviation was 1.252, the range was 16, and there were 66 missing pieces of data.

SAT Math Score

For the Elementary Algebra data set, 17 students had the SAT math score as part of their records. Eleven students had the SAT math score but no ACT math score which resulted in list-wise deletion of these 11 records with multiple regression. The remaining six students had both ACT math and SAT math scores which would not result in the deletion of the student records. These results are summarized in the following table.

Elementary Algebra SAT Math Scores

Math Test	N
SAT Math Score only	11
SAT and ACT Math Scores	6
Total	17

For the Intermediate Algebra data set, 80 students had the SAT math score as part of their records. Thirty-seven had the SAT math score but no ACT math score which resulted in list-wise deletion of these 37 records with multiple regression. The remaining 43 Intermediate Algebra students had both ACT math and SAT math scores which would not result in the deletion of the student record. These results are summarized in Table 11.

Intermediate Algebra SAT Math Scores

Math Test	N
SAT Math Score only	37
SAT and ACT Math Scores	43
Total	80

College

The number of Community and Technical College students compared to University students for Elementary Algebra and Intermediate Algebra are summarized in the following tables.

Comparison of Community and Technical College and University Students for Elementary Algebra

Institution	Number	Percent
Community and Technical College Students	132	43%
University Students	107	52%
Missing	13	5%
Totals	252	100%

Comparison of Community and Technical College and University Students for Intermediate Algebra

Institution	Number	Percent
Community and Technical College Students	141	21%
University Students	529	78%
Missing	5	1%
Totals	674	100%

Pretest

Results of the Marshall University Exam Analysis System by SAS are included for the pretests in the appendices. Test result summaries and descriptive statistics are in appendices F through K.

ASC Grade

For Elementary Algebra 166 passed (65.9%), 72 failed (28.6%), and there were 14 missing scores (5.6%). For Intermediate Algebra 485 passed (71.9%), 180 (26.7%) failed, and there were 10 missing scores (1.5%). These data are summarized in the following tables.

Elementary Algebra ASC Final Grades

Grade	N	Percent
0	72	28.6%
1	166	65.9%
Missing	14	5.6%
Totals	252	100.1% (due to round-off error)

Intermediate Algebra ASC Final Grades

Grade	N	Percent
0	180	26.7%
1	485	71.9%
Missing	10	1.5%
Totals	675	100.1% (due to round-off error)

Instructor-level Potential Predictors

Although all developmental algebra instructors (Elementary Algebra and Intermediate Algebra) had at least a Bachelor's degree, and none of the developmental algebra instructors had a doctorate, instructor education was not included as one of the independent variables studied. Some studies (Fike & Fike, 2007) included faculty education level, but in this study information about individual instructors' educational levels was not collected.

Instructor-level predictors are specific to a particular instructor which included: instructor gender, instructor employment status, instructor playing

Mozart for Your Mind tape, and instructor requiring use of ALEKS software. They will be considered in order.

Elementary Algebra

The 11 sections of Elementary Algebra were taught by 9 different instructors, of which two (22%) were males and seven (78%) were females. Four (44%) of these instructors were full-time and five (56%) were adjunct. In one of these sections (9%), the Mozart for Your Mind tape was played at the start and end of each class; the female instructor who played this music was full time. ALEKS software was not used in the Elementary Algebra course.

Intermediate Algebra

The 28 sections of Intermediate Algebra were taught by 15 different instructors, of which four (27%) were males and 11 (73%) were females. Five (33%) of these instructors were full-time and 10 (67%) were adjunct. The same instructor who played the Mozart for Your Mind tape for her Elementary Algebra students also played said tape for her two sections of Intermediate Algebra or 7% of the 28 sections. One full-time instructor used ALEKS software in two of the three classes that he taught. One ALEKS class had regular class meetings; the other was self paced. ALEKS software was used in two of the 28 sections (7%) of the Intermediate Algebra sections. This information is summarized in the following tables.

Elementary Algebra Instructor Gender

Gender	N	Percent
Males	2	22%
Females	7	78%
Totals	9	100%

Elementary Algebra Instructor Employment Status

Employment Status	N	Percent
Full-Time	4	44%
Adjunct	5	56%
Totals	9	100%

Elementary Algebra Mozart Music Use Per Section

Mozart for Your Mind Tape Use	N	Percent
Tape Used	1	9%
Tape Not Used	10	91%
Totals	11	100%

Intermediate Algebra Instructor Gender

Gender	N	Percent
Males	4	27%
Females	11	73%
Totals	15	100%

Intermediate Algebra Instructor Employment Status

Employment Status	N	Percent
Full-Time	5	33%
Adjunct	10	67%
Totals	15	100%

Intermediate Algebra Mozart Music Use per Section

Mozart for Your Mind Use	N	Percent
Tape Used	2	7%
Tape Not Used	26	93%
Totals	28	100%

Intermediate Algebra ALEKS Software Use per Section

ALEKS Software Use	N	Percent
Software Used	2	7%
Software Not Used	26	93%
Totals	28	100%

For both classes the female instructors outnumbered the male instructors in numbers and percents. While there was nearly a 50-50 split on the employment status for Elementary Algebra instructors, two-thirds of Intermediate Algebra instructors were adjunct and only one-third were full-time.

Potential Classroom-level Predictors

Classroom-level predictors are specific to the classroom and are an integral part of the learning environment. These included: class time of day, number of class meetings, and class size. They will be considered in order.

Time of Day

Although the beginning time of class was in the original data set, in order to simplify this categorical variable, the classes were coded as a dichotomous variable (i.e., a.m. or p.m. classes). Classes starting between 8 a.m. and noon were considered to be a.m. classes while classes starting between 12:15 p.m. and 6:30 p.m. were considered p.m. classes. For the 11 classes in the Elementary Algebra data set, there were four (36%) a.m. classes and seven (64%) p.m. classes. Three out of the four (75%) a.m. classes were taught by full-time faculty, while one out of the four (25%) a.m. classes was taught by an adjunct faculty member. This is summarized in the following table.

Elementary Algebra Time of Day

Time	N	Percent
a.m.	4	36%
p.m.	7	64%
Totals	11	100%

For the 28 classes in the Intermediate Algebra data set, there were nine (32%) a.m. classes, 18 (64%) p.m. classes, and one (4%) self-paced class which did not have a time. It is interesting, but not unusual to note, for the Intermediate Algebra classes all nine of the a.m. classes were taught by full-time faculty. For the p.m. classes, 15 of the 18 classes (83%) were taught by adjunct instructors while three of the 18 classes (17%) were taught by full-time instructors. This is summarized in the following table.

Intermediate Algebra Time of Day

Time	N	Percent
a.m.	9	32%
p.m.	18	64%
Self-paced	1	4%
Totals	28	100%

Number of Class Meetings

For the Elementary Algebra data group the number of class meetings ranged from twice a week to four or five times per week. Five of the 11 (45%) classes met twice a week; four out of these five (80%) classes were taught by adjunct faculty. Three of the 11 (27%) classes met four times per week; one out of the three classes was taught by an adjunct faculty member. Three of the 11 (27%) classes met five times per week; one out of the three classes was taught by an adjunct faculty member. This is summarized in the following table.

Elementary Algebra Number of Class Meetings

Number of Class Meetings	N	Percent
2	5	45%
4	3	27%
5	3	27%
Totals	11	100%

For the Intermediate Algebra data group the number of class meetings ranged from two to five times per week. Fourteen of the 27 (52%) classes met twice a week; all of these classes were taught by adjunct faculty, and all of them were p.m. classes. One of the 27 (4%) classes met three times a week in the p.m. with an adjunct instructor. Seven of the 27 (26%) classes met four times a week; one of these seven (14%) classes was taught by an adjunct instructor, the remaining six out of seven (86%) were taught by full-time instructors. Five of the

27 (19%) classes met five times per week. All five of these classes were a.m. classes taught by full-time faculty. This is summarized in the following table.

Intermediate Algebra Number of Class Meetings

Number of Class Meetings	N	Percent
2	14	52%
3	1	4%
4	7	26%
5	5	19%
Totals	27	100%

Class Size

In the 11 Elementary Algebra sections, the class size ranged from 11 to 44 students. In the 28 Intermediate Algebra sections, the class size ranged from 19 to 39 students.

Appendix S: SPSS Simple Regression Output for Elementary Algebra and Intermediate Algebra

```
REGRESSION
  /DESCRIPTIVES MEAN STDDEV CORR SIG N
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS CI(95) BCOV R ANOVA COLLIN TOL CHANGE
ZPP
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT fnlexam
  /METHOD=ENTER gender
  /RESIDUALS DURBIN HISTOGRAM(ZRESID) NORMPROB(ZRESID)
  /CASEWISE PLOT(ZRESID) OUTLIERS(3).
```

Regression

Notes

Output Created		02-Oct-2011 12:04:09
Comments		
Input	Data	C:\Users\Lin\Documents\math 096 fall 2001 with classrooms.sav
	Active Dataset	DataSet2
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	252
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.

Syntax		REGRESSION /DESCRIPTIVES MEAN STDDEV CORR SIG N /MISSING LISTWISE /STATISTICS COEFF OUTS CI(95) BCOV R ANOVA COLLIN TOL CHANGE ZPP /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT fnlexam /METHOD=ENTER gender /RESIDUALS DURBIN HISTOGRAM(ZRESID) NORMPROB(ZRESID) /CASEWISE PLOT(ZRESID) OUTLIERS(3).
Resources	Processor Time	00:00:02.043
	Elapsed Time	00:00:47.729
	Memory Required	2260 bytes
	Additional Memory Required for Residual Plots	656 bytes

[DataSet2] C:\Users\Lin\Documents\math 096 fall 2001 with classrooms.sav

Descriptive Statistics

	Mean	Std. Deviation	N
Fnlexam	65.13	14.036	168
Gender	.46	.500	168

Correlations

		fnlexam	gender
Pearson Correlation	Fnlexam	1.000	-.035
	Gender	-.035	1.000
Sig. (1-tailed)	Fnlexam	.	.326
	Gender	.326	.
N	Fnlexam	168	168
	Gender	168	168

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	gender[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: fnlexam

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics		
					R Square Change	F Change	df1
1	.035[a]	.001	-.005	14.070	.001	.204	1

a. Predictors: (Constant), gender

b. Dependent Variable: fnlexam

Model Summary[b]

Model	Change Statistics		Durbin-Watson
	df2	Sig. F Change	
1	166	.652	1.702

b. Dependent Variable: fnlexam

ANOVA[b]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	40.468	1	40.468	.204	.652[a]
	Residual	32860.651	166	197.956		
	Total	32901.119	167			

a. Predictors: (Constant), gender

b. Dependent Variable: fnlexam

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	65.582	1.475		44.466	.000
	gender	-.985	2.179	-.035	-.452	.652

a. Dependent Variable: fnlexam

Coefficients[a]

Model		95.0% Confidence Interval for B		Correlations		
		Lower Bound	Upper Bound	Zero-order	Partial	Part
1	(Constant)	62.670	68.494			
	gender	-5.286	3.316	-.035	-.035	-.035

a. Dependent Variable: fnlexam

Coefficients[a]

Model		Collinearity Statistics	
		Tolerance	VIF
1	(Constant)		
	gender	1.000	1.000

a. Dependent Variable: fnlexam

Coefficient Correlations[a]

Model			gender
1	Correlations	Gender	1.000
	Covariances	Gender	4.746

a. Dependent Variable: fnlexam

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions	
				(Constant)	gender
1	1	1.677	1.000	.16	.16
	2	.323	2.279	.84	.84

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions (Constant)	Variance Proportions gender
1	1	1.677	1.000	.16	.16
	2	.323	2.279	.84	.84

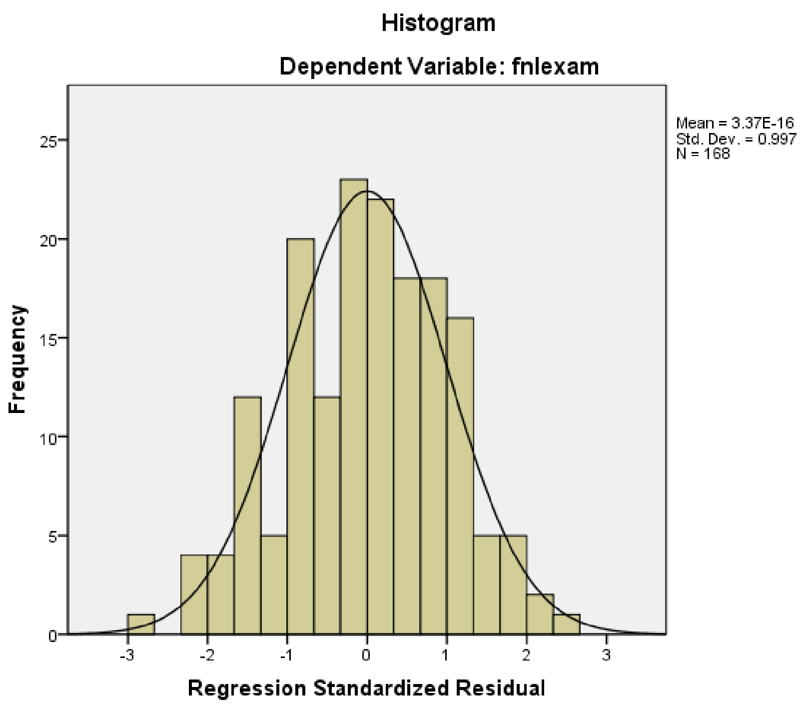
a. Dependent Variable: fnlexam

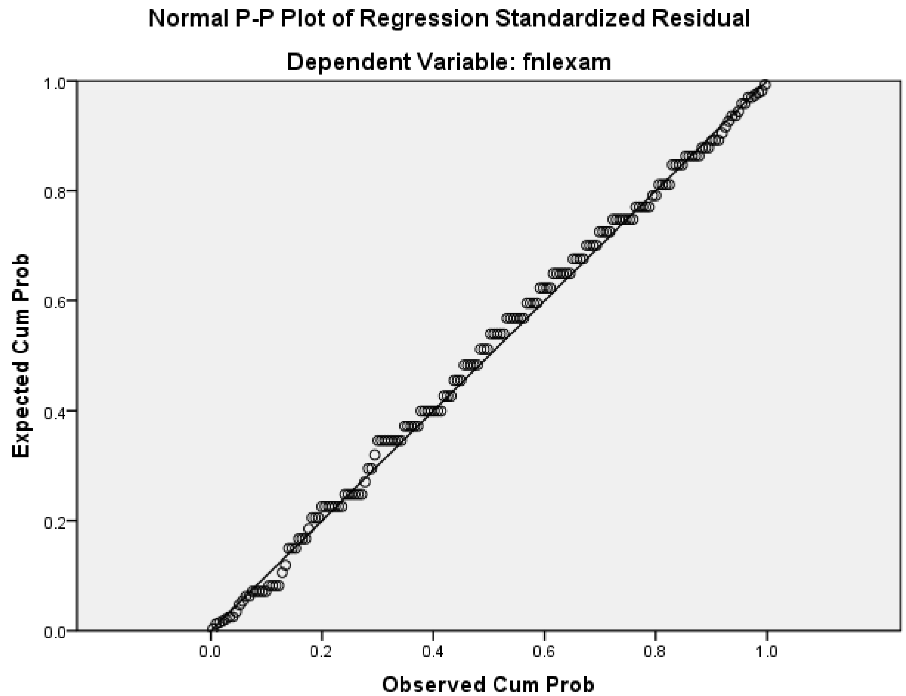
Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	64.60	65.58	65.13	.492	168
Residual	-38.597	34.418	.000	14.027	168
Std. Predicted Value	-1.084	.917	.000	1.000	168
Std. Residual	-2.743	2.446	.000	.997	168

a. Dependent Variable: fnlexam

Charts






```
REGRESSION
  /DESCRIPTIVES MEAN STDDEV CORR SIG N
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS CI(95) BCOV R ANOVA COLLIN TOL CHANGE
ZPP
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT fnlexam
  /METHOD=ENTER act
  /RESIDUALS DURBIN HISTOGRAM(ZRESID) NORMPROB(ZRESID)
  /CASEWISE PLOT(ZRESID) OUTLIERS(3).
```

Regression

Notes

Output Created		02-Oct-2011 12:14:20
Comments		
Input	Data	C:\Users\Lin\Documents\math 096 fall 2001 with classrooms.sav
	Active Dataset	DataSet2
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	252
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.
Syntax		REGRESSION /DESCRIPTIVES MEAN STDDEV CORR SIG N /MISSING LISTWISE /STATISTICS COEFF OUTS CI(95) BCOV R ANOVA COLLIN TOL CHANGE ZPP /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT fnlexam /METHOD=ENTER act /RESIDUALS DURBIN HISTOGRAM(ZRESID) NORMPROB(ZRESID) /CASEWISE PLOT(ZRESID) OUTLIERS(3).
Resources	Processor Time	00:00:01.092
	Elapsed Time	00:00:01.190
	Memory Required	2260 bytes
	Additional Memory Required for Residual Plots	656 bytes

[DataSet2] C:\Users\Lin\Documents\math 096 fall 2001 with classrooms.sav

Descriptive Statistics

	Mean	Std. Deviation	N
fnlexam	64.37	14.173	129
act	14.58	1.368	129

Correlations

		fnlexam	act
Pearson Correlation	fnlexam	1.000	.238
	act	.238	1.000
Sig. (1-tailed)	fnlexam	.	.003
	act	.003	.
N	fnlexam	129	129
	act	129	129

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	act[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: fnlexam

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics		
					R Square Change	F Change	df1
1	.238[a]	.057	.049	13.820	.057	7.616	1

a. Predictors: (Constant), act

b. Dependent Variable: fnlexam

Model Summary[b]

Model	Change Statistics		
	df2	Sig. F Change	Durbin-Watson
1	127	.007	1.715

b. Dependent Variable: fnlexam

ANOVA[b]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	1454.539	1	1454.539	7.616	.007[a]
	Residual	24255.601	127	190.989		
	Total	25710.140	128			

a. Predictors: (Constant), act

b. Dependent Variable: fnlexam

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	28.430	13.081		2.173	.032
	act	2.465	.893	.238	2.760	.007

a. Dependent Variable: fnlexam

Coefficients[a]

Model		95.0% Confidence Interval for B		Correlations		
		Lower Bound	Upper Bound	Zero-order	Partial	Part
1	(Constant)	2.546	54.314			
	act	.697	4.232	.238	.238	.238

a. Dependent Variable: fnlexam

Coefficients[a]

Model		Collinearity Statistics	
		Tolerance	VIF
1	(Constant)		
	act	1.000	1.000

a. Dependent Variable: fnlexam

Coefficient Correlations[a]

Model			act
1	Correlations	act	1.000
	Covariances	act	.798

a. Dependent Variable: fnlexam

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions	
				(Constant)	Act
1	1	1.996	1.000	.00	.00
	2	.004	21.454	1.00	1.00

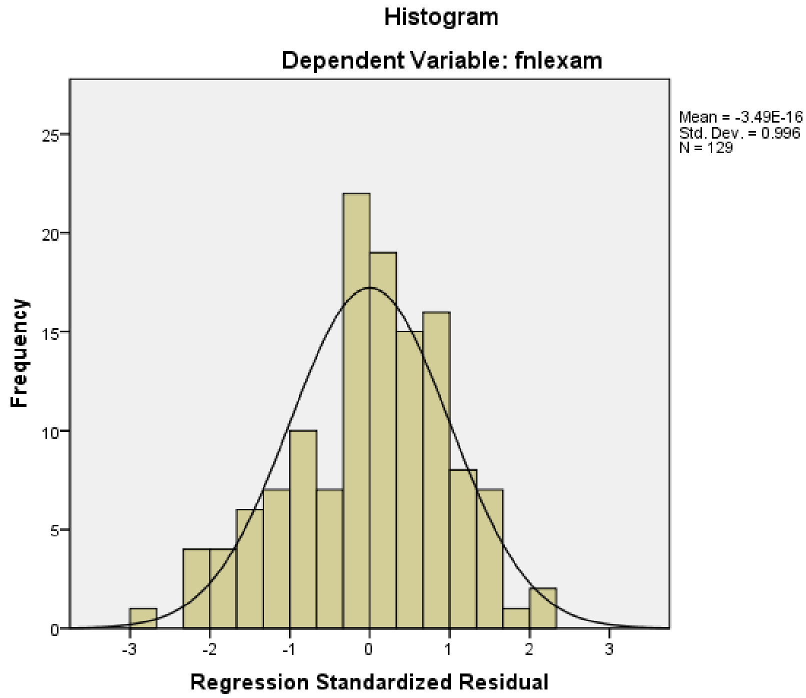
a. Dependent Variable: fnlexam

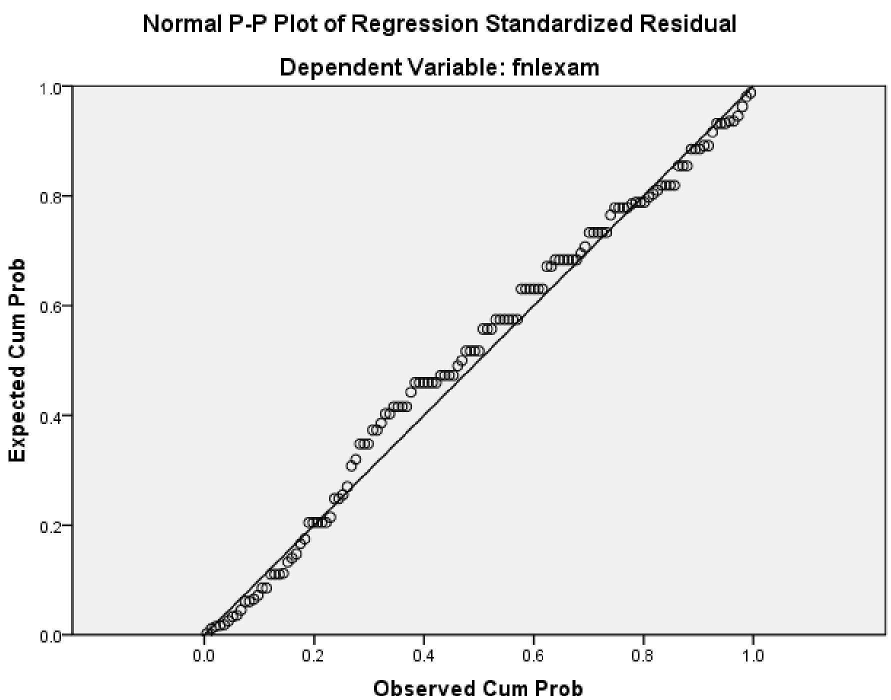
Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	53.08	80.19	64.37	3.371	129
Residual	-39.404	31.061	.000	13.766	129
Std. Predicted Value	-3.350	4.693	.000	1.000	129
Std. Residual	-2.851	2.248	.000	.996	129

a. Dependent Variable: fnlexam

Charts


Histogram
Dependent Variable: fnlexam
Mean = -3.49E-16
Std. Dev. = 0.996
N = 129
Frequency
Regression Standardized Residual
0
5
10
15
20
25
-3
-2
-1
0
1
2
3


Normal P-P Plot of Regression Standardized Residual
Dependent Variable: fnlexam
Expected Cum Prob
Observed Cum Prob
0.0
0.2
0.4
0.6
0.8
1.0

```
REGRESSION
  /DESCRIPTIVES MEAN STDDEV CORR SIG N
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS CI(95) BCOV R ANOVA COLLIN TOL CHANGE
ZPP
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT fnlexam
  /METHOD=ENTER sat
  /RESIDUALS DURBIN HISTOGRAM(ZRESID) NORMPROB(ZRESID)
  /CASEWISE PLOT(ZRESID) OUTLIERS(3).
```

Regression

Notes

Output Created		02-Oct-2011 12:17:01
Comments		
Input	Data	C:\Users\Lin\Documents\math 096 fall 2001 with classrooms.sav
	Active Dataset	DataSet2
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	252
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.

Syntax		REGRESSION /DESCRIPTIVES MEAN STDDEV CORR SIG N /MISSING LISTWISE /STATISTICS COEFF OUTS CI(95) BCOV R ANOVA COLLIN TOL CHANGE ZPP /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT fnlexam /METHOD=ENTER sat /RESIDUALS DURBIN HISTOGRAM(ZRESID) NORMPROB(ZRESID) /CASEWISE PLOT(ZRESID) OUTLIERS(3).
Resources	Processor Time	00:00:01.139
	Elapsed Time	00:00:01.111
	Memory Required	2260 bytes
	Additional Memory Required for Residual Plots	656 bytes

[DataSet2] C:\Users\Lin\Documents\math 096 fall 2001 with classrooms.sav

Descriptive Statistics

	Mean	Std. Deviation	N
fnlexam	64.20	15.332	10
sat	348.00	38.528	10

Correlations

		fnlexam	sat
Pearson Correlation	fnlexam	1.000	-.067
	sat	-.067	1.000
Sig. (1-tailed)	fnlexam	.	.427
	sat	.427	.
N	fnlexam	10	10
	sat	10	10

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	sat[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: fnlexam

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics		
					R Square Change	F Change	df1
1	.067[a]	.004	-.120	16.225	.004	.036	1

a. Predictors: (Constant), sat

b. Dependent Variable: fnlexam

Model Summary[b]

Model	Change Statistics		Durbin-Watson
	df2	Sig. F Change	
1	8	.854	2.012

b. Dependent Variable: fnlexam

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	9.486	1	9.486	.036	.854[a]
	Residual	2106.114	8	263.264		
	Total	2115.600	9			

a. Predictors: (Constant), sat

b. Dependent Variable: fnlexam

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	73.473	49.120		1.496	.173
	sat	-.027	.140	-.067	-.190	.854

a. Dependent Variable: fnlexam

Coefficients[a]

Model		95.0% Confidence Interval for B		Correlations		
		Lower Bound	Upper Bound	Zero-order	Partial	Part
1	(Constant)	-39.797	186.743			
	sat	-.350	.297	-.067	-.067	-.067

a. Dependent Variable: fnlexam

Coefficients[a]

Model		Collinearity Statistics	
		Tolerance	VIF
1	(Constant)		
	sat	1.000	1.000

a. Dependent Variable: fnlexam

Coefficient Correlations[a]

Model			sat
1	Correlations	sat	1.000
	Covariances	sat	.020

a. Dependent Variable: fnlexam

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions	
				(Constant)	sat
1	1	1.995	1.000	.00	.00
	2	.005	19.094	1.00	1.00

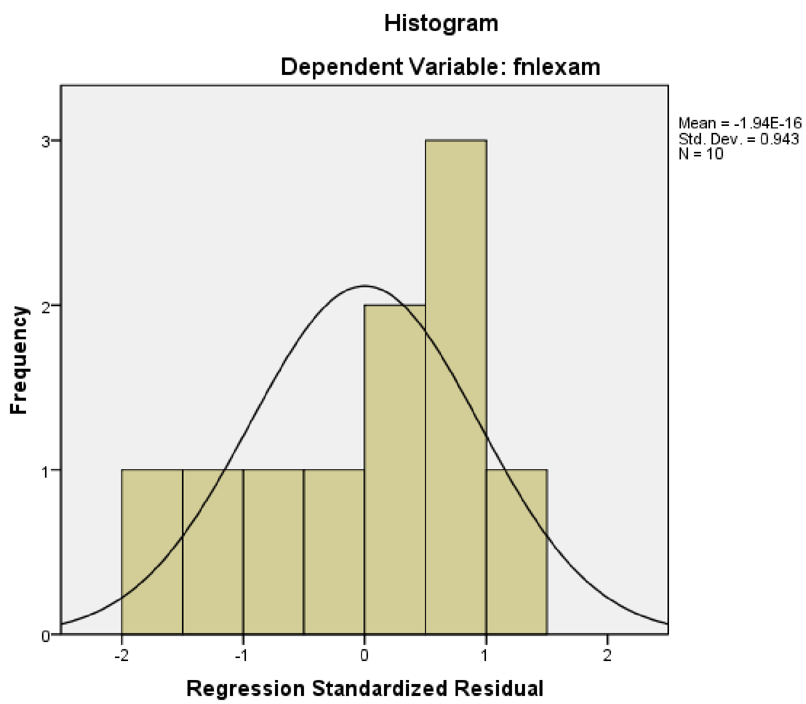
a. Dependent Variable: fnlexam

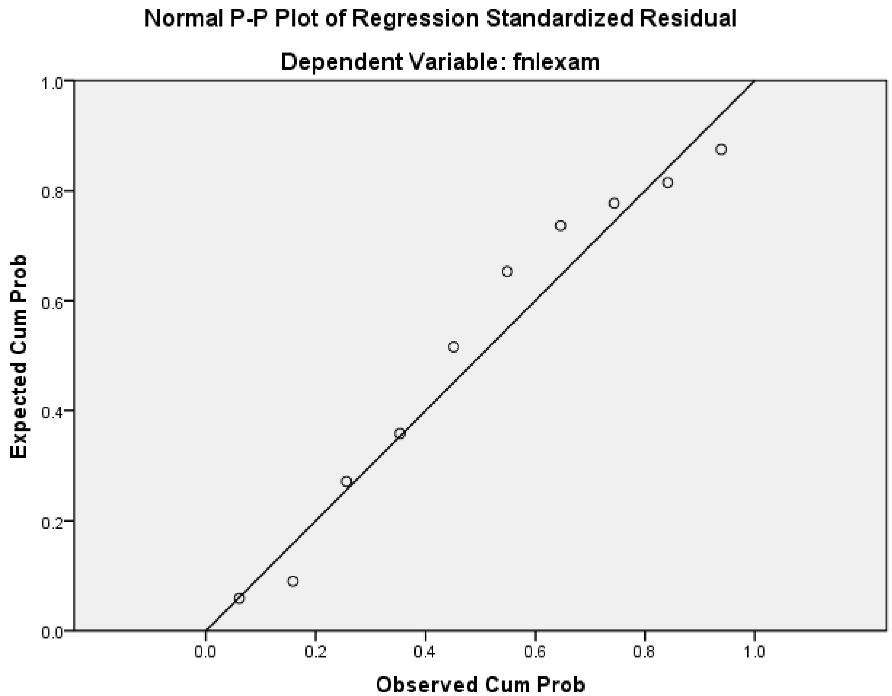
Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	63.35	65.75	64.20	1.027	10
Residual	-25.347	18.653	.000	15.297	10
Std. Predicted Value	-.831	1.505	.000	1.000	10
Std. Residual	-1.562	1.150	.000	.943	10

a. Dependent Variable: fnlexam

Charts






```
REGRESSION
  /DESCRIPTIVES MEAN STDDEV CORR SIG N
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS CI(95) BCOV R ANOVA COLLIN TOL CHANGE
ZPP
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT fnlexam
  /METHOD=ENTER comcol
  /RESIDUALS DURBIN HISTOGRAM(ZRESID) NORMPROB(ZRESID)
  /CASEWISE PLOT(ZRESID) OUTLIERS(3).
```

Regression

Notes

Output Created		02-Oct-2011 12:19:40
Comments		
Input	Data	C:\Users\Lin\Documents\math 096 fall 2001 with classrooms.sav
	Active Dataset	DataSet2
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	252

Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.
Syntax		REGRESSION /DESCRIPTIVES MEAN STDDEV CORR SIG N /MISSING LISTWISE /STATISTICS COEFF OUTS CI(95) BCOV R ANOVA COLLIN TOL CHANGE ZPP /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT fnlexam /METHOD=ENTER comcol /RESIDUALS DURBIN HISTOGRAM(ZRESID) NORMPROB(ZRESID) /CASEWISE PLOT(ZRESID) OUTLIERS(3).
Resources	Processor Time	00:00:01.170
	Elapsed Time	00:00:01.188
	Memory Required	2260 bytes
	Additional Memory Required for Residual Plots	656 bytes

[DataSet2] C:\Users\Lin\Documents\math 096 fall 2001 with classrooms.sav

Descriptive Statistics

	Mean	Std. Deviation	N
fnlexam	65.14	13.994	169
comcol	.54	.500	169

Correlations

		fnlexam	comcol
Pearson Correlation	fnlexam	1.000	-.174
	comcol	-.174	1.000

Sig. (1-tailed)	fnlexam	.	.012
	comcol	.012	.
N	fnlexam	169	169
	comcol	169	169

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	comcol[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: fnlexam

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics		
					R Square Change	F Change	df1
1	.174[a]	.030	.025	13.822	.030	5.223	1

a. Predictors: (Constant), comcol

b. Dependent Variable: fnlexam

Model Summary[b]

Model	Change Statistics		Durbin-Watson
	df2	Sig. F Change	
1	167	.024	1.728

b. Dependent Variable: fnlexam

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	997.890	1	997.890	5.223	.024[a]
	Residual	31903.980	167	191.042		
	Total	32901.870	168			

a. Predictors: (Constant), comcol

b. Dependent Variable: fnlexam

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	67.792	1.575		43.039	.000
	comcol	-4.879	2.135	-.174	-2.285	.024

a. Dependent Variable: fnlexam

Coefficients[a]

Model		95.0% Confidence Interval for B		Correlations		
		Lower Bound	Upper Bound	Zero-order	Partial	Part
1	(Constant)	64.682	70.902			
	comcol	-9.094	-.664	-.174	-.174	-.174

a. Dependent Variable: fnlexam

Coefficients[a]

Model		Collinearity Statistics	
		Tolerance	VIF
1	(Constant)		
	comcol	1.000	1.000

a. Dependent Variable: fnlexam

Coefficient Correlations[a]

Model			comcol
1	Correlations	comcol	1.000
	Covariances	comcol	4.558

a. Dependent Variable: fnlexam

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions (Constant)	Variance Proportions comcol
1	1	1.738	1.000	.13	.13
	2	.262	2.575	.87	.87

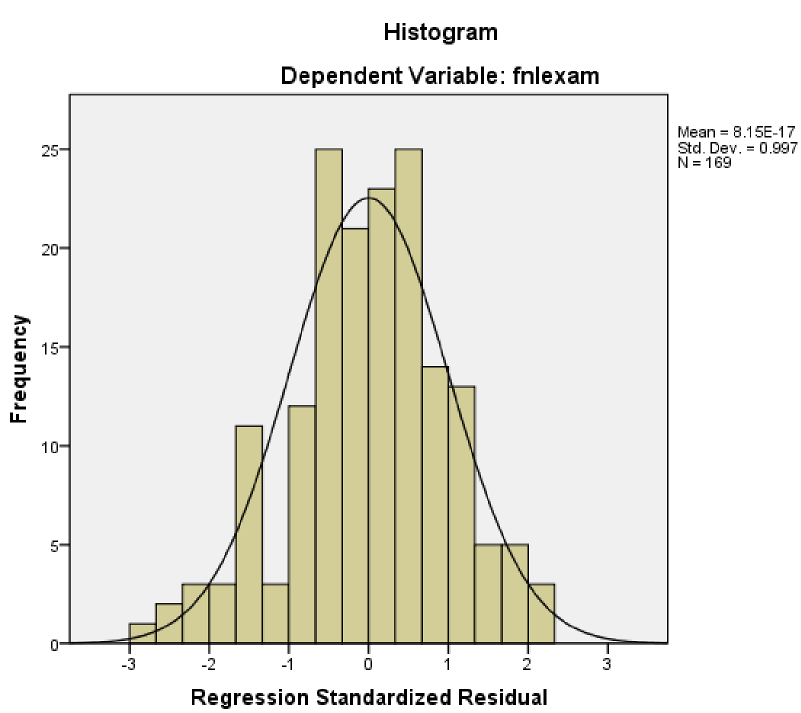
a. Dependent Variable: fnlexam

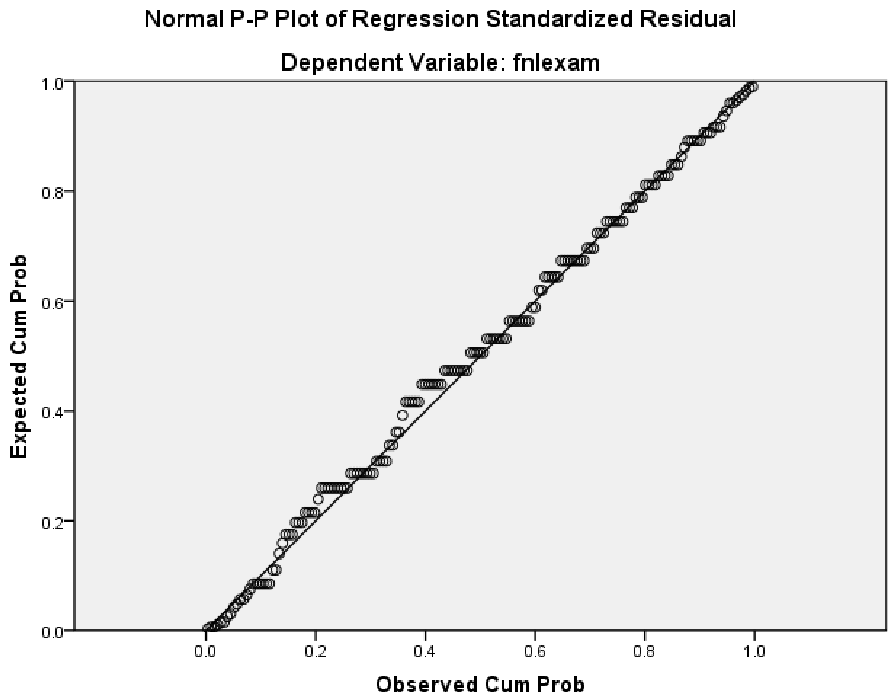
Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	62.91	67.79	65.14	2.437	169
Residual	-36.913	32.208	.000	13.781	169
Std. Predicted Value	-.912	1.090	.000	1.000	169
Std. Residual	-2.671	2.330	.000	.997	169

a. Dependent Variable: fnlexam

Charts






```
REGRESSION
  /DESCRIPTIVES MEAN STDDEV CORR SIG N
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS CI(95) BCOV R ANOVA COLLIN TOL CHANGE
ZPP
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT fnlexam
  /METHOD=ENTER pretest
  /RESIDUALS DURBIN HISTOGRAM(ZRESID) NORMPROB(ZRESID)
  /CASEWISE PLOT(ZRESID) OUTLIERS(3).
```

Regression

Notes

Output Created		02-Oct-2011 12:21:24
Comments		
Input	Data	C:\Users\Lin\Documents\math 096 fall 2001 with classrooms.sav
	Active Dataset	DataSet2
	Filter	<none>
	Weight	<none>
	Split File	<none>

	N of Rows in Working Data File	252
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.
Syntax		REGRESSION /DESCRIPTIVES MEAN STDDEV CORR SIG N /MISSING LISTWISE /STATISTICS COEFF OUTS CI(95) BCOV R ANOVA COLLIN TOL CHANGE ZPP /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT fnlexam /METHOD=ENTER pretest /RESIDUALS DURBIN HISTOGRAM(ZRESID) NORMPROB(ZRESID) /CASEWISE PLOT(ZRESID) OUTLIERS(3).
Resources	Processor Time	00:00:01.092
	Elapsed Time	00:00:01.163
	Memory Required	2260 bytes
	Additional Memory Required for Residual Plots	656 bytes

[DataSet2] C:\Users\Lin\Documents\math 096 fall 2001 with classrooms.sav

Descriptive Statistics

	Mean	Std. Deviation	N
fnlexam	65.14	13.994	169
pretest	41.60	16.845	169

Correlations

	fnlexam	pretest

Pearson Correlation	fnlexam	1.000	.370
	pretest	.370	1.000
Sig. (1-tailed)	fnlexam	.	.000
	pretest	.000	.
N	fnlexam	169	169
	pretest	169	169

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	pretest[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: fnlexam

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics		
					R Square Change	F Change	df1
1	.370[a]	.137	.132	13.040	.137	26.489	1

a. Predictors: (Constant), pretest

b. Dependent Variable: fnlexam

Model Summary[b]

Model	Change Statistics		Durbin-Watson
	df2	Sig. F Change	
1	167	.000	1.864

b. Dependent Variable: fnlexam

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4504.384	1	4504.384	26.489	.000[a]
	Residual	28397.486	167	170.045		

	Total	32901.870	168			

a. Predictors: (Constant), pretest

b. Dependent Variable: fnlexam

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	52.349	2.679		19.538	.000
	pretest	.307	.060	.370	5.147	.000

a. Dependent Variable: fnlexam

Coefficients[a]

Model		95.0% Confidence Interval for B		Correlations		
		Lower Bound	Upper Bound	Zero-order	Partial	Part
1	(Constant)	47.059	57.639			
	pretest	.189	.425	.370	.370	.370

a. Dependent Variable: fnlexam

Coefficients[a]

Model		Collinearity Statistics	
		Tolerance	VIF
1	(Constant)		
	pretest	1.000	1.000

a. Dependent Variable: fnlexam

Coefficient Correlations[a]

Model			pretest
1	Correlations	pretest	1.000
	Covariances	pretest	.004

a. Dependent Variable: fnlexam

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions	
				(Constant)	pretest
1	1	1.927	1.000	.04	.04
	2	.073	5.148	.96	.96

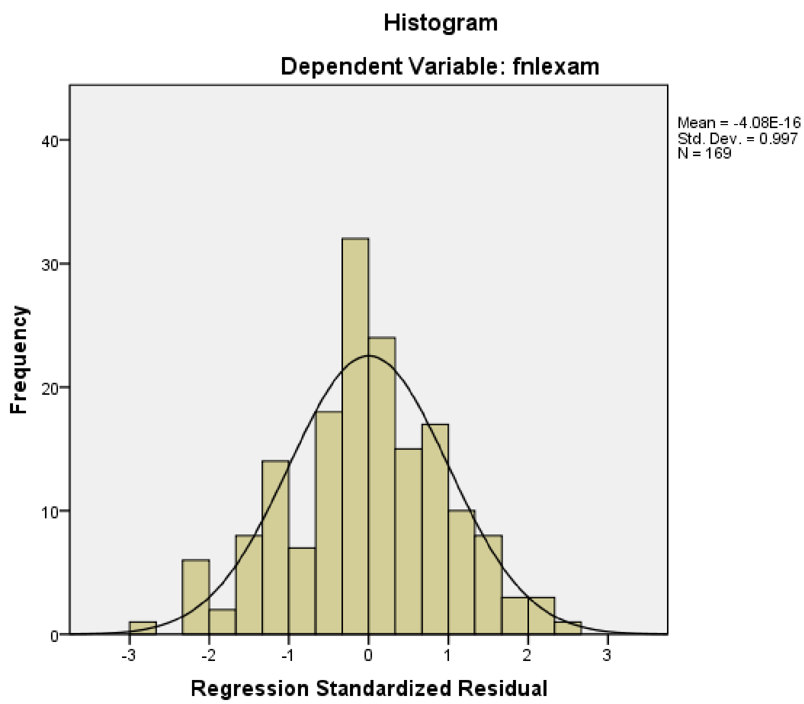
a. Dependent Variable: fnlexam

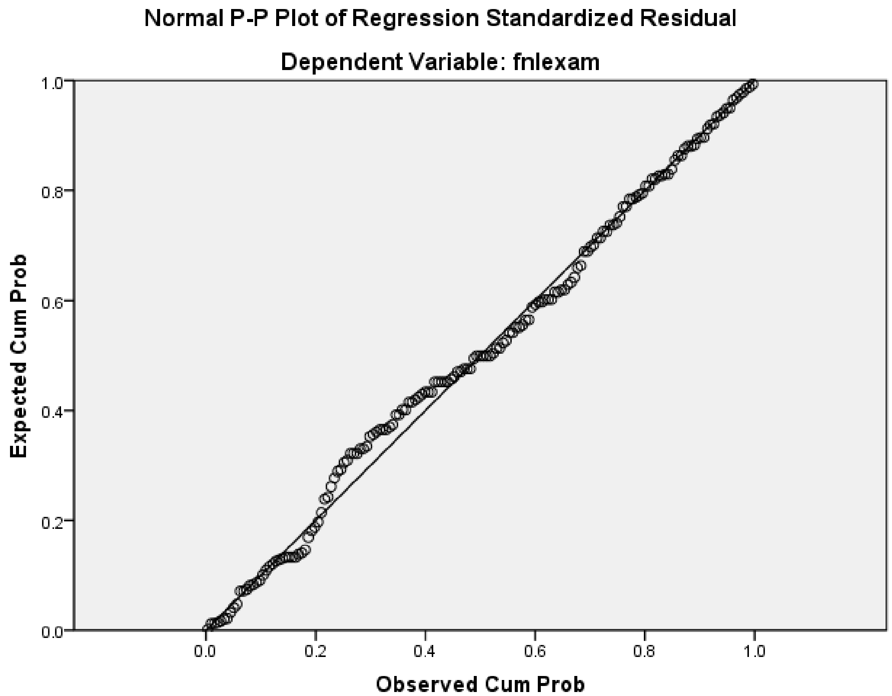
Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	53.89	80.01	65.14	5.178	169
Residual	-37.108	32.429	.000	13.001	169
Std. Predicted Value	-2.173	2.873	.000	1.000	169
Std. Residual	-2.846	2.487	.000	.997	169

a. Dependent Variable: fnlexam

Charts






```
REGRESSION
  /DESCRIPTIVES MEAN STDDEV CORR SIG N
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS CI(95) BCOV R ANOVA COLLIN TOL CHANGE
ZPP
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT fnlexam
  /METHOD=ENTER ascgr
  /RESIDUALS DURBIN HISTOGRAM(ZRESID) NORMPROB(ZRESID)
  /CASEWISE PLOT(ZRESID) OUTLIERS(3).
```

Regression

Notes

Output Created		02-Oct-2011 12:24:01
Comments		
Input	Data	C:\Users\Lin\Documents\math 096 fall 2001 with classrooms.sav
	Active Dataset	DataSet2
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	252

Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.
Syntax		REGRESSION /DESCRIPTIVES MEAN STDDEV CORR SIG N /MISSING LISTWISE /STATISTICS COEFF OUTS CI(95) BCOV R ANOVA COLLIN TOL CHANGE ZPP /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT fnlexam /METHOD=ENTER ascgr /RESIDUALS DURBIN HISTOGRAM(ZRESID) NORMPROB(ZRESID) /CASEWISE PLOT(ZRESID) OUTLIERS(3).
Resources	Processor Time	00:00:00.687
	Elapsed Time	00:00:01.135
	Memory Required	2260 bytes
	Additional Memory Required for Residual Plots	656 bytes

[DataSet2] C:\Users\Lin\Documents\math 096 fall 2001 with classrooms.sav

Descriptive Statistics

	Mean	Std. Deviation	N
fnlexam	65.14	13.994	169
ascgr	.88	.324	169

Correlations

		fnlexam	ascgr
Pearson Correlation	fnlexam	1.000	-.036
	ascgr	-.036	1.000
Sig. (1-tailed)	fnlexam	.	.322
	ascgr	.322	.
N	fnlexam	169	169
	ascgr	169	169

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	ascgr[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: fnlexam

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics		
					R Square Change	F Change	df1
1	.036[a]	.001	-.005	14.027	.001	.214	1

a. Predictors: (Constant), ascgr

b. Dependent Variable: fnlexam

Model Summary[b]

Model	Change Statistics		Durbin-Watson
	df2	Sig. F Change	
1	167	.644	1.724

b. Dependent Variable: fnlexam

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	42.199	1	42.199	.214	.644[a]
	Residual	32859.671	167	196.764		
	Total	32901.870	168			

a. Predictors: (Constant), ascgr

b. Dependent Variable: fnlexam

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	66.500	3.137		21.201	.000
	ascgr	-1.547	3.340	-.036	-.463	.644

a. Dependent Variable: fnlexam

Coefficients[a]

Model		95.0% Confidence Interval for B		Correlations		
		Lower Bound	Upper Bound	Zero-order	Partial	Part
1	(Constant)	60.308	72.692			
	ascgr	-8.142	5.048	-.036	-.036	-.036

a. Dependent Variable: fnlexam

Coefficients[a]

Model		Collinearity Statistics	
		Tolerance	VIF
1	(Constant)		
	ascgr	1.000	1.000

a. Dependent Variable: fnlexam

Coefficient Correlations[a]

Model			ascgr
1	Correlations	ascgr	1.000
	Covariances	ascgr	11.159

a. Dependent Variable: fnlexam

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions	
				(Constant)	ascgr
1	1	1.939	1.000	.03	.03
	2	.061	5.636	.97	.97

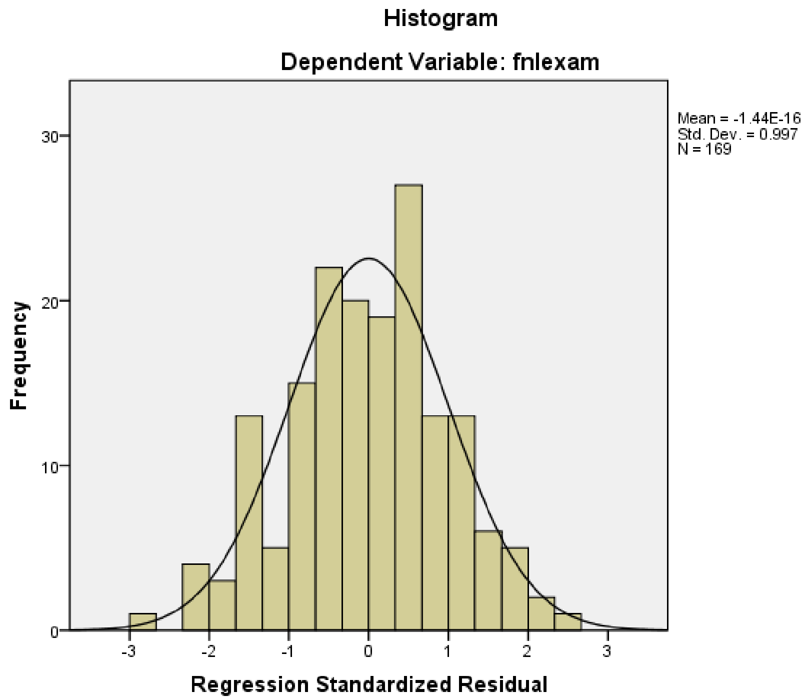
a. Dependent Variable: fnlexam

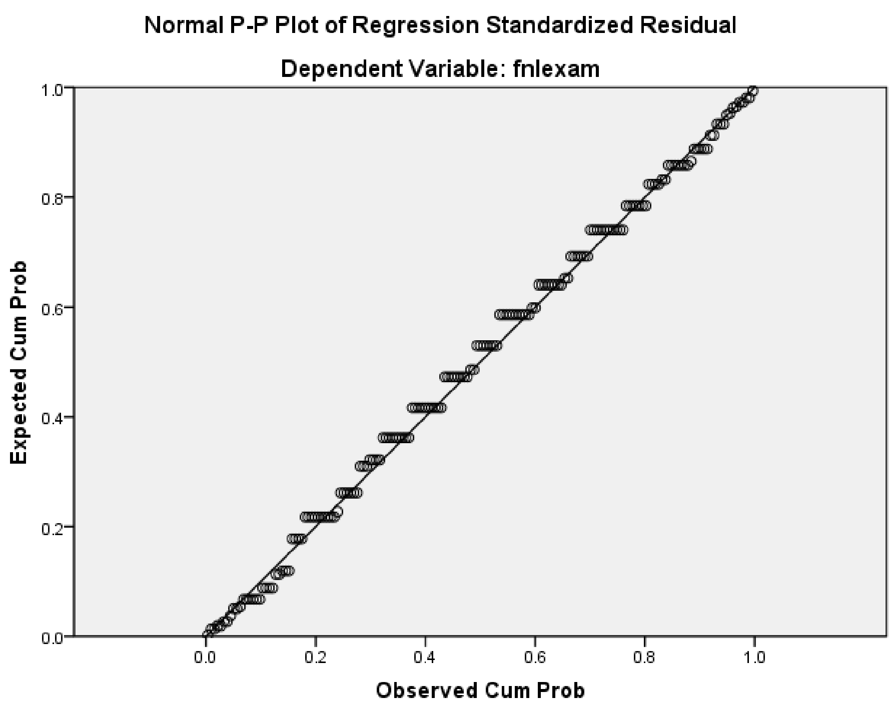
Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	64.95	66.50	65.14	.501	169
Residual	-38.953	35.047	.000	13.985	169
Std. Predicted Value	-.365	2.721	.000	1.000	169
Std. Residual	-2.777	2.498	.000	.997	169

a. Dependent Variable: fnlexam

Charts


Histogram
Dependent Variable: fnlexam
Mean = -1.44E-16
Std. Dev. = 0.997
N = 169
Frequency
30
20
10
0
-3
-2
-1
0
1
2
3
Regression Standardized Residual


Normal P-P Plot of Regression Standardized Residual
Dependent Variable: fnlexam
Expected Cum Prob
1.0
0.8
0.6
0.4
0.2
0.0
0.0
0.2
0.4
0.6
0.8
1.0
Observed Cum Prob

```
REGRESSION
  /DESCRIPTIVES MEAN STDDEV CORR SIG N
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS CI(95) BCOV R ANOVA COLLIN TOL CHANGE
ZPP
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT fnlexam
  /METHOD=ENTER techsex
  /RESIDUALS DURBIN HISTOGRAM(ZRESID) NORMPROB(ZRESID)
  /CASEWISE PLOT(ZRESID) OUTLIERS(3).
```

Regression

Notes

Output Created		02-Oct-2011 12:27:23
Comments		
Input	Data	C:\Users\Lin\Documents\math 096 fall 2001 with classrooms.sav
	Active Dataset	DataSet2
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	252
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.

Syntax		REGRESSION /DESCRIPTIVES MEAN STDDEV CORR SIG N /MISSING LISTWISE /STATISTICS COEFF OUTS CI(95) BCOV R ANOVA COLLIN TOL CHANGE ZPP /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT fnlexam /METHOD=ENTER techsex /RESIDUALS DURBIN HISTOGRAM(ZRESID) NORMPROB(ZRESID) /CASEWISE PLOT(ZRESID) OUTLIERS(3).
Resources	Processor Time	00:00:00.982
	Elapsed Time	00:00:01.121
	Memory Required	2260 bytes
	Additional Memory Required for Residual Plots	656 bytes

[DataSet2] C:\Users\Lin\Documents\math 096 fall 2001 with classrooms.sav

Descriptive Statistics

	Mean	Std. Deviation	N
fnlexam	65.14	13.994	169
techsex	.36	.480	169

Correlations

		fnlexam	techsex
Pearson Correlation	fnlexam	1.000	.147
	techsex	.147	1.000
Sig. (1-tailed)	fnlexam	.	.028
	techsex	.028	.
N	fnlexam	169	169
	techsex	169	169

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	techsex[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: fnlexam

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics		
					R Square Change	F Change	df1
1	.147[a]	.022	.016	13.884	.022	3.687	1

a. Predictors: (Constant), techsex

b. Dependent Variable: fnlexam

Model Summary[b]

Model	Change Statistics		Durbin-Watson
	df2	Sig. F Change	
1	167	.057	1.760

b. Dependent Variable: fnlexam

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	710.653	1	710.653	3.687	.057[a]
	Residual	32191.217	167	192.762		
	Total	32901.870	168			

a. Predictors: (Constant), techsex

b. Dependent Variable: fnlexam

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	63.615	1.330		47.837	.000
	techsex	4.285	2.232	.147	1.920	.057

a. Dependent Variable: fnlexam

Coefficients[a]

Model		95.0% Confidence Interval for B		Correlations		
		Lower Bound	Upper Bound	Zero-order	Partial	Part
1	(Constant)	60.989	66.240			
	techsex	-.121	8.692	.147	.147	.147

a. Dependent Variable: fnlexam

Coefficients[a]

Model		Collinearity Statistics	
		Tolerance	VIF
1	(Constant)		
	techsex	1.000	1.000

a. Dependent Variable: fnlexam

Coefficient Correlations[a]

Model			techsex
1	Correlations	techsex	1.000
	Covariances	techsex	4.981

a. Dependent Variable: fnlexam

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions	
				(Constant)	techsex
1	1	1.596	1.000	.20	.20
	2	.404	1.987	.80	.80

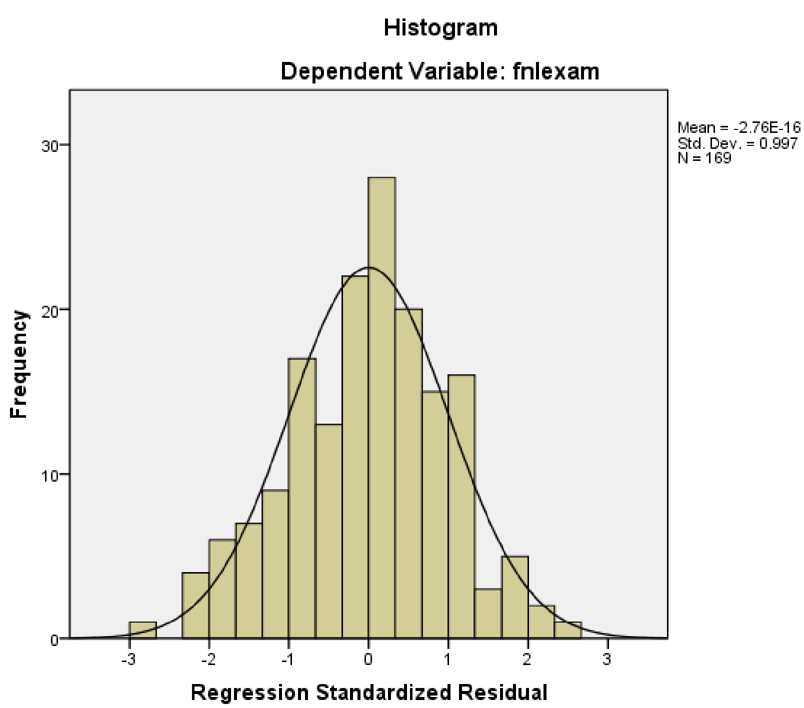
a. Dependent Variable: fnlexam

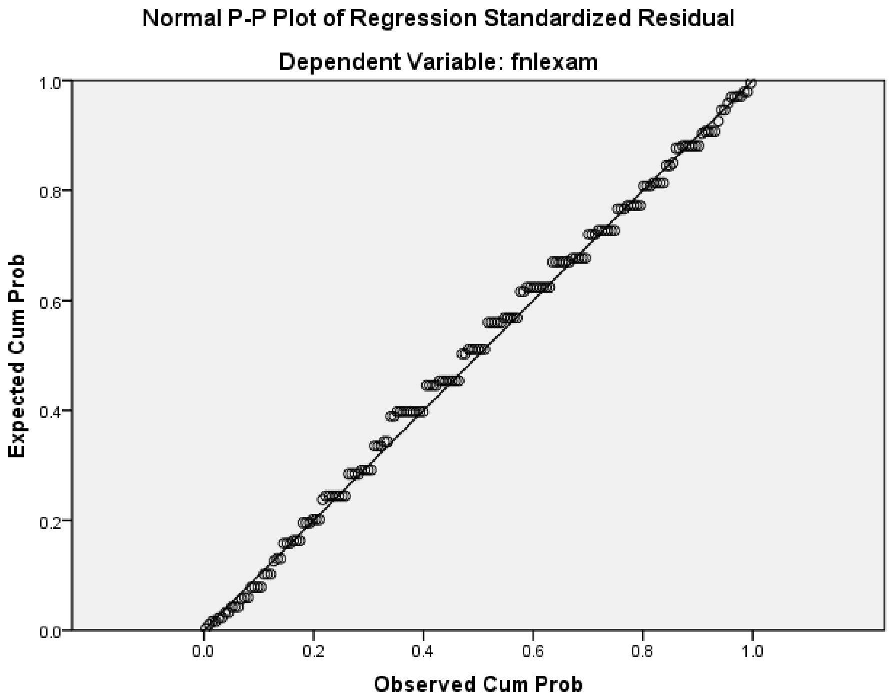
Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	63.61	67.90	65.14	2.057	169
Residual	-37.615	36.385	.000	13.842	169
Std. Predicted Value	-.740	1.344	.000	1.000	169
Std. Residual	-2.709	2.621	.000	.997	169

a. Dependent Variable: fnlexam

Charts






```
REGRESSION
  /DESCRIPTIVES MEAN STDDEV CORR SIG N
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS CI(95) BCOV R ANOVA COLLIN TOL CHANGE
ZPP
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT fnlexam
  /METHOD=ENTER adj096
  /RESIDUALS DURBIN HISTOGRAM(ZRESID) NORMPROB(ZRESID)
  /CASEWISE PLOT(ZRESID) OUTLIERS(3).
```

Regression

Notes

Output Created		02-Oct-2011 12:30:05
Comments		
Input	Data	C:\Users\Lin\Documents\math 096 fall 2001 with classrooms.sav
	Active Dataset	DataSet2
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	252

Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.
Syntax		REGRESSION /DESCRIPTIVES MEAN STDDEV CORR SIG N /MISSING LISTWISE /STATISTICS COEFF OUTS CI(95) BCOV R ANOVA COLLIN TOL CHANGE ZPP /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT fnlexam /METHOD=ENTER adj096 /RESIDUALS DURBIN HISTOGRAM(ZRESID) NORMPROB(ZRESID) /CASEWISE PLOT(ZRESID) OUTLIERS(3).
Resources	Processor Time	00:00:00.889
	Elapsed Time	00:00:01.102
	Memory Required	2260 bytes
	Additional Memory Required for Residual Plots	656 bytes

[DataSet2] C:\Users\Lin\Documents\math 096 fall 2001 with classrooms.sav

Descriptive Statistics

	Mean	Std. Deviation	N
fnlexam	65.14	13.994	169
adj096	.46	.500	169

Correlations

		fnlexam	adj096
Pearson Correlation	fnlexam	1.000	.192
	adj096	.192	1.000
Sig. (1-tailed)	fnlexam	.	.006
	adj096	.006	.
N	fnlexam	169	169
	adj096	169	169

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	adj096[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: fnlexam

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics		
					R Square Change	F Change	df1
1	.192[a]	.037	.031	13.776	.037	6.373	1

a. Predictors: (Constant), adj096

b. Dependent Variable: fnlexam

Model Summary[b]

Model	Change Statistics		Durbin-Watson
	df2	Sig. F Change	
1	167	.013	1.749

b. Dependent Variable: fnlexam

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1209.482	1	1209.482	6.373	.013[a]
	Residual	31692.388	167	189.775		
	Total	32901.870	168			

a. Predictors: (Constant), adj096

b. Dependent Variable: fnlexam

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	62.659	1.444		43.390	.000
	adj096	5.366	2.126	.192	2.525	.013

a. Dependent Variable: fnlexam

Coefficients[a]

Model		95.0% Confidence Interval for B		Correlations		
		Lower Bound	Upper Bound	Zero-order	Partial	Part
1	(Constant)	59.808	65.510			
	adj096	1.170	9.563	.192	.192	.192

a. Dependent Variable: fnlexam

Coefficients[a]

Model		Collinearity Statistics	
		Tolerance	VIF
1	(Constant)		
	adj096	1.000	1.000

a. Dependent Variable: fnlexam

Coefficient Correlations[a]

Model			adj096
1	Correlations	adj096	1.000
	Covariances	adj096	4.518

a. Dependent Variable: fnlexam

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions	
				(Constant)	adj096
1	1	1.679	1.000	.16	.16
	2	.321	2.289	.84	.84

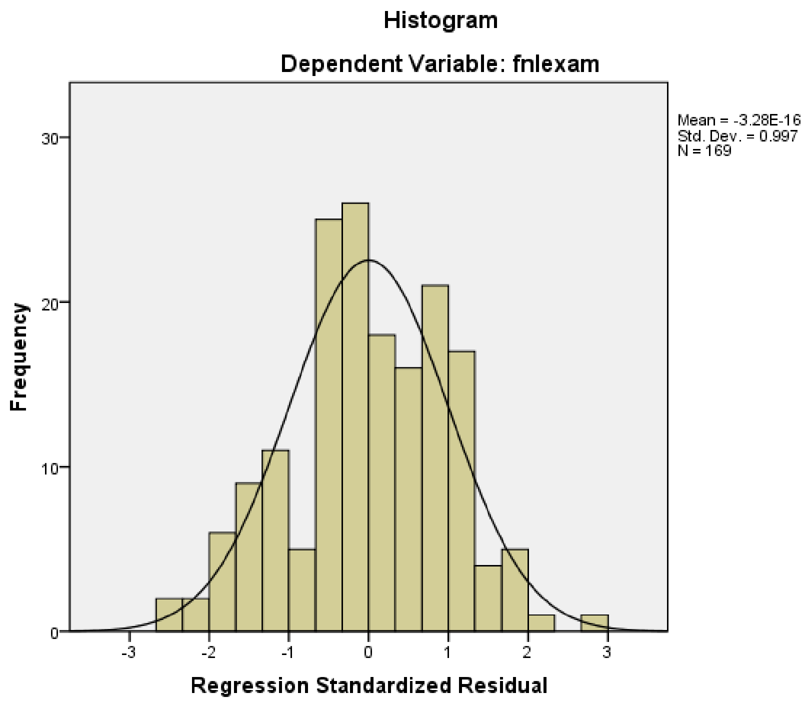
a. Dependent Variable: fnlexam

Residuals Statistics[a]

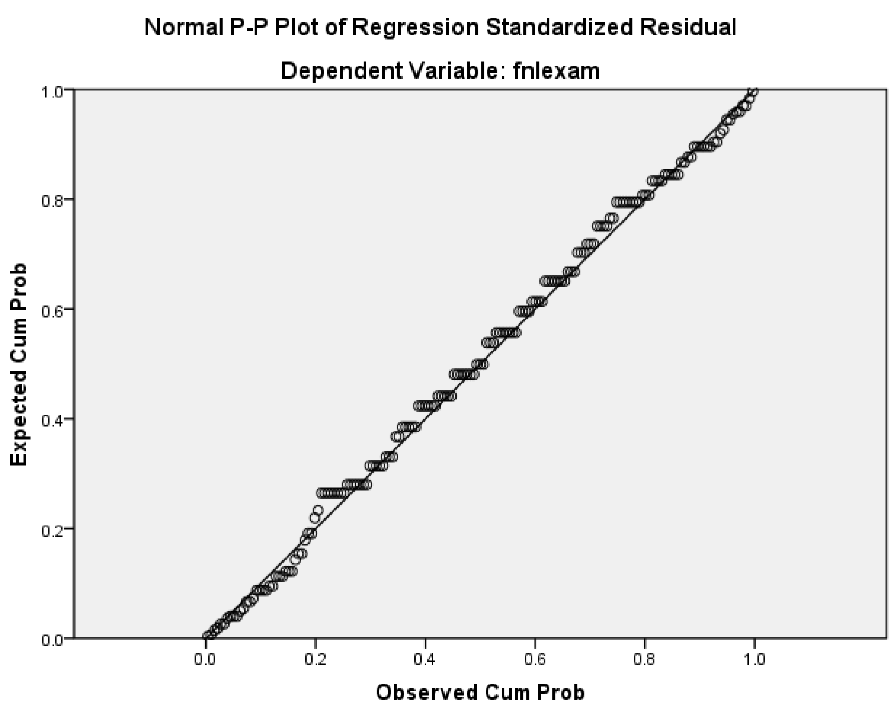
	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	62.66	68.03	65.14	2.683	169
Residual	-36.659	37.341	.000	13.735	169
Std. Predicted Value	-.923	1.077	.000	1.000	169
Std. Residual	-2.661	2.711	.000	.997	169

a. Dependent Variable: fnlexam

Charts



Histogram
Dependent Variable: fnlexam
Mean = -3.28E-16
Std. Dev. = 0.997
N = 169
Frequency
0
10
20
30
-3
-2
-1
0
1
2
3
Regression Standardized Residual



Normal P-P Plot of Regression Standardized Residual
Dependent Variable: fnlexam
Expected Cum Prob
0.0
0.2
0.4
0.6
0.8
1.0
Observed Cum Prob

```
REGRESSION
  /DESCRIPTIVES MEAN STDDEV CORR SIG N
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS CI(95) BCOV R ANOVA COLLIN TOL CHANGE
ZPP
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT fnlexam
  /METHOD=ENTER mozartuse
  /RESIDUALS DURBIN HISTOGRAM(ZRESID) NORMPROB(ZRESID)
  /CASEWISE PLOT(ZRESID) OUTLIERS(3).
```

Regression

Notes

Output Created		02-Oct-2011 12:32:01
Comments		
Input	Data	C:\Users\Lin\Documents\math 096 fall 2001 with classrooms.sav
	Active Dataset	DataSet2
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	252
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.

Syntax		REGRESSION /DESCRIPTIVES MEAN STDDEV CORR SIG N /MISSING LISTWISE /STATISTICS COEFF OUTS CI(95) BCOV R ANOVA COLLIN TOL CHANGE ZPP /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT fnlexam /METHOD=ENTER mozartuse /RESIDUALS DURBIN HISTOGRAM(ZRESID) NORMPROB(ZRESID) /CASEWISE PLOT(ZRESID) OUTLIERS(3).
Resources	Processor Time	00:00:00.952
	Elapsed Time	00:00:01.171
	Memory Required	2260 bytes
	Additional Memory Required for Residual Plots	656 bytes

[DataSet2] C:\Users\Lin\Documents\math 096 fall 2001 with classrooms.sav

Descriptive Statistics

	Mean	Std. Deviation	N
fnlexam	65.14	13.994	169
mozartuse	.18	.383	169

Correlations

		fnlexam	mozartuse
Pearson Correlation	fnlexam	1.000	.042
	mozartuse	.042	1.000
Sig. (1-tailed)	fnlexam	.	.293
	mozartuse	.293	.
N	fnlexam	169	169

Correlations

		fnlexam	mozartuse
Pearson Correlation	fnlexam	1.000	.042
	mozartuse	.042	1.000
Sig. (1-tailed)	fnlexam	.	.293
	mozartuse	.293	.
N	fnlexam	169	169
	mozartuse	169	169

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	mozartuse[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: fnlexam

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics		
					R Square Change	F Change	df1
1	.042[a]	.002	-.004	14.024	.002	.296	1

a. Predictors: (Constant), mozartuse

b. Dependent Variable: fnlexam

Model Summary[b]

Model	Change Statistics		Durbin-Watson
	df2	Sig. F Change	
1	167	.587	1.707

b. Dependent Variable: fnlexam

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	58.267	1	58.267	.296	.587[a]
	Residual	32843.603	167	196.668		
	Total	32901.870	168			

a. Predictors: (Constant), mozartuse

b. Dependent Variable: fnlexam

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	64.863	1.189		54.530	.000
	mozartuse	1.537	2.823	.042	.544	.587

a. Dependent Variable: fnlexam

Coefficients[a]

Model		95.0% Confidence Interval for B		Correlations		
		Lower Bound	Upper Bound	Zero-order	Partial	Part
1	(Constant)	62.515	67.212			
	mozartuse	-4.037	7.110	.042	.042	.042

a. Dependent Variable: fnlexam

Coefficients[a]

Model		Collinearity Statistics	
		Tolerance	VIF
1	(Constant)		
	mozartuse	1.000	1.000

a. Dependent Variable: fnlexam

Coefficient Correlations[a]

Model			mozartuse
1	Correlations	mozartuse	1.000
	Covariances	mozartuse	7.970

a. Dependent Variable: fnlexam

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions	
				(Constant)	mozartuse
1	1	1.421	1.000	.29	.29
	2	.579	1.567	.71	.71

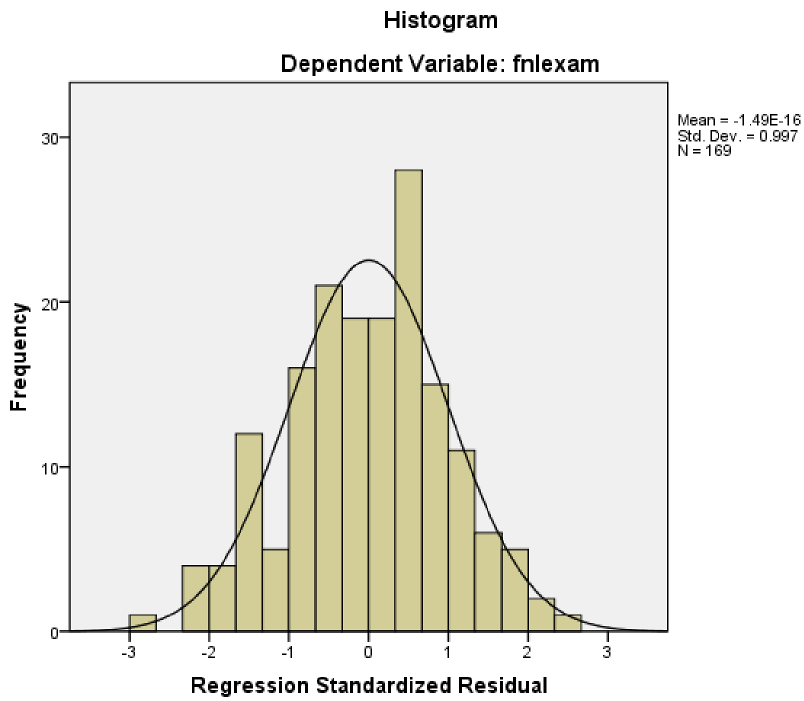
a. Dependent Variable: fnlexam

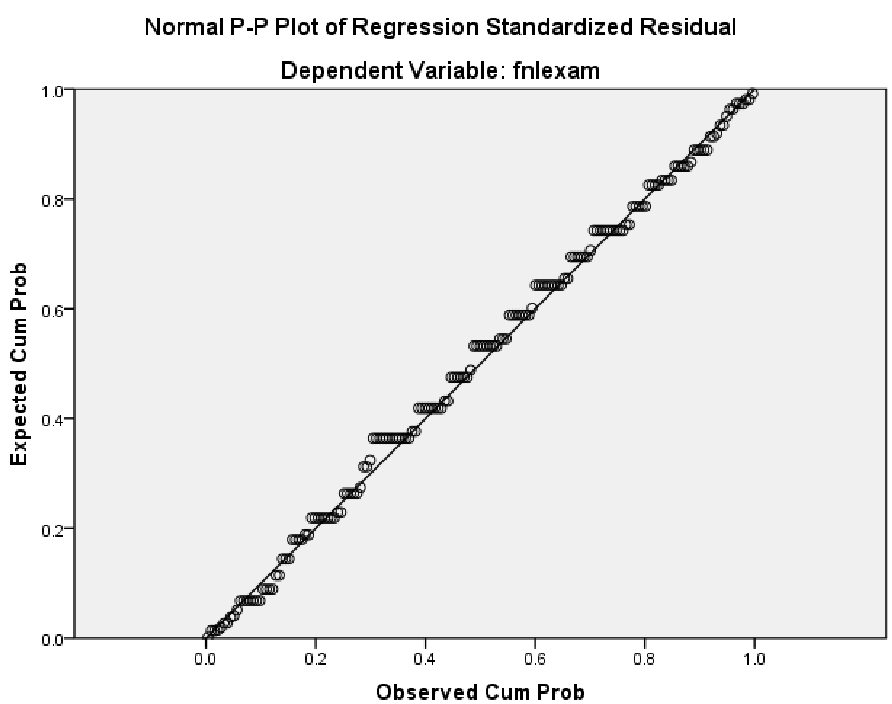
Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	64.86	66.40	65.14	.589	169
Residual	-40.400	33.600	.000	13.982	169
Std. Predicted Value	-.463	2.146	.000	1.000	169
Std. Residual	-2.881	2.396	.000	.997	169

a. Dependent Variable: fnlexam

Charts


Histogram
Dependent Variable: fnlexam
Mean = -1.49E-16
Std. Dev. = 0.997
N = 169
Frequency
Regression Standardized Residual
0
10
20
30
-3
-2
-1
0
1
2
3


Normal P-P Plot of Regression Standardized Residual
Dependent Variable: fnlexam
Expected Cum Prob
Observed Cum Prob
0.0
0.2
0.4
0.6
0.8
1.0

```
REGRESSION
  /DESCRIPTIVES MEAN STDDEV CORR SIG N
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS CI(95) BCOV R ANOVA COLLIN TOL CHANGE
ZPP
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT fnlexam
  /METHOD=ENTER amisone
  /RESIDUALS DURBIN HISTOGRAM(ZRESID) NORMPROB(ZRESID)
  /CASEWISE PLOT(ZRESID) OUTLIERS(3).
```

Regression

Notes

Output Created		02-Oct-2011 12:33:49
Comments		
Input	Data	C:\Users\Lin\Documents\math 096 fall 2001 with classrooms.sav
	Active Dataset	DataSet2
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	252
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.

Syntax		REGRESSION /DESCRIPTIVES MEAN STDDEV CORR SIG N /MISSING LISTWISE /STATISTICS COEFF OUTS CI(95) BCOV R ANOVA COLLIN TOL CHANGE ZPP /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT fnlexam /METHOD=ENTER amisone /RESIDUALS DURBIN HISTOGRAM(ZRESID) NORMPROB(ZRESID) /CASEWISE PLOT(ZRESID) OUTLIERS(3).
Resources	Processor Time	00:00:01.092
	Elapsed Time	00:00:01.173
	Memory Required	2260 bytes
	Additional Memory Required for Residual Plots	656 bytes

[DataSet2] C:\Users\Lin\Documents\math 096 fall 2001 with classrooms.sav

Descriptive Statistics

	Mean	Std. Deviation	N
fnlexam	65.24	13.973	168
amisone	.36	.481	168

Correlations

		fnlexam	amisone
Pearson Correlation	fnlexam	1.000	.018
	amisone	.018	1.000
Sig. (1-tailed)	fnlexam	.	.411
	amisone	.411	.
N	fnlexam	168	168

Correlations

		fnlexam	amisone
Pearson Correlation	fnlexam	1.000	.018
	amisone	.018	1.000
Sig. (1-tailed)	fnlexam	.	.411
	amisone	.411	.
N	fnlexam	168	168
	amisone	168	168

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	amisone[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: fnlexam

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics		
					R Square Change	F Change	df1
1	.018[a]	.000	-.006	14.013	.000	.051	1

a. Predictors: (Constant), amisone

b. Dependent Variable: fnlexam

Model Summary[b]

Model	Change Statistics		Durbin-Watson
	df2	Sig. F Change	
1	166	.821	1.705

b. Dependent Variable: fnlexam

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	10.076	1	10.076	.051	.821[a]
	Residual	32596.400	166	196.364		
	Total	32606.476	167			

a. Predictors: (Constant), amisone

b. Dependent Variable: fnlexam

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	65.056	1.348		48.246	.000
	amisone	.511	2.256	.018	.227	.821

a. Dependent Variable: fnlexam

Coefficients[a]

Model		95.0% Confidence Interval for B		Correlations		
		Lower Bound	Upper Bound	Zero-order	Partial	Part
1	(Constant)	62.393	67.718			
	amisone	-3.944	4.966	.018	.018	.018

a. Dependent Variable: fnlexam

Coefficients[a]

Model		Collinearity Statistics	
		Tolerance	VIF
1	(Constant)		
	amisone	1.000	1.000

a. Dependent Variable: fnlexam

Coefficient Correlations[a]

Model			amisone
1	Correlations	amisone	1.000
	Covariances	amisone	5.091

a. Dependent Variable: fnlexam

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions	
				(Constant)	amisone
1	1	1.598	1.000	.20	.20
	2	.402	1.993	.80	.80

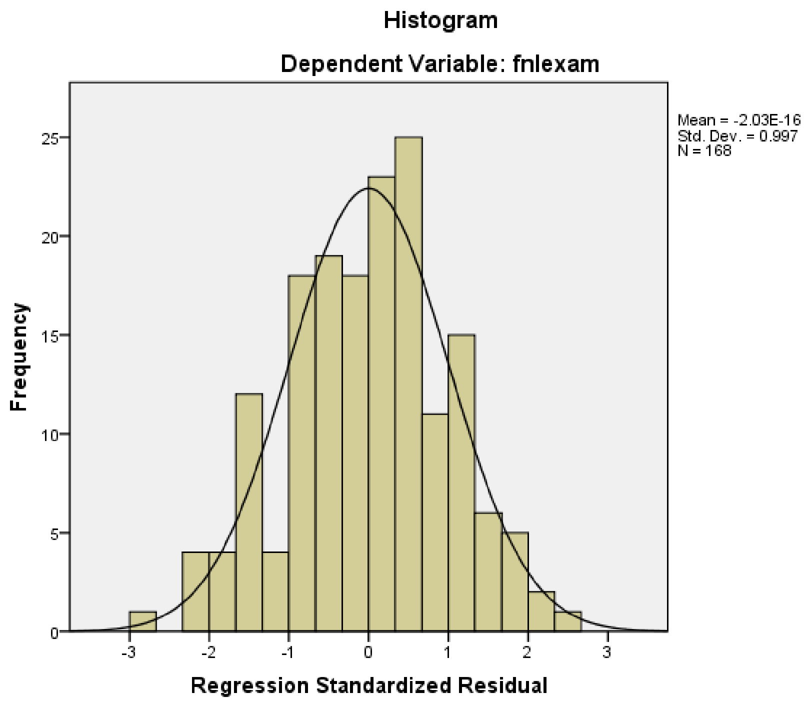
a. Dependent Variable: fnlexam

Residuals Statistics[a]

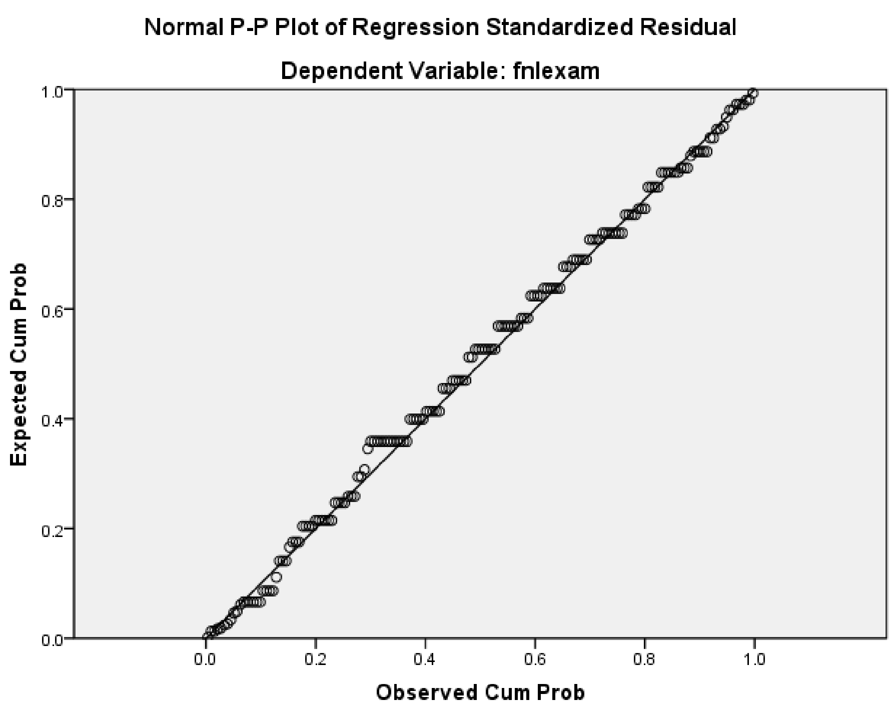
	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	65.06	65.57	65.24	.246	168
Residual	-39.567	34.433	.000	13.971	168
Std. Predicted Value	-.743	1.338	.000	1.000	168
Std. Residual	-2.824	2.457	.000	.997	168

a. Dependent Variable: fnlexam

Charts



Histogram
Dependent Variable: fnlexam
Mean = -2.03E-16
Std. Dev. = 0.997
N = 168
Frequency
Regression Standardized Residual



Normal P-P Plot of Regression Standardized Residual
Dependent Variable: fnlexam
Expected Cum Prob
Observed Cum Prob

```
REGRESSION
  /DESCRIPTIVES MEAN STDDEV CORR SIG N
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS CI(95) BCOV R ANOVA COLLIN TOL CHANGE
ZPP
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT fnlexam
  /METHOD=ENTER numbmeet
  /RESIDUALS DURBIN HISTOGRAM(ZRESID) NORMPROB(ZRESID)
  /CASEWISE PLOT(ZRESID) OUTLIERS(3).
```

Regression

Notes

Output Created		02-Oct-2011 12:35:48
Comments		
Input	Data	C:\Users\Lin\Documents\math 096 fall 2001 with classrooms.sav
	Active Dataset	DataSet2
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	252
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.

Syntax		REGRESSION /DESCRIPTIVES MEAN STDDEV CORR SIG N /MISSING LISTWISE /STATISTICS COEFF OUTS CI(95) BCOV R ANOVA COLLIN TOL CHANGE ZPP /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT fnlexam /METHOD=ENTER numbmeet /RESIDUALS DURBIN HISTOGRAM(ZRESID) NORMPROB(ZRESID) /CASEWISE PLOT(ZRESID) OUTLIERS(3).
Resources	Processor Time	00:00:00.920
	Elapsed Time	00:00:01.108
	Memory Required	2260 bytes
	Additional Memory Required for Residual Plots	656 bytes

[DataSet2] C:\Users\Lin\Documents\math 096 fall 2001 with classrooms.sav

Descriptive Statistics

	Mean	Std. Deviation	N
fnlexam	65.14	13.994	169
numbmeet	3.56	1.326	169

Correlations

		fnlexam	numbmeet
Pearson Correlation	fnlexam	1.000	-.172
	numbmeet	-.172	1.000
Sig. (1-tailed)	fnlexam	.	.012
	numbmeet	.012	.
N	fnlexam	169	169

Correlations

		fnlexam	numbmeet
Pearson Correlation	fnlexam	1.000	-.172
	numbmeet	-.172	1.000
Sig. (1-tailed)	fnlexam	.	.012
	numbmeet	.012	.
N	fnlexam	169	169
	numbmeet	169	169

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	numbmeet[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: fnlexam

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics		
					R Square Change	F Change	df1
1	.172[a]	.030	.024	13.826	.030	5.121	1

a. Predictors: (Constant), numbmeet

b. Dependent Variable: fnlexam

Model Summary[b]

Model	Change Statistics		Durbin-Watson
	df2	Sig. F Change	
1	167	.025	1.755

b. Dependent Variable: fnlexam

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	978.924	1	978.924	5.121	.025[a]
	Residual	31922.946	167	191.155		
	Total	32901.870	168			

a. Predictors: (Constant), numbmeet

b. Dependent Variable: fnlexam

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	71.618	3.056		23.439	.000
	numbmeet	-1.820	.804	-.172	-2.263	.025

a. Dependent Variable: fnlexam

Coefficients[a]

Model		95.0% Confidence Interval for B		Correlations		
		Lower Bound	Upper Bound	Zero-order	Partial	Part
1	(Constant)	65.586	77.651			
	numbmeet	-3.407	-.232	-.172	-.172	-.172

a. Dependent Variable: fnlexam

Coefficients[a]

Model		Collinearity Statistics	
		Tolerance	VIF
1	(Constant)		
	numbmeet	1.000	1.000

a. Dependent Variable: fnlexam

Coefficient Correlations[a]

Model			numbmeet
1	Correlations	numbmeet	1.000
	Covariances	numbmeet	.647

a. Dependent Variable: fnlexam

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions	
				(Constant)	numbmeet
1	1	1.937	1.000	.03	.03
	2	.063	5.566	.97	.97

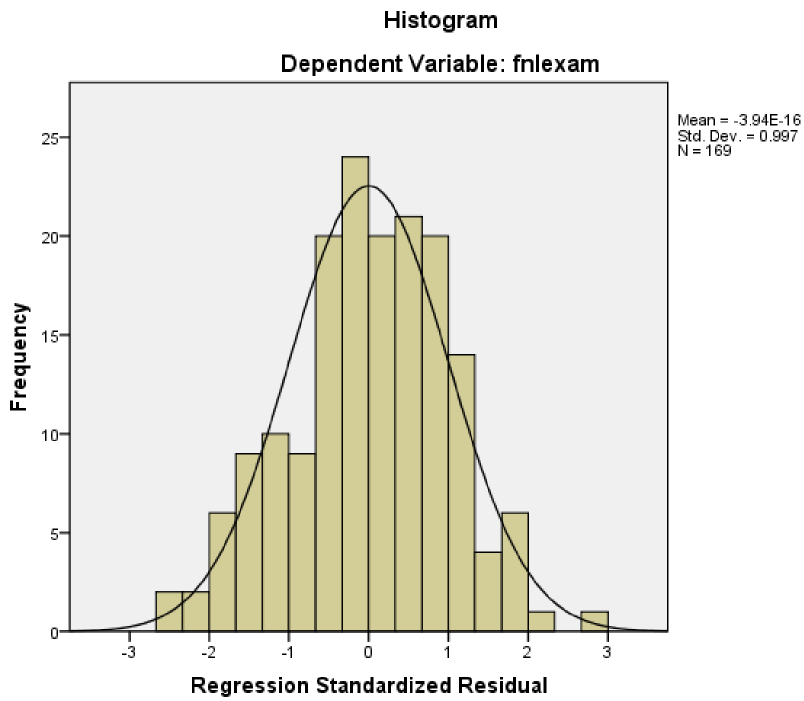
a. Dependent Variable: fnlexam

Residuals Statistics[a]

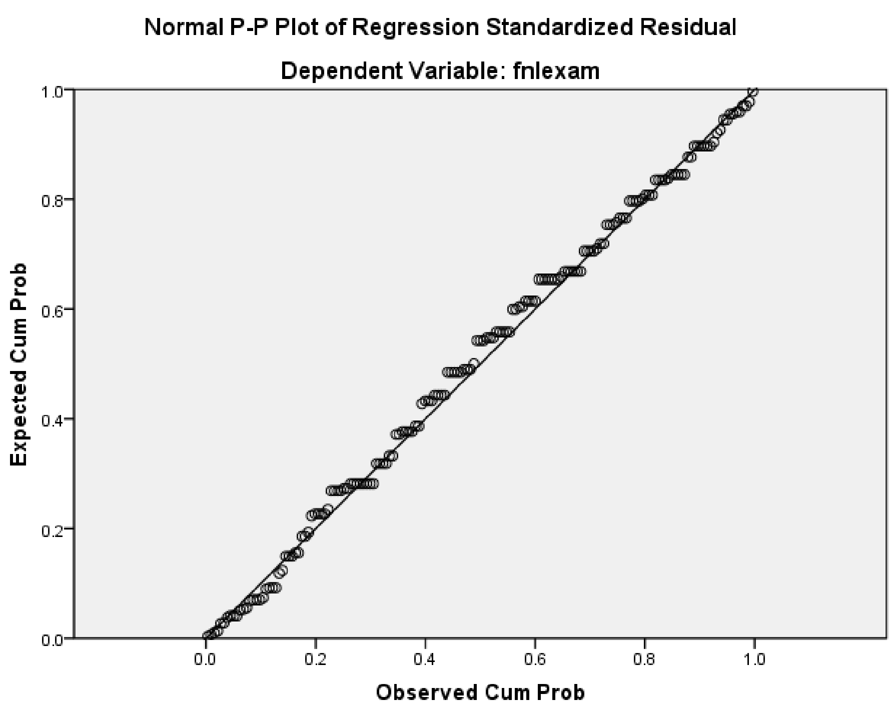
	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	62.52	67.98	65.14	2.414	169
Residual	-36.519	37.481	.000	13.785	169
Std. Predicted Value	-1.084	1.178	.000	1.000	169
Std. Residual	-2.641	2.711	.000	.997	169

a. Dependent Variable: fnlexam

Charts



Histogram
Dependent Variable: fnlexam
Mean = -3.94E-16
Std. Dev. = 0.997
N = 169
Frequency
Regression Standardized Residual



Normal P-P Plot of Regression Standardized Residual
Dependent Variable: fnlexam
Expected Cum Prob
Observed Cum Prob

```
REGRESSION
  /DESCRIPTIVES MEAN STDDEV CORR SIG N
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS CI(95) BCOV R ANOVA COLLIN TOL CHANGE
ZPP
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT fnlexam
  /METHOD=ENTER classize
  /RESIDUALS DURBIN HISTOGRAM(ZRESID) NORMPROB(ZRESID)
  /CASEWISE PLOT(ZRESID) OUTLIERS(3).
```

Regression

Notes

Output Created		02-Oct-2011 12:37:35
Comments		
Input	Data	C:\Users\Lin\Documents\math 096 fall 2001 with classrooms.sav
	Active Dataset	DataSet2
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	252
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.

Syntax		REGRESSION /DESCRIPTIVES MEAN STDDEV CORR SIG N /MISSING LISTWISE /STATISTICS COEFF OUTS CI(95) BCOV R ANOVA COLLIN TOL CHANGE ZPP /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT fnlexam /METHOD=ENTER classize /RESIDUALS DURBIN HISTOGRAM(ZRESID) NORMPROB(ZRESID) /CASEWISE PLOT(ZRESID) OUTLIERS(3).
Resources	Processor Time	00:00:01.185
	Elapsed Time	00:00:01.066
	Memory Required	2260 bytes
	Additional Memory Required for Residual Plots	656 bytes

[DataSet2] C:\Users\Lin\Documents\math 096 fall 2001 with classrooms.sav

Descriptive Statistics

	Mean	Std. Deviation	N
fnlexam	65.14	13.994	169
classize	34.07	12.132	169

Correlations

		fnlexam	classize
Pearson Correlation	fnlexam	1.000	.106
	classize	.106	1.000
Sig. (1-tailed)	fnlexam	.	.085
	classize	.085	.
N	fnlexam	169	169
	classize	169	169

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	classize[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: fnlexam

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics		
					R Square Change	F Change	df1
1	.106[a]	.011	.005	13.957	.011	1.896	1

a. Predictors: (Constant), classize

b. Dependent Variable: fnlexam

Model Summary[b]

Model	Change Statistics		Durbin-Watson
	df2	Sig. F Change	
1	167	.170	1.736

b. Dependent Variable: fnlexam

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	369.390	1	369.390	1.896	.170[a]
	Residual	32532.480	167	194.805		
	Total	32901.870	168			

a. Predictors: (Constant), classize

b. Dependent Variable: fnlexam

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	60.972	3.209		19.001	.000
	classize	.122	.089	.106	1.377	.170

a. Dependent Variable: fnlexam

Coefficients[a]

Model		95.0% Confidence Interval for B		Correlations		
		Lower Bound	Upper Bound	Zero-order	Partial	Part
1	(Constant)	54.637	67.307			
	classize	-.053	.297	.106	.106	.106

a. Dependent Variable: fnlexam

Coefficients[a]

Model		Collinearity Statistics	
		Tolerance	VIF
1	(Constant)		
	classize	1.000	1.000

a. Dependent Variable: fnlexam

Coefficient Correlations[a]

Model			classize
1	Correlations	classize	1.000
	Covariances	classize	.008

a. Dependent Variable: fnlexam

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions (Constant)	classize
1	1	1.942	1.000	.03	.03
	2	.058	5.805	.97	.97

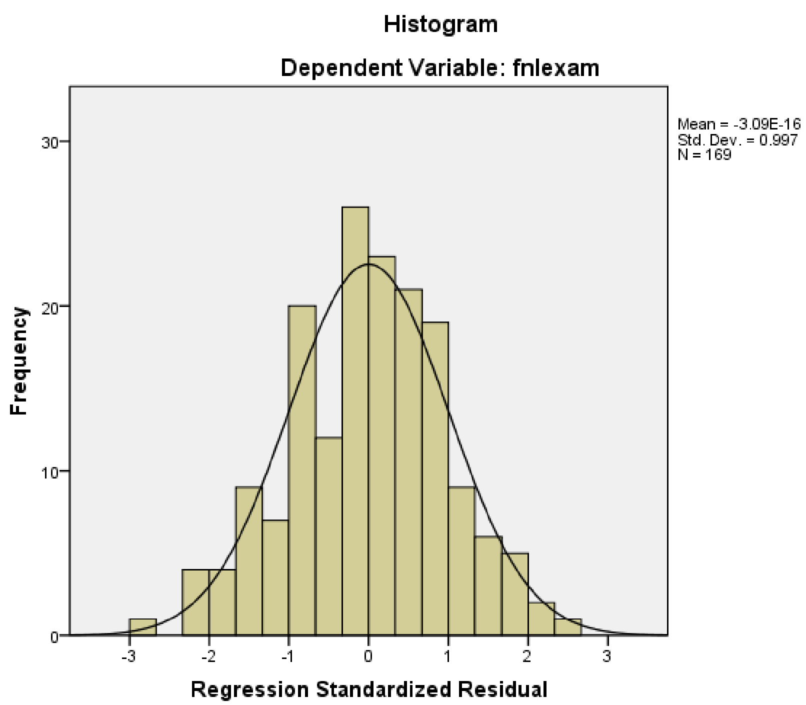
a. Dependent Variable: fnlexam

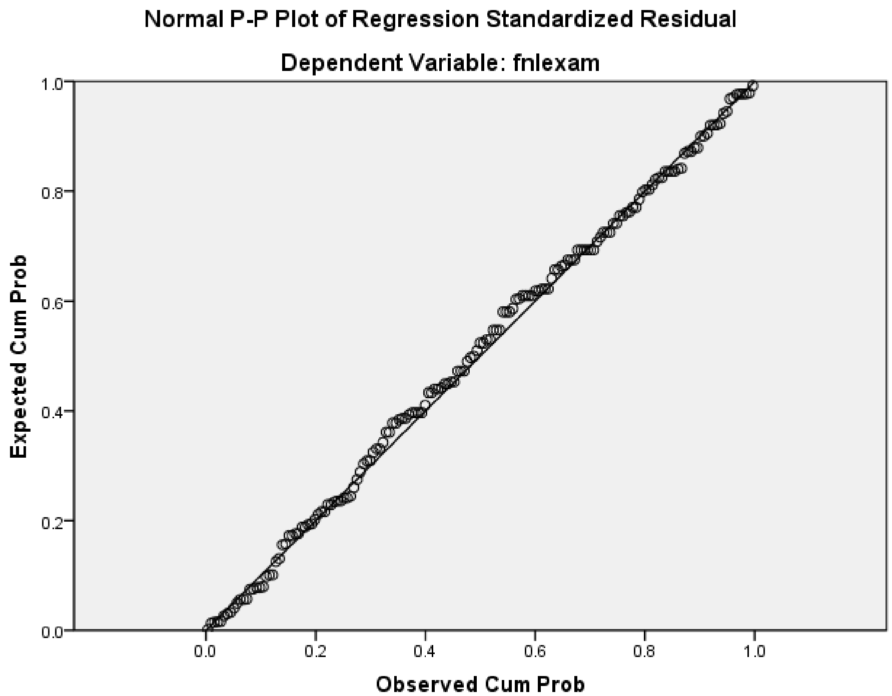
Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	62.32	66.96	65.14	1.483	169
Residual	-40.350	33.650	.000	13.916	169
Std. Predicted Value	-1.902	1.230	.000	1.000	169
Std. Residual	-2.891	2.411	.000	.997	169

a. Dependent Variable: fnlexam

Charts






```
GET
  FILE='C:\Users\Lin\Documents\math 097 fall 2001 with classrooms no
names.sav'.
DATASET NAME DataSet1 WINDOW=FRONT.
REGRESSION
  /DESCRIPTIVES MEAN STDDEV CORR SIG N
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS CI(95) BCOV R ANOVA COLLIN TOL CHANGE
ZPP
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT fnlexam
  /METHOD=ENTER gender
  /RESIDUALS DURBIN HISTOGRAM(ZRESID) NORMPROB(ZRESID)
  /CASEWISE PLOT(ZRESID) OUTLIERS(3).
```

Regression

Notes

Output Created		02-Oct-2011 13:34:52
Comments		
Input	Data	C:\Users\Lin\Documents\math 097 fall 2001 with classrooms no names.sav
	Active Dataset	DataSet1

	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	675
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.
Syntax		REGRESSION /DESCRIPTIVES MEAN STDDEV CORR SIG N /MISSING LISTWISE /STATISTICS COEFF OUTS CI(95) BCOV R ANOVA COLLIN TOL CHANGE ZPP /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT fnlexam /METHOD=ENTER gender /RESIDUALS DURBIN HISTOGRAM(ZRESID) NORMPROB(ZRESID) /CASEWISE PLOT(ZRESID) OUTLIERS(3).
Resources	Processor Time	00:00:02.152
	Elapsed Time	00:00:01.872
	Memory Required	2260 bytes
	Additional Memory Required for Residual Plots	656 bytes

[DataSet1] C:\Users\Lin\Documents\math 097 fall 2001 with classrooms no names.sav

Descriptive Statistics

	Mean	Std. Deviation	N
fnlexam	68.55	14.175	508

Descriptive Statistics

	Mean	Std. Deviation	N
fnlexam	68.55	14.175	508
gender	.38	.487	508

Correlations

		fnlexam	gender
Pearson Correlation	fnlexam	1.000	-.149
	gender	-.149	1.000
Sig. (1-tailed)	fnlexam	.	.000
	gender	.000	.
N	fnlexam	508	508
	gender	508	508

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	gender[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: fnlexam

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics		
					R Square Change	F Change	df1
1	.149[a]	.022	.020	14.031	.022	11.425	1

a. Predictors: (Constant), gender

b. Dependent Variable: fnlexam

Model Summary[b]

Model	Change Statistics		Durbin-Watson
	df2	Sig. F Change	
1	506	.001	1.659

Model Summary[b]

Model	Change Statistics		
	df2	Sig. F Change	Durbin-Watson
1	506	.001	1.659

b. Dependent Variable: fnlexam

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2249.389	1	2249.389	11.425	.001[a]
	Residual	99622.176	506	196.882		
	Total	101871.565	507			

a. Predictors: (Constant), gender

b. Dependent Variable: fnlexam

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	70.214	.793		88.531	.000
	gender	-4.327	1.280	-.149	-3.380	.001

a. Dependent Variable: fnlexam

Coefficients[a]

Model		95.0% Confidence Interval for B		Correlations		
		Lower Bound	Upper Bound	Zero-order	Partial	Part
1	(Constant)	68.656	71.772			
	gender	-6.842	-1.812	-.149	-.149	-.149

a. Dependent Variable: fnlexam

Coefficients[a]

Model		Collinearity Statistics	
		Tolerance	VIF
1	(Constant)		
	gender	1.000	1.000

a. Dependent Variable: fnlexam

Coefficient Correlations[a]

Model			gender
1	Correlations	gender	1.000
	Covariances	gender	1.639

a. Dependent Variable: fnlexam

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions	
				(Constant)	gender
1	1	1.620	1.000	.19	.19
	2	.380	2.063	.81	.81

a. Dependent Variable: fnlexam

Casewise Diagnostics[a]

Case Number	Std. Residual	fnlexam	Predicted Value	Residual
551	-3.579	20	70.21	-50.214

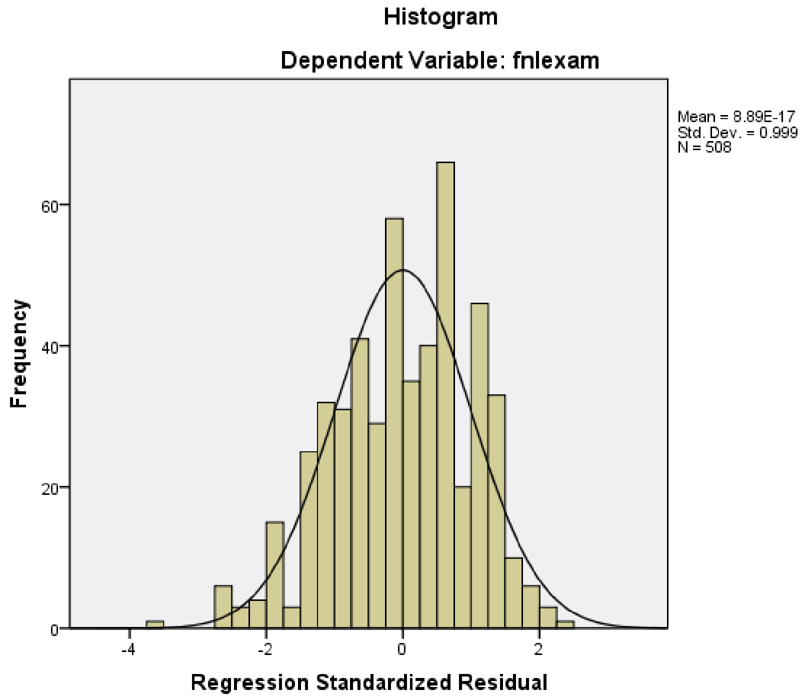
a. Dependent Variable: fnlexam

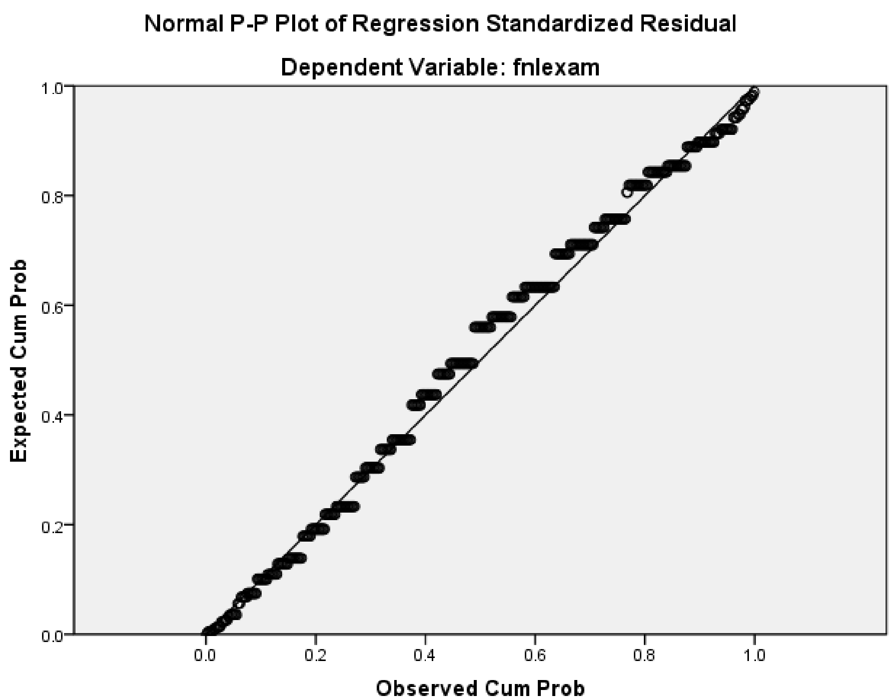
Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	65.89	70.21	68.55	2.106	508
Residual	-50.214	32.113	.000	14.018	508
Std. Predicted Value	-1.266	.789	.000	1.000	508
Std. Residual	-3.579	2.289	.000	.999	508

a. Dependent Variable: fnlexam

Charts


Histogram
Dependent Variable: fnlexam
Mean = 8.89E-17
Std. Dev. = 0.999
N = 508
Frequency
60
40
20
0
-4
-2
0
2
Regression Standardized Residual


Normal P-P Plot of Regression Standardized Residual
Dependent Variable: fnlexam
Expected Cum Prob
1.0
0.8
0.6
0.4
0.2
0.0
0.0
0.2
0.4
0.6
0.8
1.0
Observed Cum Prob

```
REGRESSION
  /DESCRIPTIVES MEAN STDDEV CORR SIG N
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS CI(95) BCOV R ANOVA COLLIN TOL CHANGE
ZPP
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT fnlexam
  /METHOD=ENTER act
  /RESIDUALS DURBIN HISTOGRAM(ZRESID) NORMPROB(ZRESID)
  /CASEWISE PLOT(ZRESID) OUTLIERS(3).
```

Regression

Notes

Output Created		02-Oct-2011 13:36:59
Comments		
Input	Data	C:\Users\Lin\Documents\math 097 fall 2001 with classrooms no names.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	675
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.

Syntax		REGRESSION /DESCRIPTIVES MEAN STDDEV CORR SIG N /MISSING LISTWISE /STATISTICS COEFF OUTS CI(95) BCOV R ANOVA COLLIN TOL CHANGE ZPP /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT fnlexam /METHOD=ENTER act /RESIDUALS DURBIN HISTOGRAM(ZRESID) NORMPROB(ZRESID) /CASEWISE PLOT(ZRESID) OUTLIERS(3).
Resources	Processor Time	00:00:01.014
	Elapsed Time	00:00:01.256
	Memory Required	2260 bytes
	Additional Memory Required for Residual Plots	656 bytes

[DataSet1] C:\Users\Lin\Documents\math 097 fall 2001 with classrooms no names.sav

Descriptive Statistics

	Mean	Std. Deviation	N
fnlexam	68.39	14.223	470
act	16.83	1.156	470

Correlations

		fnlexam	act
Pearson Correlation	fnlexam	1.000	.240
	act	.240	1.000
Sig. (1-tailed)	fnlexam	.	.000
	act	.000	.
N	fnlexam	470	470
	act	470	470

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	act[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: fnlexam

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics		
					R Square Change	F Change	df1
1	.240[a]	.058	.056	13.820	.058	28.724	1

a. Predictors: (Constant), act

b. Dependent Variable: fnlexam

Model Summary[b]

Model	Change Statistics		Durbin-Watson
	df2	Sig. F Change	
1	468	.000	1.694

b. Dependent Variable: fnlexam

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	5486.429	1	5486.429	28.724	.000[a]
	Residual	89390.866	468	191.006		
	Total	94877.296	469			

a. Predictors: (Constant), act

b. Dependent Variable: fnlexam

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	18.577	9.315		1.994	.047
	act	2.960	.552	.240	5.359	.000

a. Dependent Variable: fnlexam

Coefficients[a]

Model		95.0% Confidence Interval for B		Correlations		
		Lower Bound	Upper Bound	Zero-order	Partial	Part
1	(Constant)	.271	36.882			
	act	1.874	4.045	.240	.240	.240

a. Dependent Variable: fnlexam

Coefficients[a]

Model		Collinearity Statistics	
		Tolerance	VIF
1	(Constant)		
	act	1.000	1.000

a. Dependent Variable: fnlexam

Coefficient Correlations[a]

Model			act
1	Correlations	act	1.000
	Covariances	act	.305

a. Dependent Variable: fnlexam

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions	
				(Constant)	act
1	1	1.998	1.000	.00	.00
	2	.002	29.191	1.00	1.00

a. Dependent Variable: fnlexam

Casewise Diagnostics[a]

Case Number	Std. Residual	fnlexam	Predicted Value	Residual
192	3.108	100	57.05	42.949

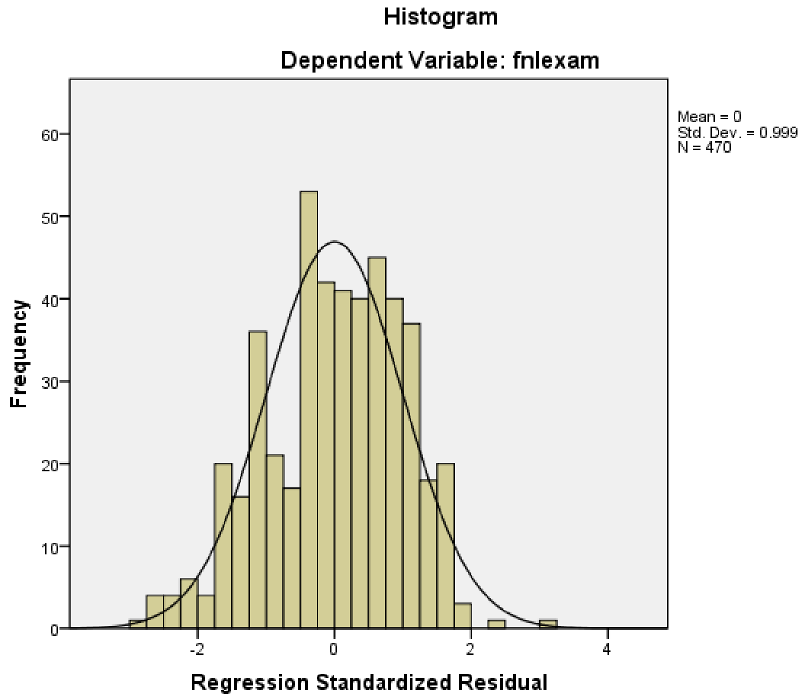
a. Dependent Variable: fnlexam

Residuals Statistics[a]

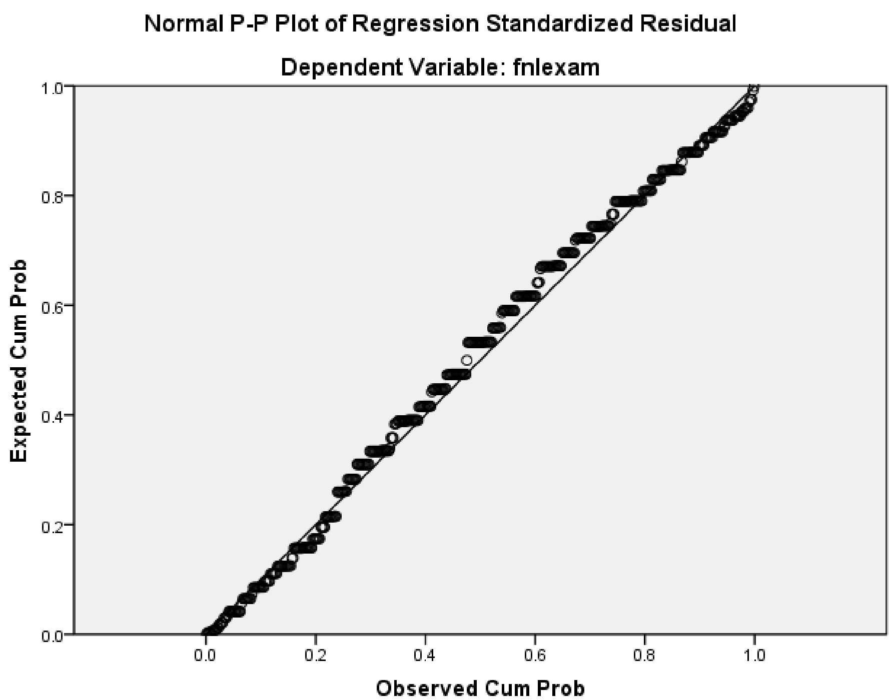
	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	54.09	83.69	68.39	3.420	470
Residual	-40.889	42.949	.000	13.806	470
Std. Predicted Value	-4.179	4.474	.000	1.000	470
Std. Residual	-2.959	3.108	.000	.999	470

a. Dependent Variable: fnlexam

Charts



Histogram
Dependent Variable: fnlexam
Mean = 0
Std. Dev. = 0.999
N = 470
Frequency
60
50
40
30
20
10
0
-2
0
2
4
Regression Standardized Residual



Normal P-P Plot of Regression Standardized Residual
Dependent Variable: fnlexam
Expected Cum Prob
1.0
0.8
0.6
0.4
0.2
0.0
0.0
0.2
0.4
0.6
0.8
1.0
Observed Cum Prob

```
REGRESSION
  /DESCRIPTIVES MEAN STDDEV CORR SIG N
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS CI(95) BCOV R ANOVA COLLIN TOL CHANGE
ZPP
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT fnlexam
  /METHOD=ENTER sat
  /RESIDUALS DURBIN HISTOGRAM(ZRESID) NORMPROB(ZRESID)
  /CASEWISE PLOT(ZRESID) OUTLIERS(3).
```

Regression

Notes

Output Created		02-Oct-2011 13:38:30
Comments		
Input	Data	C:\Users\Lin\Documents\math 097 fall 2001 with classrooms no names.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	675
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.

Syntax		REGRESSION /DESCRIPTIVES MEAN STDDEV CORR SIG N /MISSING LISTWISE /STATISTICS COEFF OUTS CI(95) BCOV R ANOVA COLLIN TOL CHANGE ZPP /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT fnlexam /METHOD=ENTER sat /RESIDUALS DURBIN HISTOGRAM(ZRESID) NORMPROB(ZRESID) /CASEWISE PLOT(ZRESID) OUTLIERS(3).
Resources	Processor Time	00:00:01.123
	Elapsed Time	00:00:01.087
	Memory Required	2260 bytes
	Additional Memory Required for Residual Plots	656 bytes

[DataSet1] C:\Users\Lin\Documents\math 097 fall 2001 with classrooms no names.sav

Descriptive Statistics

	Mean	Std. Deviation	N
fnlexam	68.73	15.163	64
sat	412.19	46.886	64

Correlations

		fnlexam	sat
Pearson Correlation	fnlexam	1.000	.285
	sat	.285	1.000
Sig. (1-tailed)	fnlexam	.	.011
	sat	.011	.
N	fnlexam	64	64
	sat	64	64

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	sat[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: fnlexam

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics		
					R Square Change	F Change	df1
1	.285[a]	.081	.067	14.649	.081	5.493	1

a. Predictors: (Constant), sat

b. Dependent Variable: fnlexam

Model Summary[b]

Model	Change Statistics		Durbin-Watson
	df2	Sig. F Change	
1	62	.022	1.947

b. Dependent Variable: fnlexam

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1178.801	1	1178.801	5.493	.022[a]
	Residual	13305.684	62	214.608		
	Total	14484.484	63			

a. Predictors: (Constant), sat

b. Dependent Variable: fnlexam

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	30.707	16.329		1.881	.065
	sat	.092	.039	.285	2.344	.022

a. Dependent Variable: fnlexam

Coefficients[a]

Model		95.0% Confidence Interval for B		Correlations		
		Lower Bound	Upper Bound	Zero-order	Partial	Part
1	(Constant)	-1.934	63.347			
	sat	.014	.171	.285	.285	.285

a. Dependent Variable: fnlexam

Coefficients[a]

Model		Collinearity Statistics	
		Tolerance	VIF
1	(Constant)		
	sat	1.000	1.000

a. Dependent Variable: fnlexam

Coefficient Correlations[a]

Model			sat
1	Correlations	sat	1.000
	Covariances	sat	.002

a. Dependent Variable: fnlexam

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions (Constant)	Variance Proportions sat
1	1	1.994	1.000	.00	.00
	2	.006	17.778	1.00	1.00

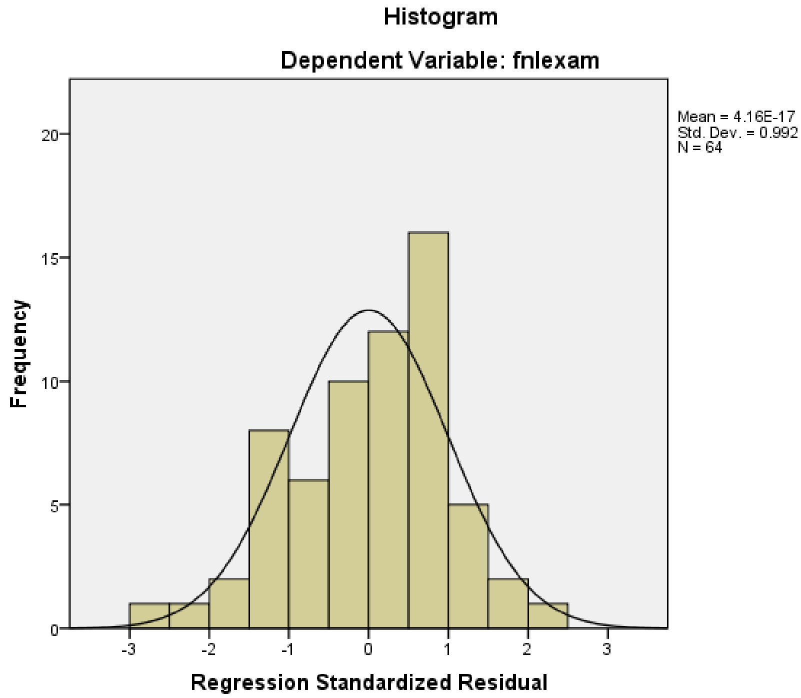
a. Dependent Variable: fnlexam

Residuals Statistics[a]

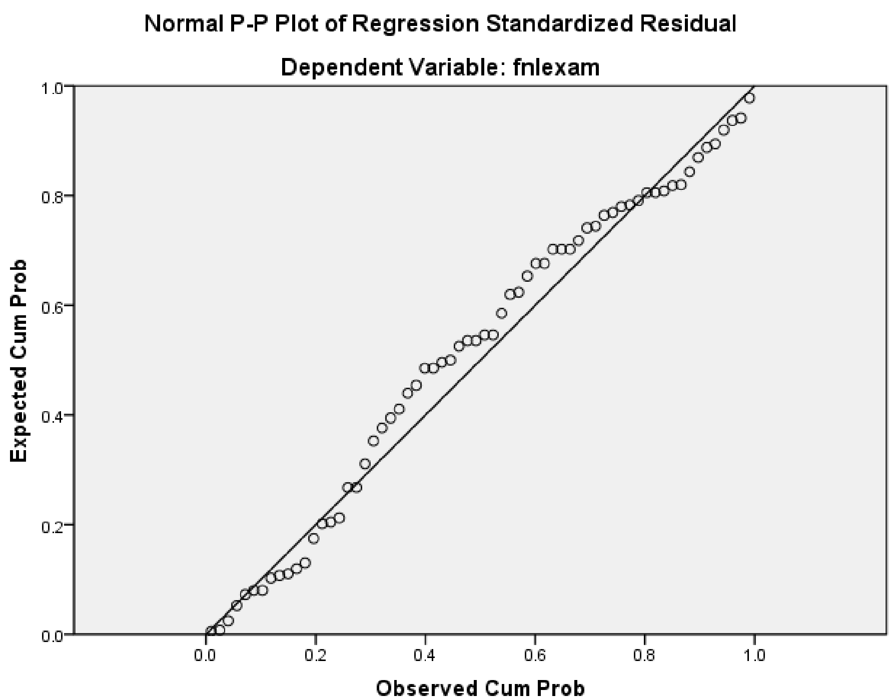
	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	54.69	79.60	68.73	4.326	64
Residual	-36.687	29.467	.000	14.533	64
Std. Predicted Value	-3.246	2.513	.000	1.000	64
Std. Residual	-2.504	2.011	.000	.992	64

a. Dependent Variable: fnlexam

Charts



Histogram
Dependent Variable: fnlexam
Mean = 4.16E-17
Std. Dev. = 0.992
N = 64
Frequency
20
15
10
5
0
-3
-2
-1
0
1
2
3
Regression Standardized Residual



Normal P-P Plot of Regression Standardized Residual
Dependent Variable: fnlexam
Expected Cum Prob
1.0
0.8
0.6
0.4
0.2
0.0
0.0
0.2
0.4
0.6
0.8
1.0
Observed Cum Prob

```
REGRESSION
  /DESCRIPTIVES MEAN STDDEV CORR SIG N
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS CI(95) BCOV R ANOVA COLLIN TOL CHANGE
ZPP
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT fnlexam
  /METHOD=ENTER comcol
  /RESIDUALS DURBIN HISTOGRAM(ZRESID) NORMPROB(ZRESID)
  /CASEWISE PLOT(ZRESID) OUTLIERS(3).
```

Regression

Notes

Output Created		02-Oct-2011 13:41:00
Comments		
Input	Data	C:\Users\Lin\Documents\math 097 fall 2001 with classrooms no names.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	675
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.

Syntax		REGRESSION /DESCRIPTIVES MEAN STDDEV CORR SIG N /MISSING LISTWISE /STATISTICS COEFF OUTS CI(95) BCOV R ANOVA COLLIN TOL CHANGE ZPP /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT fnlexam /METHOD=ENTER comcol /RESIDUALS DURBIN HISTOGRAM(ZRESID) NORMPROB(ZRESID) /CASEWISE PLOT(ZRESID) OUTLIERS(3).
Resources	Processor Time	00:00:01.217
	Elapsed Time	00:00:01.208
	Memory Required	2260 bytes
	Additional Memory Required for Residual Plots	656 bytes

[DataSet1] C:\Users\Lin\Documents\math 097 fall 2001 with classrooms no names.sav

Descriptive Statistics

	Mean	Std. Deviation	N
fnlexam	68.52	14.194	517
comcol	.18	.384	517

Correlations

		fnlexam	comcol
Pearson Correlation	fnlexam	1.000	-.088
	comcol	-.088	1.000
Sig. (1-tailed)	fnlexam	.	.023
	comcol	.023	.
N	fnlexam	517	517
	comcol	517	517

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	comcol[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: fnlexam

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics		
					R Square Change	F Change	df1
1	.088[a]	.008	.006	14.152	.008	4.018	1

a. Predictors: (Constant), comcol

b. Dependent Variable: fnlexam

Model Summary[b]

Model	Change Statistics		Durbin-Watson
	df2	Sig. F Change	
1	515	.046	1.678

b. Dependent Variable: fnlexam

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	804.756	1	804.756	4.018	.046[a]
	Residual	103150.192	515	200.292		
	Total	103954.948	516			

a. Predictors: (Constant), comcol

b. Dependent Variable: fnlexam

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	69.108	.687		100.550	.000
	comcol	-3.248	1.621	-.088	-2.004	.046

a. Dependent Variable: fnlexam

Coefficients[a]

Model		95.0% Confidence Interval for B		Correlations		
		Lower Bound	Upper Bound	Zero-order	Partial	Part
1	(Constant)	67.758	70.459			
	comcol	-6.432	-.065	-.088	-.088	-.088

a. Dependent Variable: fnlexam

Coefficients[a]

Model		Collinearity Statistics	
		Tolerance	VIF
1	(Constant)		
	comcol	1.000	1.000

a. Dependent Variable: fnlexam

Coefficient Correlations[a]

Model			comcol
1	Correlations	comcol	1.000
	Covariances	comcol	2.626

a. Dependent Variable: fnlexam

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions	
				(Constant)	comcol
1	1	1.424	1.000	.29	.29
	2	.576	1.573	.71	.71

a. Dependent Variable: fnlexam

Casewise Diagnostics[a]

Case Number	Std. Residual	fnlexam	Predicted Value	Residual
551	-3.240	20	65.86	-45.860

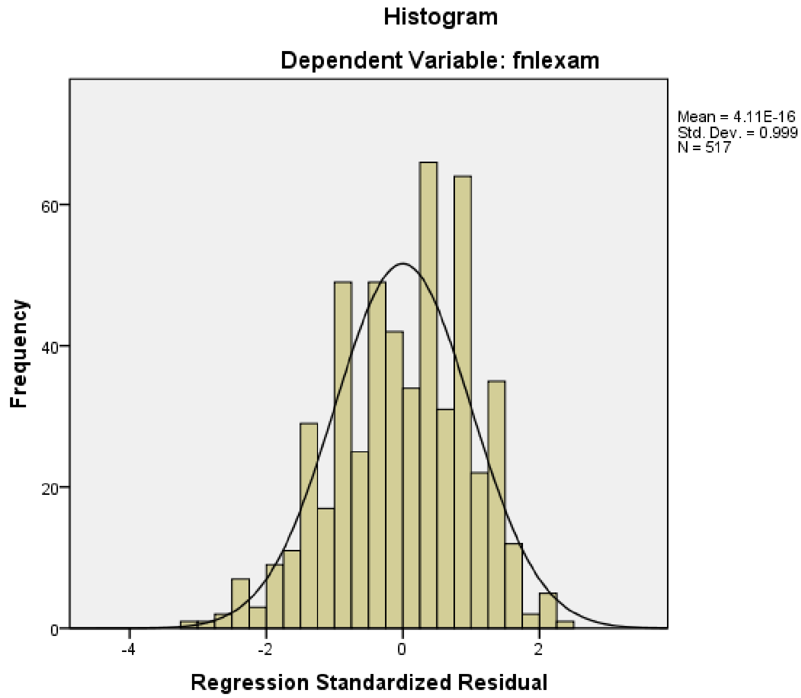
a. Dependent Variable: fnlexam

Residuals Statistics[a]

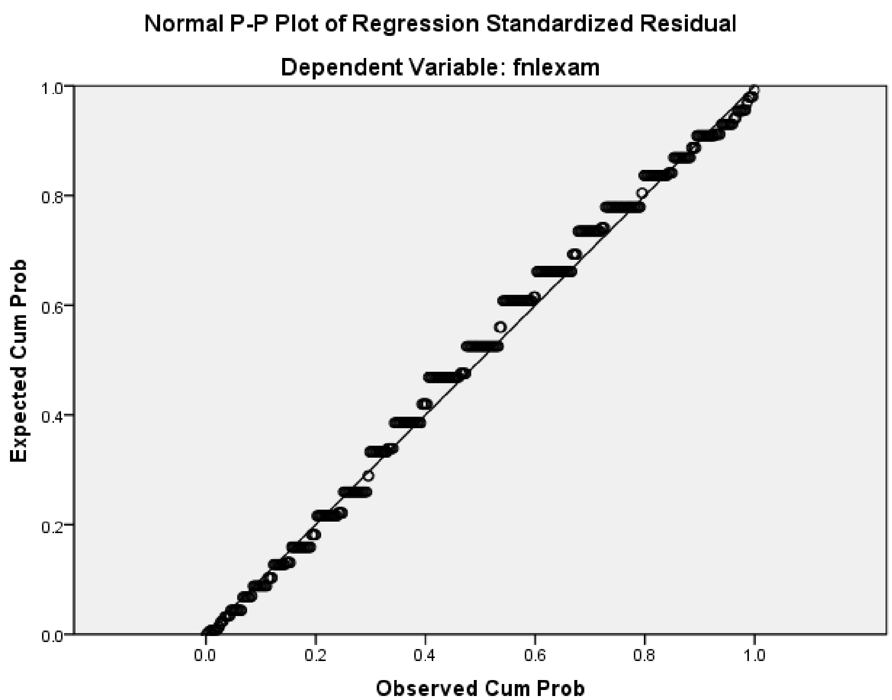
	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	65.86	69.11	68.52	1.249	517
Residual	-45.860	34.140	.000	14.139	517
Std. Predicted Value	-2.133	.468	.000	1.000	517
Std. Residual	-3.240	2.412	.000	.999	517

a. Dependent Variable: fnlexam

Charts



Histogram
Dependent Variable: fnlexam
Mean = 4.11E-16
Std. Dev. = 0.999
N = 517
Frequency
60
40
20
0
-4
-2
0
2
Regression Standardized Residual



Normal P-P Plot of Regression Standardized Residual
Dependent Variable: fnlexam
Expected Cum Prob
1.0
0.8
0.6
0.4
0.2
0.0
0.0
0.2
0.4
0.6
0.8
1.0
Observed Cum Prob

```
REGRESSION
  /DESCRIPTIVES MEAN STDDEV CORR SIG N
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS CI(95) BCOV R ANOVA COLLIN TOL CHANGE
ZPP
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT fnlexam
  /METHOD=ENTER pretest
  /RESIDUALS DURBIN HISTOGRAM(ZRESID) NORMPROB(ZRESID)
  /CASEWISE PLOT(ZRESID) OUTLIERS(3).
```

Regression

Notes

Output Created		02-Oct-2011 13:42:12
Comments		
Input	Data	C:\Users\Lin\Documents\math 097 fall 2001 with classrooms no names.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	675
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.

Syntax		REGRESSION /DESCRIPTIVES MEAN STDDEV CORR SIG N /MISSING LISTWISE /STATISTICS COEFF OUTS CI(95) BCOV R ANOVA COLLIN TOL CHANGE ZPP /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT fnlexam /METHOD=ENTER pretest /RESIDUALS DURBIN HISTOGRAM(ZRESID) NORMPROB(ZRESID) /CASEWISE PLOT(ZRESID) OUTLIERS(3).
Resources	Processor Time	00:00:01.092
	Elapsed Time	00:00:01.257
	Memory Required	2260 bytes
	Additional Memory Required for Residual Plots	656 bytes

[DataSet1] C:\Users\Lin\Documents\math 097 fall 2001 with classrooms no names.sav

Descriptive Statistics

	Mean	Std. Deviation	N
fnlexam	68.87	14.561	434
pretest	47.03	14.554	434

Correlations

		fnlexam	pretest
Pearson Correlation	fnlexam	1.000	.294
	pretest	.294	1.000
Sig. (1-tailed)	fnlexam	.	.000
	pretest	.000	.
N	fnlexam	434	434
	pretest	434	434

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	pretest[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: fnlexam

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics		
					R Square Change	F Change	df1
1	.294[a]	.087	.085	13.933	.087	40.966	1

a. Predictors: (Constant), pretest

b. Dependent Variable: fnlexam

Model Summary[b]

Model	Change Statistics		Durbin-Watson
	df2	Sig. F Change	
1	432	.000	1.603

b. Dependent Variable: fnlexam

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	7952.318	1	7952.318	40.966	.000[a]
	Residual	83859.712	432	194.120		
	Total	91812.030	433			

a. Predictors: (Constant), pretest

b. Dependent Variable: fnlexam

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	55.026	2.265		24.299	.000
	pretest	.294	.046	.294	6.400	.000

a. Dependent Variable: fnlexam

Coefficients[a]

Model		95.0% Confidence Interval for B		Correlations		
		Lower Bound	Upper Bound	Zero-order	Partial	Part
1	(Constant)	50.575	59.476			
	pretest	.204	.385	.294	.294	.294

a. Dependent Variable: fnlexam

Coefficients[a]

Model		Collinearity Statistics	
		Tolerance	VIF
1	(Constant)		
	pretest	1.000	1.000

a. Dependent Variable: fnlexam

Coefficient Correlations[a]

Model			pretest
1	Correlations	pretest	1.000
	Covariances	pretest	.002

a. Dependent Variable: fnlexam

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions	
				(Constant)	pretest
1	1	1.955	1.000	.02	.02
	2	.045	6.621	.98	.98

a. Dependent Variable: fnlexam

Casewise Diagnostics[a]

Case Number	Std. Residual	fnlexam	Predicted Value	Residual
551	-3.254	20	65.33	-45.332

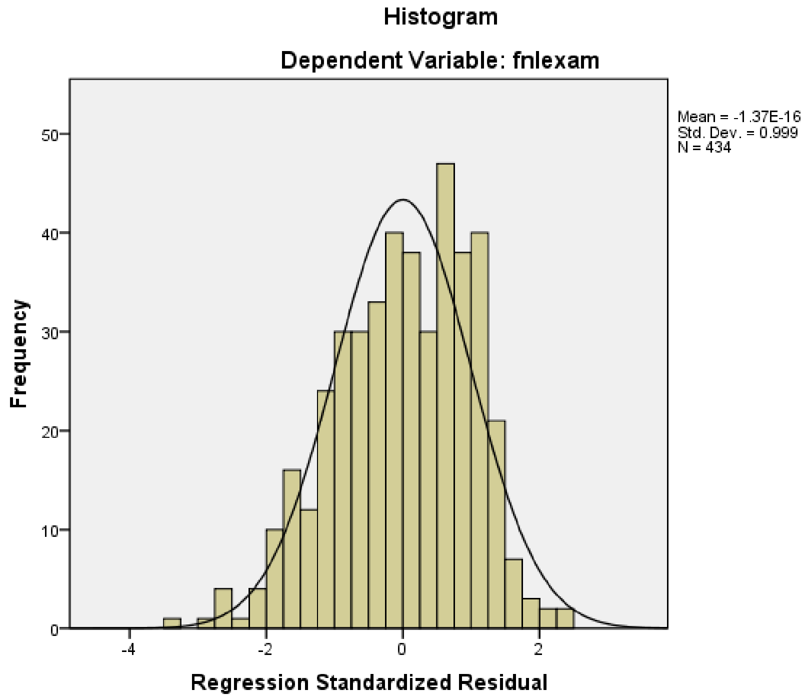
a. Dependent Variable: fnlexam

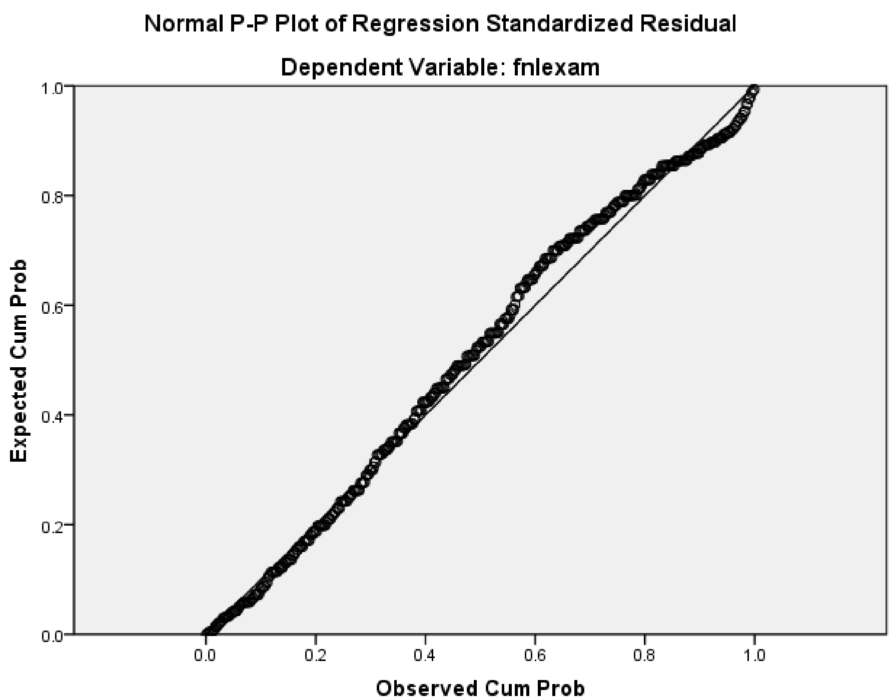
Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	56.50	80.05	68.87	4.286	434
Residual	-45.332	34.668	.000	13.917	434
Std. Predicted Value	-2.888	2.609	.000	1.000	434
Std. Residual	-3.254	2.488	.000	.999	434

a. Dependent Variable: fnlexam

Charts


Histogram
Dependent Variable: fnlexam
Mean = -1.37E-16
Std. Dev. = 0.999
N = 434
Frequency
Regression Standardized Residual
50
40
30
20
10
0
-4
-2
0
2


Normal P-P Plot of Regression Standardized Residual
Dependent Variable: fnlexam
Expected Cum Prob
Observed Cum Prob
1.0
0.8
0.6
0.4
0.2
0.0
0.0
0.2
0.4
0.6
0.8
1.0

```
REGRESSION
  /DESCRIPTIVES MEAN STDDEV CORR SIG N
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS CI(95) BCOV R ANOVA COLLIN TOL CHANGE
ZPP
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT fnlexam
  /METHOD=ENTER ascgr
  /RESIDUALS DURBIN HISTOGRAM(ZRESID) NORMPROB(ZRESID)
  /CASEWISE PLOT(ZRESID) OUTLIERS(3).
```

Regression

Notes

Output Created		02-Oct-2011 13:44:57
Comments		
Input	Data	C:\Users\Lin\Documents\math 097 fall 2001 with classrooms no names.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	675
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.

Syntax		REGRESSION /DESCRIPTIVES MEAN STDDEV CORR SIG N /MISSING LISTWISE /STATISTICS COEFF OUTS CI(95) BCOV R ANOVA COLLIN TOL CHANGE ZPP /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT fnlexam /METHOD=ENTER ascgr /RESIDUALS DURBIN HISTOGRAM(ZRESID) NORMPROB(ZRESID) /CASEWISE PLOT(ZRESID) OUTLIERS(3).
Resources	Processor Time	00:00:01.076
	Elapsed Time	00:00:01.853
	Memory Required	2260 bytes
	Additional Memory Required for Residual Plots	656 bytes

[DataSet1] C:\Users\Lin\Documents\math 097 fall 2001 with classrooms no names.sav

Descriptive Statistics

	Mean	Std. Deviation	N
fnlexam	68.55	14.212	514
ascgr	.86	.347	514

Correlations

		fnlexam	ascgr
Pearson Correlation	fnlexam	1.000	.170
	ascgr	.170	1.000
Sig. (1-tailed)	fnlexam	.	.000
	ascgr	.000	.
N	fnlexam	514	514
	ascgr	514	514

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	ascgr[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: fnlexam

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics		
					R Square Change	F Change	df1
1	.170[a]	.029	.027	14.019	.029	15.179	1

a. Predictors: (Constant), ascgr

b. Dependent Variable: fnlexam

Model Summary[b]

Model	Change Statistics		Durbin-Watson
	df2	Sig. F Change	
1	512	.000	1.699

b. Dependent Variable: fnlexam

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2983.355	1	2983.355	15.179	.000[a]
	Residual	100627.726	512	196.539		
	Total	103611.082	513			

a. Predictors: (Constant), ascgr

b. Dependent Variable: fnlexam

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	62.583	1.652		37.879	.000
	ascgr	6.942	1.782	.170	3.896	.000

a. Dependent Variable: fnlexam

Coefficients[a]

Model		95.0% Confidence Interval for B		Correlations		
		Lower Bound	Upper Bound	Zero-order	Partial	Part
1	(Constant)	59.337	65.829			
	ascgr	3.441	10.442	.170	.170	.170

a. Dependent Variable: fnlexam

Coefficients[a]

Model		Collinearity Statistics	
		Tolerance	VIF
1	(Constant)		
	ascgr	1.000	1.000

a. Dependent Variable: fnlexam

Coefficient Correlations[a]

Model			ascgr
1	Correlations	ascgr	1.000
	Covariances	ascgr	3.174

a. Dependent Variable: fnlexam

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions	
				(Constant)	ascgr
1	1	1.927	1.000	.04	.04
	2	.073	5.150	.96	.96

a. Dependent Variable: fnlexam

Casewise Diagnostics[a]

Case Number	Std. Residual	fnlexam	Predicted Value	Residual
551	-3.037	20	62.58	-42.583

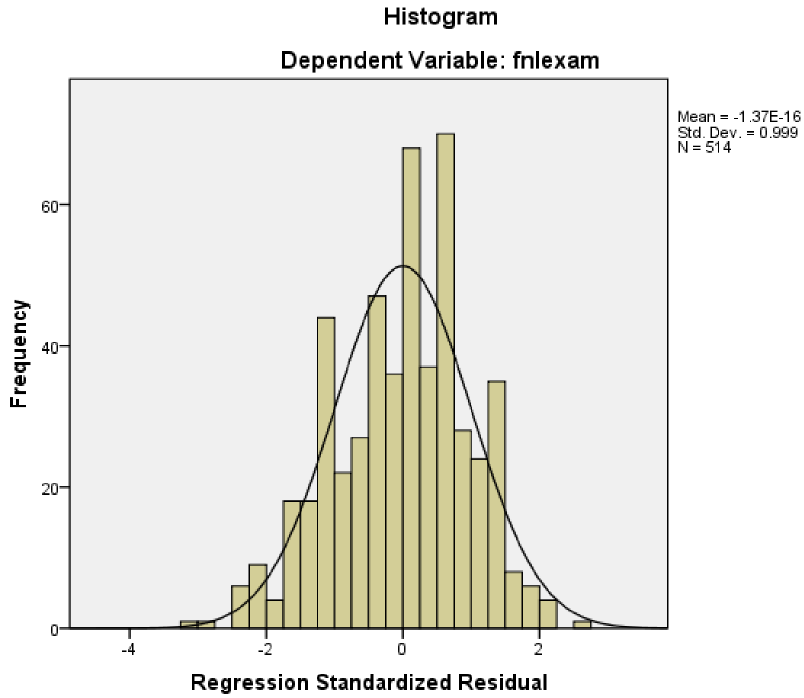
a. Dependent Variable: fnlexam

Residuals Statistics[a]

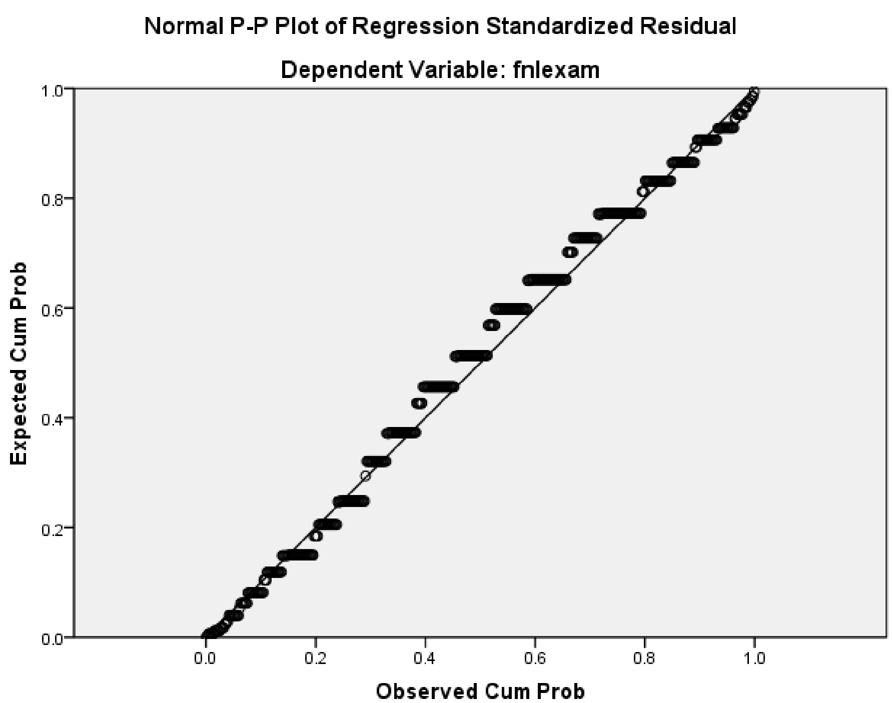
	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	62.58	69.52	68.55	2.412	514
Residual	-42.583	35.417	.000	14.006	514
Std. Predicted Value	-2.475	.403	.000	1.000	514
Std. Residual	-3.037	2.526	.000	.999	514

a. Dependent Variable: fnlexam

Charts



Histogram
Dependent Variable: fnlexam
Mean = -1.37E-16
Std. Dev. = 0.999
N = 514
Frequency
60
40
20
0
-4
-2
0
2
Regression Standardized Residual



Normal P-P Plot of Regression Standardized Residual
Dependent Variable: fnlexam
Expected Cum Prob
1.0
0.8
0.6
0.4
0.2
0.0
0.0
0.2
0.4
0.6
0.8
1.0
Observed Cum Prob

```
REGRESSION
  /DESCRIPTIVES MEAN STDDEV CORR SIG N
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS CI(95) BCOV R ANOVA COLLIN TOL CHANGE
ZPP
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT fnlexam
  /METHOD=ENTER techsex
  /RESIDUALS DURBIN HISTOGRAM(ZRESID) NORMPROB(ZRESID)
  /CASEWISE PLOT(ZRESID) OUTLIERS(3).
```

Regression

Notes

Output Created		02-Oct-2011 13:46:52
Comments		
Input	Data	C:\Users\Lin\Documents\math 097 fall 2001 with classrooms no names.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	675
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.

Syntax		REGRESSION /DESCRIPTIVES MEAN STDDEV CORR SIG N /MISSING LISTWISE /STATISTICS COEFF OUTS CI(95) BCOV R ANOVA COLLIN TOL CHANGE ZPP /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT fnlexam /METHOD=ENTER techsex /RESIDUALS DURBIN HISTOGRAM(ZRESID) NORMPROB(ZRESID) /CASEWISE PLOT(ZRESID) OUTLIERS(3).
Resources	Processor Time	00:00:00.983
	Elapsed Time	00:00:01.163
	Memory Required	2260 bytes
	Additional Memory Required for Residual Plots	656 bytes

[DataSet1] C:\Users\Lin\Documents\math 097 fall 2001 with classrooms no names.sav

Descriptive Statistics

	Mean	Std. Deviation	N
fnlexam	68.50	14.192	518
techsex	.31	.462	518

Correlations

		fnlexam	techsex
Pearson Correlation	fnlexam	1.000	-.098
	techsex	-.098	1.000
Sig. (1-tailed)	fnlexam	.	.013
	techsex	.013	.
N	fnlexam	518	518
	techsex	518	518

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	techsex[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: fnlexam

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics		
					R Square Change	F Change	df1
1	.098[a]	.010	.008	14.138	.010	4.980	1

a. Predictors: (Constant), techsex

b. Dependent Variable: fnlexam

Model Summary[b]

Model	Change Statistics		Durbin-Watson
	df2	Sig. F Change	
1	516	.026	1.678

b. Dependent Variable: fnlexam

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	995.407	1	995.407	4.980	.026[a]
	Residual	103142.091	516	199.888		
	Total	104137.498	517			

a. Predictors: (Constant), techsex

b. Dependent Variable: fnlexam

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	69.421	.746		93.034	.000
	techsex	-3.006	1.347	-.098	-2.232	.026

a. Dependent Variable: fnlexam

Coefficients[a]

Model		95.0% Confidence Interval for B		Correlations		
		Lower Bound	Upper Bound	Zero-order	Partial	Part
1	(Constant)	67.955	70.887			
	techsex	-5.651	-.360	-.098	-.098	-.098

a. Dependent Variable: fnlexam

Coefficients[a]

Model		Collinearity Statistics	
		Tolerance	VIF
1	(Constant)		
	techsex	1.000	1.000

a. Dependent Variable: fnlexam

Coefficient Correlations[a]

Model			techsex
1	Correlations	techsex	1.000
	Covariances	techsex	1.814

a. Dependent Variable: fnlexam

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions	
				(Constant)	techsex
1	1	1.554	1.000	.22	.22
	2	.446	1.867	.78	.78

a. Dependent Variable: fnlexam

\

Casewise Diagnostics[a]

Case Number	Std. Residual	fnlexam	Predicted Value	Residual
551	-3.496	20	69.42	-49.421

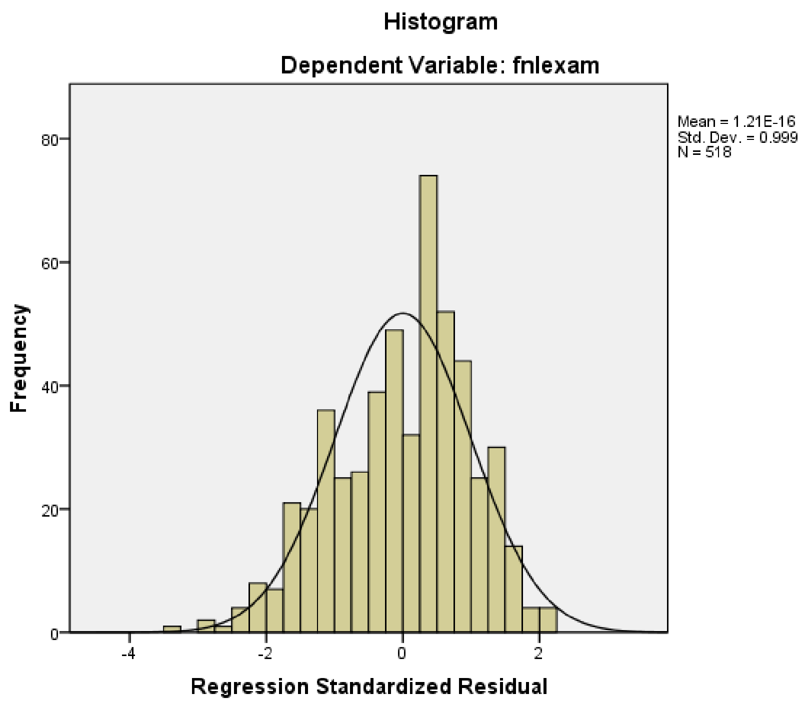
a. Dependent Variable: fnlexam

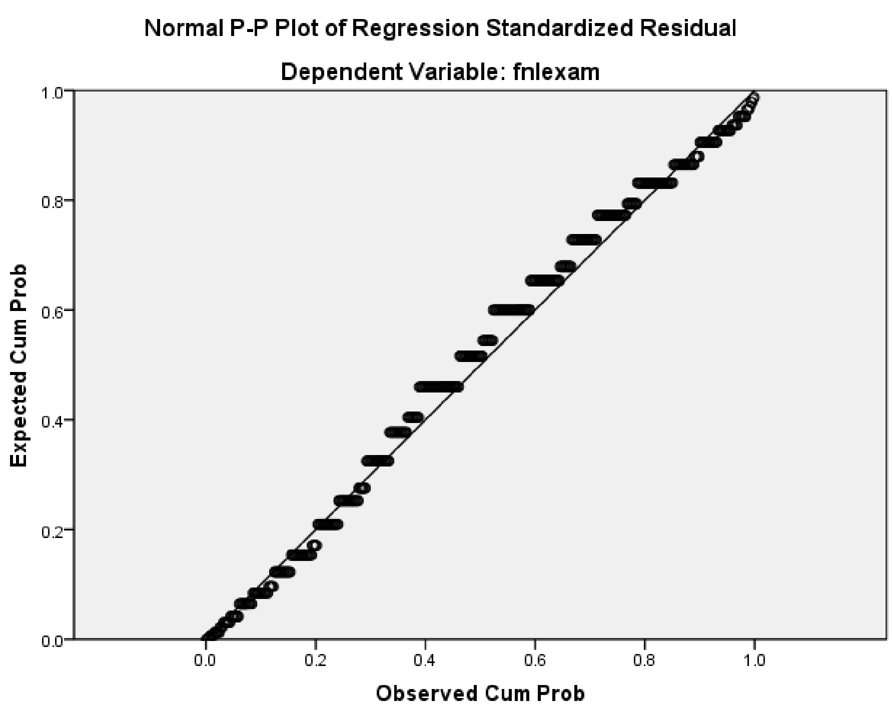
Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	66.42	69.42	68.50	1.388	518
Residual	-49.421	31.585	.000	14.124	518
Std. Predicted Value	-1.501	.665	.000	1.000	518
Std. Residual	-3.496	2.234	.000	.999	518

a. Dependent Variable: fnlexam

Charts


Histogram
Dependent Variable: fnlexam
Mean = 1.21E-16
Std. Dev. = 0.999
N = 518
Frequency
0
20
40
60
80
-4
-2
0
2
Regression Standardized Residual


Normal P-P Plot of Regression Standardized Residual
Dependent Variable: fnlexam
Expected Cum Prob
0.0
0.2
0.4
0.6
0.8
1.0
Observed Cum Prob

```
REGRESSION
  /DESCRIPTIVES MEAN STDDEV CORR SIG N
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS CI(95) BCOV R ANOVA COLLIN TOL CHANGE
ZPP
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
 /DEPENDENT fnlexam
  /METHOD=ENTER adj097
  /RESIDUALS DURBIN HISTOGRAM(ZRESID) NORMPROB(ZRESID)
  /CASEWISE PLOT(ZRESID) OUTLIERS(3).
```

Regression

Notes

Output Created		02-Oct-2011 13:48:35
Comments		
Input	Data	C:\Users\Lin\Documents\math 097 fall 2001 with classrooms no names.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	675
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.

Syntax		REGRESSION /DESCRIPTIVES MEAN STDDEV CORR SIG N /MISSING LISTWISE /STATISTICS COEFF OUTS CI(95) BCOV R ANOVA COLLIN TOL CHANGE ZPP /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT fnlexam /METHOD=ENTER adj097 /RESIDUALS DURBIN HISTOGRAM(ZRESID) NORMPROB(ZRESID) /CASEWISE PLOT(ZRESID) OUTLIERS(3).
Resources	Processor Time	00:00:01.372
	Elapsed Time	00:00:01.280
	Memory Required	2260 bytes
	Additional Memory Required for Residual Plots	656 bytes

[DataSet1] C:\Users\Lin\Documents\math 097 fall 2001 with classrooms no names.sav

Descriptive Statistics

	Mean	Std. Deviation	N
fnlexam	68.50	14.192	518
adj097	.49	.500	518

Correlations

		fnlexam	adj097
Pearson Correlation	fnlexam	1.000	-.017
	adj097	-.017	1.000
Sig. (1-tailed)	fnlexam	.	.351
	adj097	.351	.
N	fnlexam	518	518
	adj097	518	518

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	adj097[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: fnlexam

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics		
					R Square Change	F Change	df1
1	.017[a]	.000	-.002	14.204	.000	.147	1

a. Predictors: (Constant), adj097

b. Dependent Variable: fnlexam

Model Summary[b]

Model	Change Statistics		Durbin-Watson
	df2	Sig. F Change	
1	516	.701	1.662

b. Dependent Variable: fnlexam

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	29.710	1	29.710	.147	.701[a]
	Residual	104107.788	516	201.759		
	Total	104137.498	517			

a. Predictors: (Constant), adj097

b. Dependent Variable: fnlexam

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	68.732	.873		78.771	.000
	adj097	-.479	1.249	-.017	-.384	.701

a. Dependent Variable: fnlexam

Coefficients[a]

Model		95.0% Confidence Interval for B		Correlations		
		Lower Bound	Upper Bound	Zero-order	Partial	Part
1	(Constant)	67.018	70.446			
	adj097	-2.932	1.974	-.017	-.017	-.017

a. Dependent Variable: fnlexam

Coefficients[a]

Model		Collinearity Statistics	
		Tolerance	VIF
1	(Constant)		
	adj097	1.000	1.000

a. Dependent Variable: fnlexam

Coefficient Correlations[a]

Model			adj097
1	Correlations	adj097	1.000
	Covariances	adj097	1.559

a. Dependent Variable: fnlexam

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions	
				(Constant)	adj097
1	1	1.699	1.000	.15	.15
	2	.301	2.375	.85	.85

a. Dependent Variable: fnlexam

Casewise Diagnostics[a]

Case Number	Std. Residual	fnlexam	Predicted Value	Residual
551	-3.397	20	68.25	-48.253

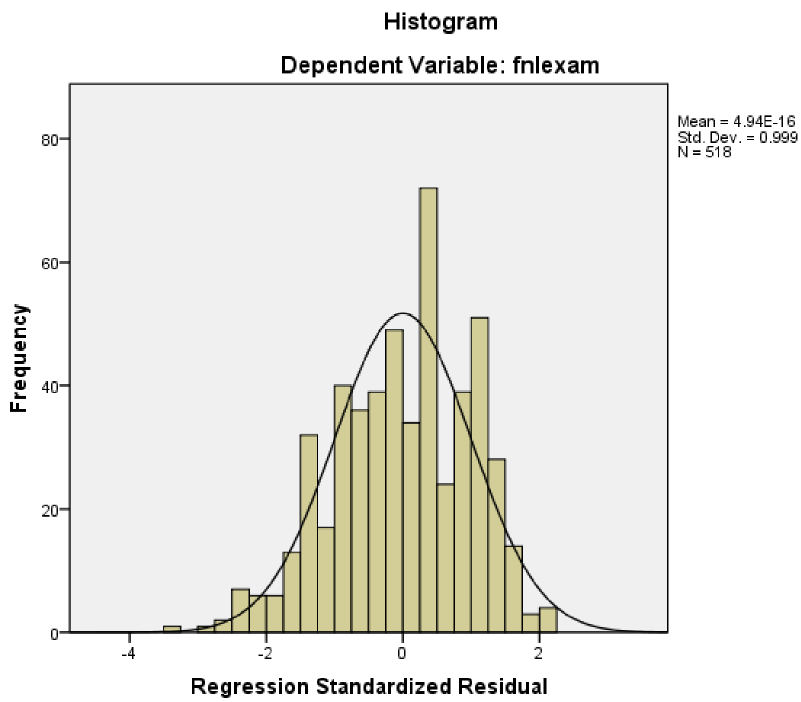
a. Dependent Variable: fnlexam

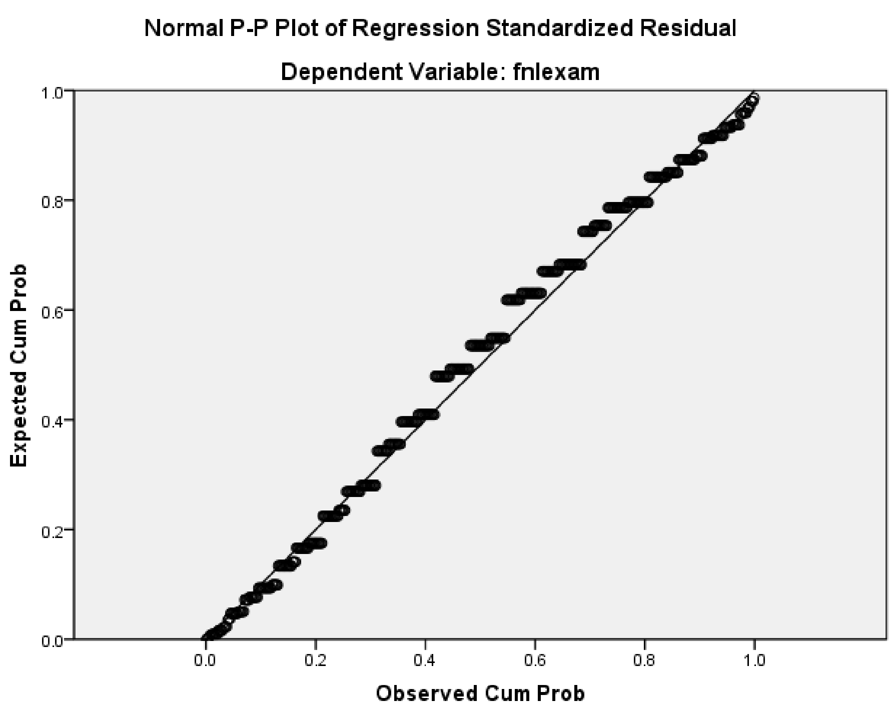
Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	68.25	68.73	68.50	.240	518
Residual	-48.253	31.268	.000	14.190	518
Std. Predicted Value	-1.022	.976	.000	1.000	518
Std. Residual	-3.397	2.201	.000	.999	518

a. Dependent Variable: fnlexam

Charts


Histogram
Dependent Variable: fnlexam
Mean = 4.94E-16
Std. Dev. = 0.999
N = 518
Frequency
80
60
40
20
0
-4
-2
0
2
Regression Standardized Residual


Normal P-P Plot of Regression Standardized Residual
Dependent Variable: fnlexam
Expected Cum Prob
1.0
0.8
0.6
0.4
0.2
0.0
0.0
0.2
0.4
0.6
0.8
1.0
Observed Cum Prob

```
REGRESSION
  /DESCRIPTIVES MEAN STDDEV CORR SIG N
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS CI(95) BCOV R ANOVA COLLIN TOL CHANGE
ZPP
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT fnlexam
  /METHOD=ENTER mozartuse
  /RESIDUALS DURBIN HISTOGRAM(ZRESID) NORMPROB(ZRESID)
  /CASEWISE PLOT(ZRESID) OUTLIERS(3).
```

Regression

Notes

Output Created		02-Oct-2011 13:50:09
Comments		
Input	Data	C:\Users\Lin\Documents\math 097 fall 2001 with classrooms no names.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	675
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.

Syntax		REGRESSION /DESCRIPTIVES MEAN STDDEV CORR SIG N /MISSING LISTWISE /STATISTICS COEFF OUTS CI(95) BCOV R ANOVA COLLIN TOL CHANGE ZPP /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT fnlexam /METHOD=ENTER mozartuse /RESIDUALS DURBIN HISTOGRAM(ZRESID) NORMPROB(ZRESID) /CASEWISE PLOT(ZRESID) OUTLIERS(3).
Resources	Processor Time	00:00:00.967
	Elapsed Time	00:00:01.217
	Memory Required	2260 bytes
	Additional Memory Required for Residual Plots	656 bytes

[DataSet1] C:\Users\Lin\Documents\math 097 fall 2001 with classrooms no names.sav

Descriptive Statistics

	Mean	Std. Deviation	N
fnlexam	68.50	14.192	518
mozartuse	.11	.316	518

Correlations

		fnlexam	mozartuse
Pearson Correlation	fnlexam	1.000	.124
	mozartuse	.124	1.000
Sig. (1-tailed)	fnlexam	.	.002
	mozartuse	.002	.
N	fnlexam	518	518
	mozartuse	518	518

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	mozartuse[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: fnlexam

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics		
					R Square Change	F Change	df1
1	.124[a]	.015	.014	14.096	.015	8.111	1

a. Predictors: (Constant), mozartuse

b. Dependent Variable: fnlexam

Model Summary[b]

Model	Change Statistics		Durbin-Watson
	df2	Sig. F Change	
1	516	.005	1.689

b. Dependent Variable: fnlexam

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1611.634	1	1611.634	8.111	.005[a]
	Residual	102525.864	516	198.694		
	Total	104137.498	517			

a. Predictors: (Constant), mozartuse

b. Dependent Variable: fnlexam

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	67.872	.657		103.270	.000
	mozartuse	5.594	1.964	.124	2.848	.005

a. Dependent Variable: fnlexam

Coefficients[a]

Model		95.0% Confidence Interval for B		Correlations		
		Lower Bound	Upper Bound	Zero-order	Partial	Part
1	(Constant)	66.581	69.163			
	mozartuse	1.735	9.452	.124	.124	.124

a. Dependent Variable: fnlexam

Coefficients[a]

Model		Collinearity Statistics	
		Tolerance	VIF
1	(Constant)		
	mozartuse	1.000	1.000

a. Dependent Variable: fnlexam

Coefficient Correlations[a]

Model			mozartuse
1	Correlations	mozartuse	1.000
	Covariances	mozartuse	3.858

a. Dependent Variable: fnlexam

Collinearity Diagnostics[a]

Model	Dimension			Variance Proportions	
		Eigenvalue	Condition Index	(Constant)	mozartuse
1	1	1.335	1.000	.33	.33
	2	.665	1.416	.67	.67

a. Dependent Variable: fnlexam

Casewise Diagnostics[a]

Case Number	Std. Residual	fnlexam	Predicted Value	Residual
551	-3.396	20	67.87	-47.872

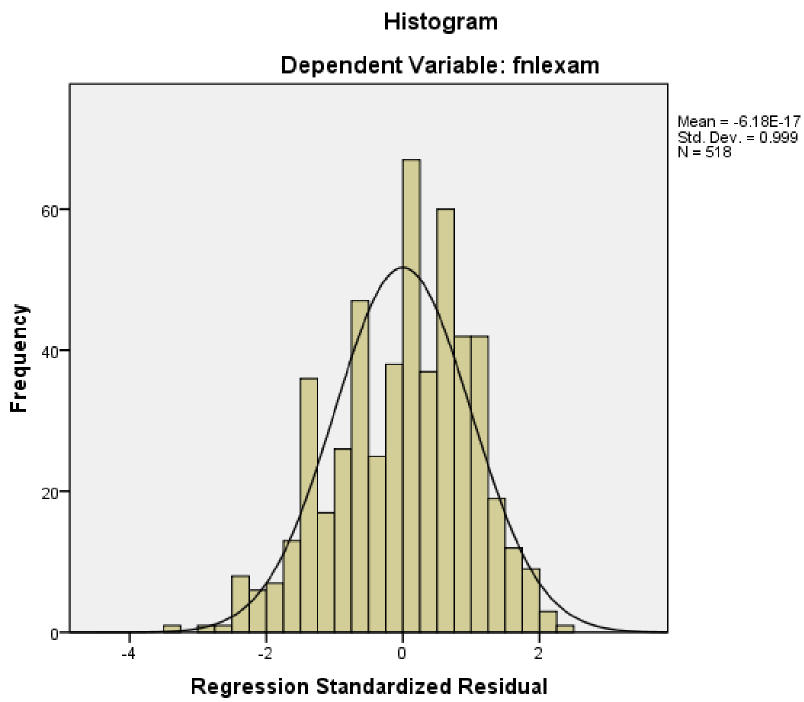
a. Dependent Variable: fnlexam

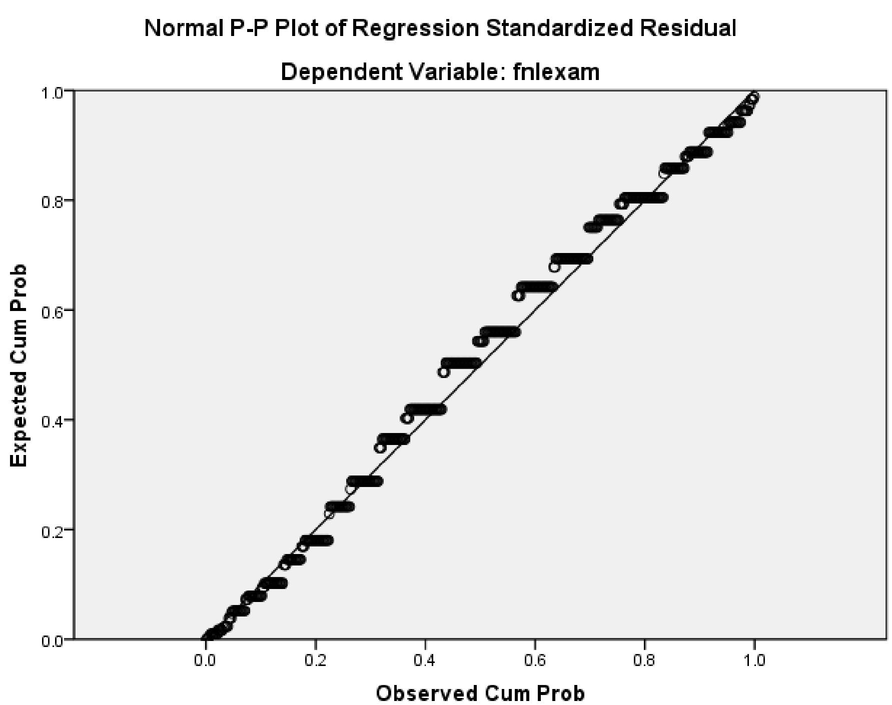
Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	67.87	73.47	68.50	1.766	518
Residual	-47.872	32.128	.000	14.082	518
Std. Predicted Value	-.355	2.813	.000	1.000	518
Std. Residual	-3.396	2.279	.000	.999	518

a. Dependent Variable: fnlexam

Charts


Histogram
Dependent Variable: fnlexam
Mean = -6.18E-17
Std. Dev. = 0.999
N = 518
Frequency
0
20
40
60
-4
-2
0
2
Regression Standardized Residual


Normal P-P Plot of Regression Standardized Residual
Dependent Variable: fnlexam
Expected Cum Prob
0.0
0.2
0.4
0.6
0.8
1.0
Observed Cum Prob

```
REGRESSION
  /DESCRIPTIVES MEAN STDDEV CORR SIG N
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS CI(95) BCOV R ANOVA COLLIN TOL CHANGE
ZPP
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT fnlexam
  /METHOD=ENTER ALEKSuse
  /RESIDUALS DURBIN HISTOGRAM(ZRESID) NORMPROB(ZRESID)
  /CASEWISE PLOT(ZRESID) OUTLIERS(3).
```

Regression

Notes

Output Created		02-Oct-2011 13:52:25
Comments		
Input	Data	C:\Users\Lin\Documents\math 097 fall 2001 with classrooms no names.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	675
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.

Syntax		REGRESSION /DESCRIPTIVES MEAN STDDEV CORR SIG N /MISSING LISTWISE /STATISTICS COEFF OUTS CI(95) BCOV R ANOVA COLLIN TOL CHANGE ZPP /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT fnlexam /METHOD=ENTER ALEKSuse /RESIDUALS DURBIN HISTOGRAM(ZRESID) NORMPROB(ZRESID) /CASEWISE PLOT(ZRESID) OUTLIERS(3).
Resources	Processor Time	00:00:01.451
	Elapsed Time	00:00:01.298
	Memory Required	2260 bytes
	Additional Memory Required for Residual Plots	656 bytes

[DataSet1] C:\Users\Lin\Documents\math 097 fall 2001 with classrooms no names.sav

Descriptive Statistics

	Mean	Std. Deviation	N
fnlexam	68.50	14.192	518
ALEKSuse	.04	.202	518

Correlations

		fnlexam	ALEKSuse
Pearson Correlation	fnlexam	1.000	-.036
	ALEKSuse	-.036	1.000
Sig. (1-tailed)	fnlexam	.	.204
	ALEKSuse	.204	.
N	fnlexam	518	518
	ALEKSuse	518	518

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	ALEKSuse[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: fnlexam

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics		
					R Square Change	F Change	df1
1	.036[a]	.001	-.001	14.197	.001	.686	1

a. Predictors: (Constant), ALEKSuse

b. Dependent Variable: fnlexam

Model Summary[b]

Model	Change Statistics		Durbin-Watson
	df2	Sig. F Change	
1	516	.408	1.663

b. Dependent Variable: fnlexam

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	138.207	1	138.207	.686	.408[a]
	Residual	103999.291	516	201.549		
	Total	104137.498	517			

a. Predictors: (Constant), ALEKSuse

b. Dependent Variable: fnlexam

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	68.607	.637		107.626	.000
	ALEKSuse	-2.561	3.093	-.036	-.828	.408

a. Dependent Variable: fnlexam

Coefficients[a]

Model		95.0% Confidence Interval for B		Correlations		
		Lower Bound	Upper Bound	Zero-order	Partial	Part
1	(Constant)	67.355	69.859			
	ALEKSuse	-8.638	3.515	-.036	-.036	-.036

a. Dependent Variable: fnlexam

Coefficients[a]

Model		Collinearity Statistics	
		Tolerance	VIF
1	(Constant)		
	ALEKSuse	1.000	1.000

a. Dependent Variable: fnlexam

Coefficient Correlations[a]

Model			ALEKSuse
1	Correlations	ALEKSuse	1.000
	Covariances	ALEKSuse	9.568

a. Dependent Variable: fnlexam

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions (Constant)	
				(Constant)	ALEKSuse
1	1	1.206	1.000	.40	.40
	2	.794	1.233	.60	.60

a. Dependent Variable: fnlexam

Casewise Diagnostics[a]

Case Number	Std. Residual	fnlexam	Predicted Value	Residual
551	-3.424	20	68.61	-48.607

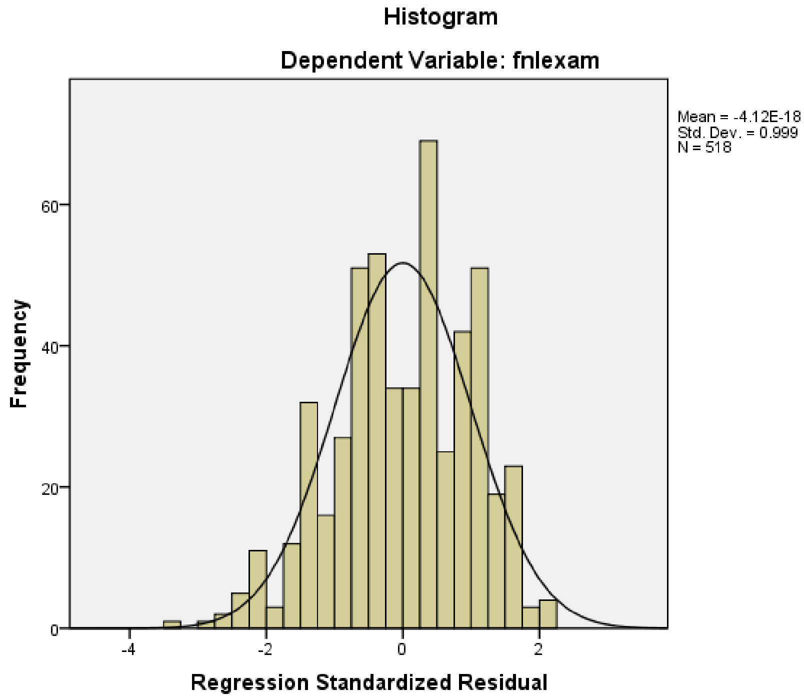
a. Dependent Variable: fnlexam

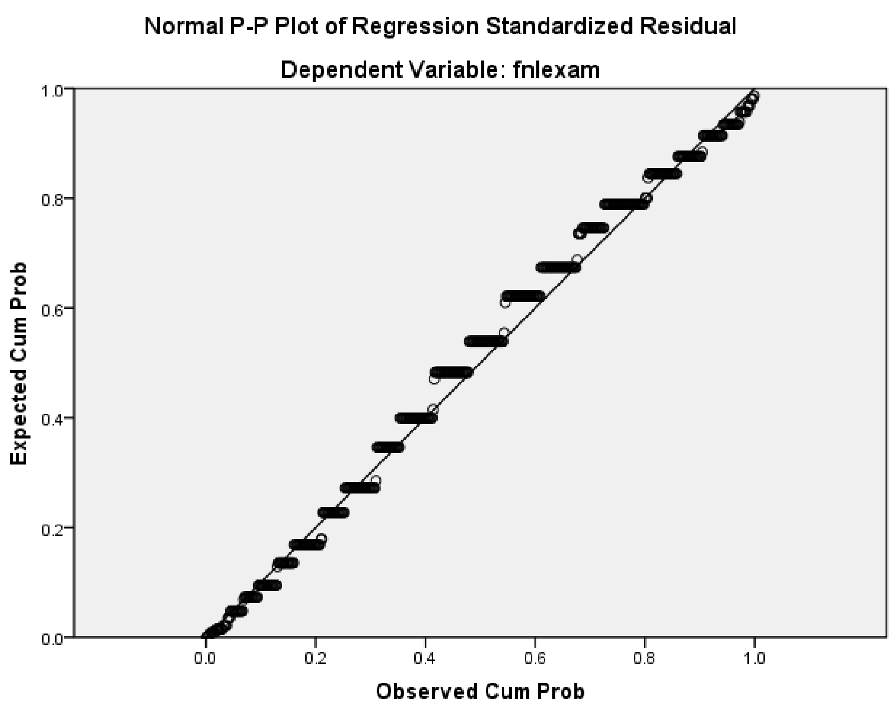
Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	66.05	68.61	68.50	.517	518
Residual	-48.607	31.393	.000	14.183	518
Std. Predicted Value	-4.744	.210	.000	1.000	518
Std. Residual	-3.424	2.211	.000	.999	518

a. Dependent Variable: fnlexam

Charts


Histogram
Dependent Variable: fnlexam
Mean = -4.12E-18
Std. Dev. = 0.999
N = 518
Frequency
60
40
20
0
-4
-2
0
2
Regression Standardized Residual


Normal P-P Plot of Regression Standardized Residual
Dependent Variable: fnlexam
Expected Cum Prob
1.0
0.8
0.6
0.4
0.2
0.0
0.0
0.2
0.4
0.6
0.8
1.0
Observed Cum Prob

```
REGRESSION
  /DESCRIPTIVES MEAN STDDEV CORR SIG N
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS CI(95) BCOV R ANOVA COLLIN TOL CHANGE
ZPP
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT fnlexam
  /METHOD=ENTER amisone
  /RESIDUALS DURBIN HISTOGRAM(ZRESID) NORMPROB(ZRESID)
  /CASEWISE PLOT(ZRESID) OUTLIERS(3).
```

Regression

Notes

Output Created		02-Oct-2011 13:54:32
Comments		
Input	Data	C:\Users\Lin\Documents\math 097 fall 2001 with classrooms no names.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	675
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.

Syntax		REGRESSION /DESCRIPTIVES MEAN STDDEV CORR SIG N /MISSING LISTWISE /STATISTICS COEFF OUTS CI(95) BCOV R ANOVA COLLIN TOL CHANGE ZPP /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT fnlexam /METHOD=ENTER amisone /RESIDUALS DURBIN HISTOGRAM(ZRESID) NORMPROB(ZRESID) /CASEWISE PLOT(ZRESID) OUTLIERS(3).
Resources	Processor Time	00:00:01.014
	Elapsed Time	00:00:01.139
	Memory Required	2260 bytes
	Additional Memory Required for Residual Plots	656 bytes

[DataSet1] C:\Users\Lin\Documents\math 097 fall 2001 with classrooms no names.sav

Descriptive Statistics

	Mean	Std. Deviation	N
fnlexam	68.63	14.173	510
amisone	.36	.481	510

Correlations

		fnlexam	amisone
Pearson Correlation	fnlexam	1.000	.020
	amisone	.020	1.000
Sig. (1-tailed)	fnlexam	.	.329
	amisone	.329	.
N	fnlexam	510	510
	amisone	510	510

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	amisone[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: fnlexam

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics		
					R Square Change	F Change	df1
1	.020[a]	.000	-.002	14.184	.000	.196	1

a. Predictors: (Constant), amisone

b. Dependent Variable: fnlexam

Model Summary[b]

Model	Change Statistics		Durbin-Watson
	df2	Sig. F Change	
1	508	.658	1.648

b. Dependent Variable: fnlexam

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	39.449	1	39.449	.196	.658[a]
	Residual	102201.249	508	201.184		
	Total	102240.698	509			

a. Predictors: (Constant), amisone

b. Dependent Variable: fnlexam

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	68.422	.787		86.964	.000
	amisone	.578	1.306	.020	.443	.658

a. Dependent Variable: fnlexam

Coefficients[a]

Model		95.0% Confidence Interval for B		Correlations		
		Lower Bound	Upper Bound	Zero-order	Partial	Part
1	(Constant)	66.876	69.967			
	amisone	-1.988	3.145	.020	.020	.020

a. Dependent Variable: fnlexam

Coefficients[a]

Model		Collinearity Statistics	
		Tolerance	VIF
1	(Constant)		
	amisone	1.000	1.000

a. Dependent Variable: fnlexam

Coefficient Correlations[a]

Model			amisone
1	Correlations	amisone	1.000
	Covariances	amisone	1.707

a. Dependent Variable: fnlexam

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions	
				(Constant)	amisone
1	1	1.602	1.000	.20	.20
	2	.398	2.007	.80	.80

a. Dependent Variable: fnlexam

Casewise Diagnostics[a]

Case Number	Std. Residual	fnlexam	Predicted Value	Residual
551	-3.414	20	68.42	-48.422

a. Dependent Variable: fnlexam

Residuals Statistics[a]

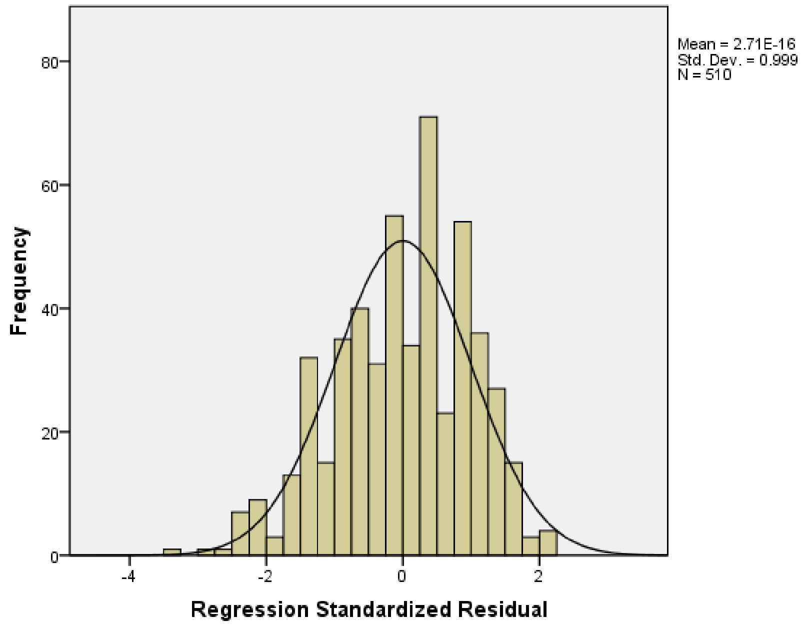
	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	68.42	69.00	68.63	.278	510
Residual	-48.422	31.000	.000	14.170	510
Std. Predicted Value	-.754	1.324	.000	1.000	510
Std. Residual	-3.414	2.186	.000	.999	510

a. Dependent Variable: fnlexam

Charts

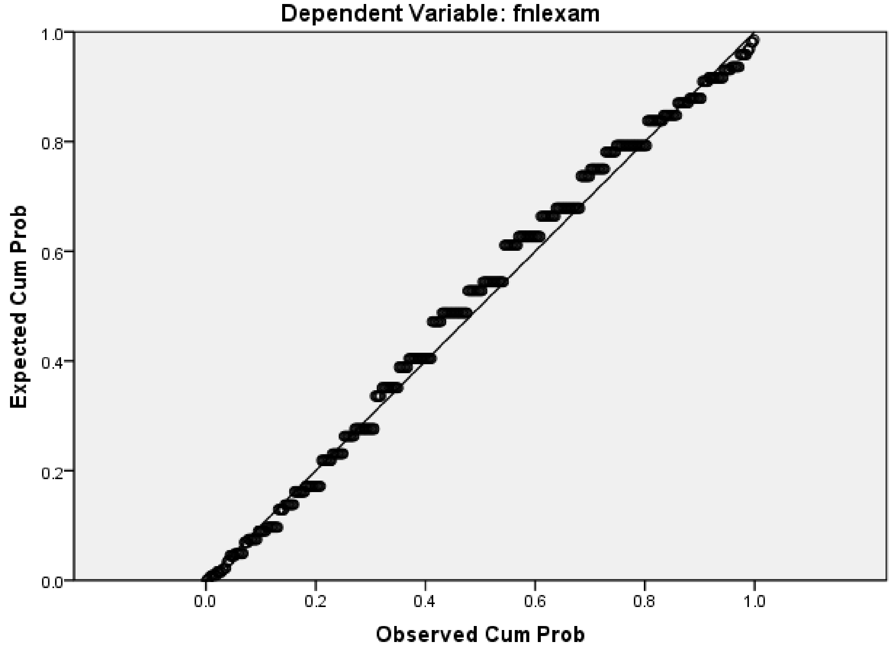
Histogram

Dependent Variable: fnlexam



Normal P-P Plot of Regression Standardized Residual

Dependent Variable: fnlexam



```
REGRESSION
  /DESCRIPTIVES MEAN STDDEV CORR SIG N
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS CI(95) BCOV R ANOVA COLLIN TOL CHANGE
ZPP
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT fnlexam
  /METHOD=ENTER numbmeet
  /RESIDUALS DURBIN HISTOGRAM(ZRESID) NORMPROB(ZRESID)
  /CASEWISE PLOT(ZRESID) OUTLIERS(3).
```

Regression

Notes

Output Created		02-Oct-2011 13:55:43
Comments		
Input	Data	C:\Users\Lin\Documents\math 097 fall 2001 with classrooms no names.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	675
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.

Syntax		REGRESSION /DESCRIPTIVES MEAN STDDEV CORR SIG N /MISSING LISTWISE /STATISTICS COEFF OUTS CI(95) BCOV R ANOVA COLLIN TOL CHANGE ZPP /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT fnlexam /METHOD=ENTER numbmeet /RESIDUALS DURBIN HISTOGRAM(ZRESID) NORMPROB(ZRESID) /CASEWISE PLOT(ZRESID) OUTLIERS(3).
Resources	Processor Time	00:00:01.139
	Elapsed Time	00:00:01.182
	Memory Required	2260 bytes
	Additional Memory Required for Residual Plots	656 bytes

[DataSet1] C:\Users\Lin\Documents\math 097 fall 2001 with classrooms no names.sav

Descriptive Statistics

	Mean	Std. Deviation	N
fnlexam	68.63	14.173	510
numbmeet	3.24	1.275	510

Correlations

		fnlexam	numbmeet
Pearson Correlation	fnlexam	1.000	.068
	numbmeet	.068	1.000
Sig. (1-tailed)	fnlexam	.	.062
	numbmeet	.062	.
N	fnlexam	510	510
	numbmeet	510	510

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	numbmeet[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: fnlexam

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics		
					R Square Change	F Change	df1
1	.068[a]	.005	.003	14.154	.005	2.380	1

a. Predictors: (Constant), numbmeet

b. Dependent Variable: fnlexam

Model Summary[b]

Model	Change Statistics		Durbin-Watson
	df2	Sig. F Change	
1	508	.124	1.658

b. Dependent Variable: fnlexam

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	476.802	1	476.802	2.380	.124[a]
	Residual	101763.896	508	200.323		
	Total	102240.698	509			

a. Predictors: (Constant), numbmeet

b. Dependent Variable: fnlexam

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	66.176	1.711		38.688	.000
	numbmeet	.759	.492	.068	1.543	.124

a. Dependent Variable: fnlexam

Coefficients[a]

Model		95.0% Confidence Interval for B		Correlations		
		Lower Bound	Upper Bound	Zero-order	Partial	Part
1	(Constant)	62.815	69.536			
	numbmeet	-.208	1.725	.068	.068	.068

a. Dependent Variable: fnlexam

Coefficients[a]

Model		Collinearity Statistics	
		Tolerance	VIF
1	(Constant)		
	numbmeet	1.000	1.000

a. Dependent Variable: fnlexam

Coefficient Correlations[a]

Model			numbmeet
1	Correlations	numbmeet	1.000
	Covariances	numbmeet	.242

a. Dependent Variable: fnlexam

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions	
				(Constant)	numbmeet
1	1	1.930	1.000	.03	.03
	2	.070	5.269	.97	.97

a. Dependent Variable: fnlexam

Casewise Diagnostics[a]

Case Number	Std. Residual	fnlexam	Predicted Value	Residual
551	-3.370	20	67.69	-47.694

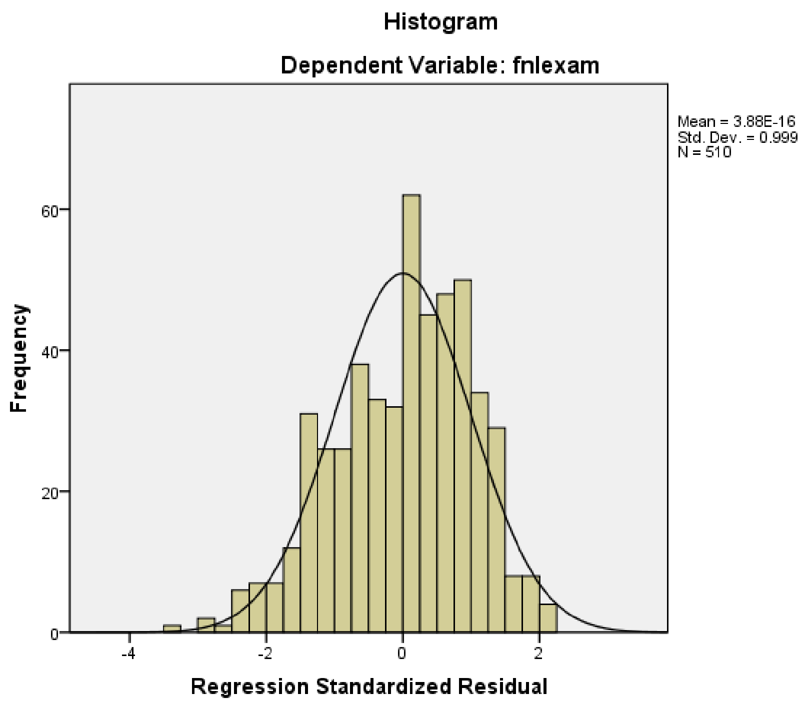
a. Dependent Variable: fnlexam

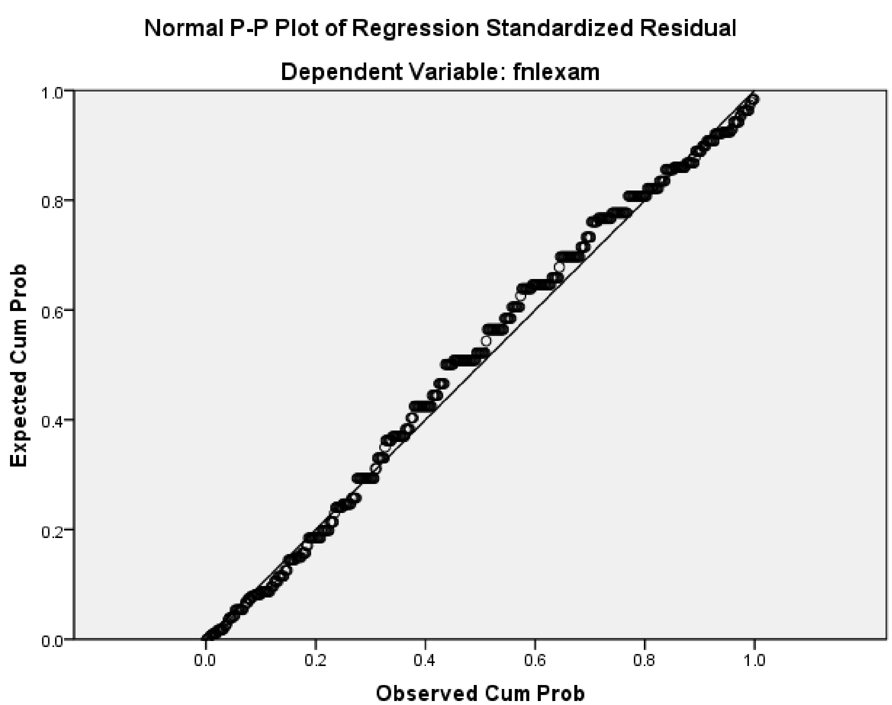
Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	67.69	69.97	68.63	.968	510
Residual	-47.694	30.306	.000	14.140	510
Std. Predicted Value	-.969	1.384	.000	1.000	510
Std. Residual	-3.370	2.141	.000	.999	510

a. Dependent Variable: fnlexam

Charts


Histogram
Dependent Variable: fnlexam
Mean = 3.88E-16
Std. Dev. = 0.999
N = 510
Frequency
60
40
20
0
-4
-2
0
2
Regression Standardized Residual


Normal P-P Plot of Regression Standardized Residual
Dependent Variable: fnlexam
Expected Cum Prob
1.0
0.8
0.6
0.4
0.2
0.0
0.0
0.2
0.4
0.6
0.8
1.0
Observed Cum Prob

```
REGRESSION
  /DESCRIPTIVES MEAN STDDEV CORR SIG N
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS CI(95) BCOV R ANOVA COLLIN TOL CHANGE
ZPP
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT fnlexam
  /METHOD=ENTER classize
  /RESIDUALS DURBIN HISTOGRAM(ZRESID) NORMPROB(ZRESID)
  /CASEWISE PLOT(ZRESID) OUTLIERS(3).
```

Regression

Notes

Output Created		02-Oct-2011 13:56:52
Comments		
Input	Data	C:\Users\Lin\Documents\math 097 fall 2001 with classrooms no names.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	675
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.

Syntax		REGRESSION /DESCRIPTIVES MEAN STDDEV CORR SIG N /MISSING LISTWISE /STATISTICS COEFF OUTS CI(95) BCOV R ANOVA COLLIN TOL CHANGE ZPP /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT fnlexam /METHOD=ENTER classize /RESIDUALS DURBIN HISTOGRAM(ZRESID) NORMPROB(ZRESID) /CASEWISE PLOT(ZRESID) OUTLIERS(3).
Resources	Processor Time	00:00:01.123
	Elapsed Time	00:00:01.182
	Memory Required	2260 bytes
	Additional Memory Required for Residual Plots	656 bytes

[DataSet1] C:\Users\Lin\Documents\math 097 fall 2001 with classrooms no names.sav

Descriptive Statistics

	Mean	Std. Deviation	N
fnlexam	68.50	14.192	518
classize	25.72	6.002	518

Correlations

		fnlexam	classize
Pearson Correlation	fnlexam	1.000	.085
	classize	.085	1.000
Sig. (1-tailed)	fnlexam	.	.026
	classize	.026	.
N	fnlexam	518	518
	classize	518	518

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	classize[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: fnlexam

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics		
					R Square Change	F Change	df1
1	.085[a]	.007	.005	14.155	.007	3.776	1

a. Predictors: (Constant), classize

b. Dependent Variable: fnlexam

Model Summary[b]

Model	Change Statistics		Durbin-Watson
	df2	Sig. F Change	
1	516	.053	1.669

b. Dependent Variable: fnlexam

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	756.575	1	756.575	3.776	.053[a]
	Residual	103380.923	516	200.351		
	Total	104137.498	517			

a. Predictors: (Constant), classize

b. Dependent Variable: fnlexam

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	63.314	2.739		23.112	.000
	classize	.202	.104	.085	1.943	.053

a. Dependent Variable: fnlexam

Coefficients[a]

Model		95.0% Confidence Interval for B		Correlations		
		Lower Bound	Upper Bound	Zero-order	Partial	Part
1	(Constant)	57.932	68.695			
	classize	-.002	.405	.085	.085	.085

a. Dependent Variable: fnlexam

Coefficients[a]

Model		Collinearity Statistics	
		Tolerance	VIF
1	(Constant)		
	classize	1.000	1.000

a. Dependent Variable: fnlexam

Coefficient Correlations[a]

Model			classize
1	Correlations	classize	1.000
	Covariances	classize	.011

a. Dependent Variable: fnlexam

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions (Constant)	Variance Proportions classize
1	1	1.974	1.000	.01	.01
	2	.026	8.695	.99	.99

a. Dependent Variable: fnlexam

Casewise Diagnostics[a]

Case Number	Std. Residual	fnlexam	Predicted Value	Residual
551	-3.331	20	67.14	-47.143

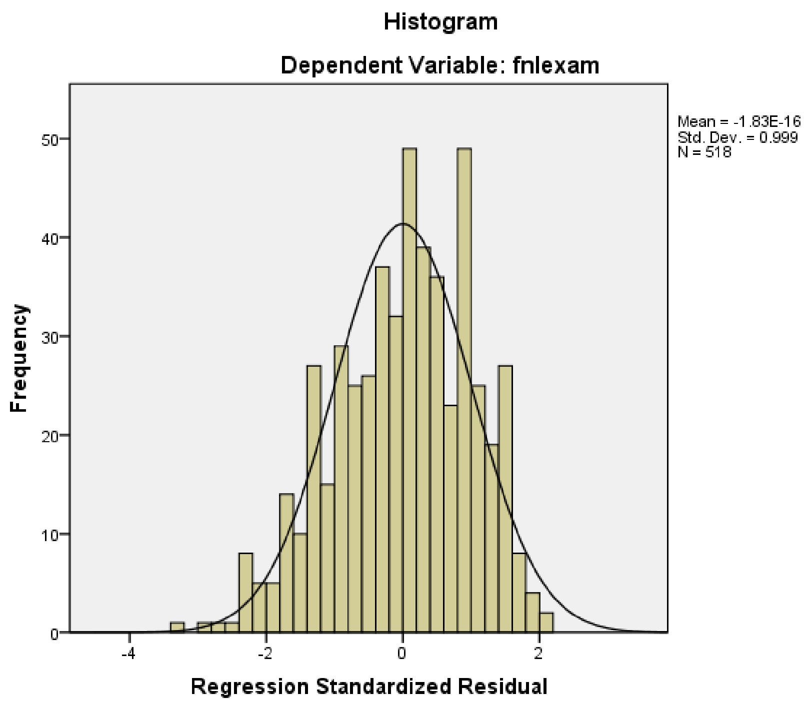
a. Dependent Variable: fnlexam

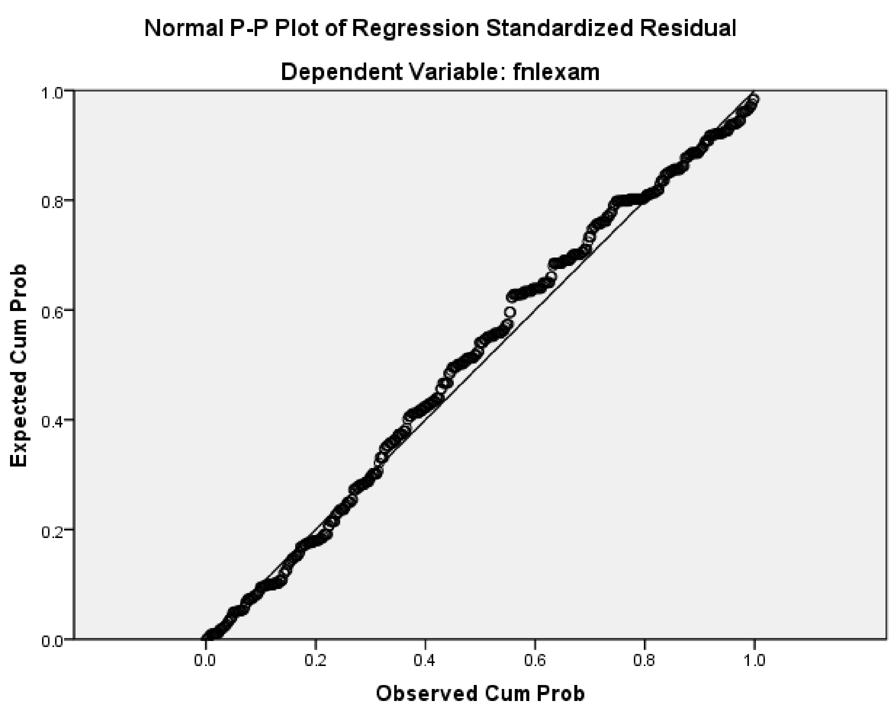
Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	67.14	71.17	68.50	1.210	518
Residual	-47.143	30.438	.000	14.141	518
Std. Predicted Value	-1.120	2.212	.000	1.000	518
Std. Residual	-3.331	2.150	.000	.999	518

a. Dependent Variable: fnlexam

Charts


Histogram
Dependent Variable: fnlexam
Mean = -1.83E-16
Std. Dev. = 0.999
N = 518
Frequency
50
40
30
20
10
0
-4
-2
0
2
Regression Standardized Residual


Normal P-P Plot of Regression Standardized Residual
Dependent Variable: fnlexam
Expected Cum Prob
1.0
0.8
0.6
0.4
0.2
0.0
0.0
0.2
0.4
0.6
0.8
1.0
Observed Cum Prob

Appendix T: SPSS Simple Binary Logistic Regression Output for Elementary Algebra and Intermediate Algebra

```
GET
  FILE='C:\Users\Lin\Documents\math 096 fall 2001 with classrooms.sav'.
DATASET NAME DataSet1 WINDOW=FRONT.
LOGISTIC REGRESSION VARIABLES fnlgrd
  /METHOD=ENTER gender
  /CLASSPLOT
  /CASEWISE OUTLIER(2)
  /PRINT=GOODFIT CORR ITER(1) CI(95)
  /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).
```

Logistic Regression

Notes

Output Created		02-Oct-2011 14:48:42
Comments		
Input	Data	C:\Users\Lin\Documents\math 096 fall 2001 with classrooms.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	252
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing
Syntax		LOGISTIC REGRESSION VARIABLES fnlgrd /METHOD=ENTER gender /CLASSPLOT /CASEWISE OUTLIER(2) /PRINT=GOODFIT CORR ITER(1) CI(95) /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).
Resources	Processor Time	00:00:00.015
	Elapsed Time	00:00:00.032

[DataSet1] C:\Users\Lin\Documents\math 096 fall 2001 with classrooms.sav

Case Processing Summary

Unweighted Cases[a]		N	Percent
Selected Cases	Included in Analysis	234	92.9
	Missing Cases	18	7.1
	Total	252	100.0
Unselected Cases		0	.0
Total		252	100.0

a. If weight is in effect, see classification table for the total number of cases.

Dependent Variable Encoding

Original Value	Internal Value
0	0
1	1

Block 0: Beginning Block

Iteration History[a,b,c]

Iteration			Coefficients
		-2 Log likelihood	Constant
Step 0	1	320.003	.274
	2	320.003	.275
	3	320.003	.275

a. Constant is included in the model.

b. Initial -2 Log Likelihood: 320.003

c. Estimation terminated at iteration number 3 because parameter estimates changed by less than .001.

Classification Table[a,b]

Observed			Predicted fnlgrd 0	Predicted fnlgrd 1	Percentage Correct
Step 0	fnlgrd	0	0	101	.0
		1	0	133	100.0
	Overall Percentage				56.8

a. Constant is included in the model.

b. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 0	Constant	.275	.132	4.349	1	.037	1.317

Variables not in the Equation

			Score	df	Sig.
Step 0	Variables	gender	.000	1	.990
	Overall Statistics		.000	1	.990

Block 1: Method = Enter

Iteration History[a,b,c,d]

Iteration		-2 Log likelihood	Coefficients Constant	Coefficients gender
Step 1	1	320.003	.272	.003
	2	320.003	.274	.003
	3	320.003	.274	.003

a. Method: Enter

b. Constant is included in the model.

c. Initial -2 Log Likelihood: 320.003

Iteration History[a,b,c,d]

Iteration		-2 Log likelihood	Coefficients	
			Constant	gender
Step 1	1	320.003	.272	.003
	2	320.003	.274	.003
	3	320.003	.274	.003

a. Method: Enter

b. Constant is included in the model.

c. Initial -2 Log Likelihood: 320.003

d. Estimation terminated at iteration number 3 because parameter estimates changed by less than .001.

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	.000	1	.990
	Block	.000	1	.990
	Model	.000	1	.990

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	320.003[a]	.000	.000

a. Estimation terminated at iteration number 3 because parameter estimates changed by less than .001.

Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	.000	0	.

Contingency Table for Hosmer and Lemeshow Test

		fnlgrd = 0		fnlgrd = 1		Total
		Observed	Expected	Observed	Expected	
Step 1	1	54	54.000	71	71.000	125
	2	47	47.000	62	62.000	109

Classification Table[a]

Observed			Predicted: fnlgrd 0	Predicted: fnlgrd 1	Percentage Correct
Step 1	fnlgrd	0	0	101	.0
		1	0	133	100.0
	Overall Percentage				56.8

a. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	gender	.003	.265	.000	1	.990	1.003
	Constant	.274	.181	2.298	1	.130	1.315

a. Variable(s) entered on step 1: gender.

Variables in the Equation

		95% C.I.for EXP(B)	
		Lower	Upper
Step 1[a]	gender	.597	1.685
	Constant		

a. Variable(s) entered on step 1: gender.

Correlation Matrix

		Constant	gender
Step 1	Constant	1.000	-.682
	gender	-.682	1.000

Step number: 1

Observed Groups and Predicted Probabilities

```
    320 +                                                                    +
        I                                                                    I
        I                                                                    I
F       I                                                                    I
R   240 +                                   1                                +
E       I                                  1                                 I
Q       I                                  1                                 I
U       I                                  1                                 I
E   160 +                                   1                                +
N       I                                  1                                 I
C       I                                  1                                 I
Y       I                                  0                                 I
     80 +                                   0                                +
        I                                  0                                 I
        I                                  0                                 I
        I                                  0                                 I
Predicted ---------+---------+---------+---------+---------+---------+---------+---------+---------+----------
  Prob:   0        .1        .2        .3        .4        .5        .6        .7        .8        .9        1
  Group:
000000000000000000000000000000000000000000000000011111111111111111111111111111111111111111111111
```

Predicted Probability is of Membership for 1
The Cut Value is .50
Symbols: 0 - 0
1 - 1
Each Symbol Represents 20 Cases.

Casewise List[a]

a. The casewise plot is not produced because no outliers were found.

```
LOGISTIC REGRESSION VARIABLES fnlgrd
  /METHOD=ENTER act
  /CLASSPLOT
  /CASEWISE OUTLIER(2)
  /PRINT=GOODFIT CORR ITER(1) CI(95)
  /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).
```

Logistic Regression

Notes

Output Created		02-Oct-2011 14:50:00
Comments		
Input	Data	C:\Users\Lin\Documents\math 096 fall 2001 with classrooms.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	252
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing
Syntax		LOGISTIC REGRESSION VARIABLES fnlgrd /METHOD=ENTER act /CLASSPLOT /CASEWISE OUTLIER(2) /PRINT=GOODFIT CORR ITER(1) CI(95) /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).
Resources	Processor Time	00:00:00.000
	Elapsed Time	00:00:00.034

[DataSet1] C:\Users\Lin\Documents\math 096 fall 2001 with classrooms.sav

Case Processing Summary

Unweighted Cases[a]		N	Percent
Selected Cases	Included in Analysis	177	70.2
	Missing Cases	75	29.8
	Total	252	100.0
Unselected Cases		0	.0
Total		252	100.0

a. If weight is in effect, see classification table for the total number of cases.

Dependent Variable Encoding

Original Value	Internal Value
0	0
1	1

Block 0: Beginning Block

Iteration History[a,b,c]

Iteration		-2 Log likelihood	Coefficients Constant
Step 0	1	244.101	.169
	2	244.101	.170

a. Constant is included in the model.

b. Initial -2 Log Likelihood: 244.101

c. Estimation terminated at iteration number 2 because parameter estimates changed by less than .001.

Classification Table[a,b]

Observed			Predicted fnlgrd 0	Predicted fnlgrd 1	Percentage Correct
Step 0	fnlgrd	0	0	81	.0
		1	0	96	100.0
	Overall Percentage				54.2

a. Constant is included in the model.

b. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 0	Constant	.170	.151	1.268	1	.260	1.185

Variables not in the Equation

			Score	df	Sig.
Step 0	Variables	act	4.990	1	.025
	Overall Statistics		4.990	1	.025

Block 1: Method = Enter

Iteration History[a,b,c,d]

Iteration		-2 Log likelihood	Coefficients	
			Constant	act
Step 1	1	238.905	-4.101	.295
	2	238.859	-4.551	.326
	3	238.859	-4.560	.327
	4	238.859	-4.560	.327

a. Method: Enter

b. Constant is included in the model.

c. Initial -2 Log Likelihood: 244.101

d. Estimation terminated at iteration number 4 because parameter estimates changed by less than .001.

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	5.242	1	.022
	Block	5.242	1	.022
	Model	5.242	1	.022

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	238.859[a]	.029	.039

a. Estimation terminated at iteration number 4 because parameter estimates changed by less than .001.

Hosmer and Lemeshow Test

Step	Chi-square	Df	Sig.
1	1.756	2	.416

Contingency Table for Hosmer and Lemeshow Test

		fnlgrd = 0		fnlgrd = 1		Total
		Observed	Expected	Observed	Expected	
Step 1	1	13	13.738	9	8.262	22
	2	28	24.332	21	24.668	49
	3	37	40.323	60	56.677	97
	4	3	2.607	6	6.393	9

Classification Table[a]

Observed			Predicted		
			fnlgrd		Percentage Correct
			0	1	
Step 1	fnlgrd	0	13	68	16.0
		1	9	87	90.6
	Overall Percentage				56.5

a. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	act	.327	.152	4.638	1	.031	1.386
	Constant	-4.560	2.201	4.292	1	.038	.010

a. Variable(s) entered on step 1: act.

Variables in the Equation

		95% C.I.for EXP(B)	
		Lower	Upper
Step 1[a]	act	1.030	1.866
	Constant		

a. Variable(s) entered on step 1: act.

Correlation Matrix

		Constant	act
Step 1	Constant	1.000	-.998
	act	-.998	1.000

Step number: 1

```
          Observed Groups and Predicted Probabilities

    160 +                                                            +
        I                                                            I
        I                                                            I
F       I                                                            I
R   120 +                                                            +
E       I                                                            I
Q       I                                 1                          I
U       I                                 1                          I
E    80 +                                  1                         +
N       I                                 1                          I
C       I                                 1                          I
Y       I                             1   1                          I
     40 +                              1   0                         +
        I                            0   0                           I
        I                            0   0                           I
        I                    0   0   0   0   1                       I
Predicted ---------+---------+---------+---------+---------+---------+---------+---------+---------+--------
-+----------
  Prob:   0     .1     .2     .3     .4     .5     .6     .7     .8     .9     1
  Group:
000000000000000000000000000000000000000000000000001111111111111
1111111111111111111111111111111111

          Predicted Probability is of Membership for 1
          The Cut Value is .50
          Symbols: 0 - 0
                   1 - 1
          Each Symbol Represents 10 Cases.
```

Casewise List[a]

a. The casewise plot is not produced because no outliers were found.

```
LOGISTIC REGRESSION VARIABLES fnlgrd
  /METHOD=ENTER sat
  /CLASSPLOT
  /CASEWISE OUTLIER(2)
  /PRINT=GOODFIT CORR ITER(1) CI(95)
  /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).
```

Logistic Regression

Notes

Output Created		02-Oct-2011 14:51:19
Comments		
Input	Data	C:\Users\Lin\Documents\math 096 fall 2001 with classrooms.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	252
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing
Syntax		LOGISTIC REGRESSION VARIABLES fnlgrd /METHOD=ENTER sat /CLASSPLOT /CASEWISE OUTLIER(2) /PRINT=GOODFIT CORR ITER(1) CI(95) /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).
Resources	Processor Time	00:00:00.016
	Elapsed Time	00:00:00.035

[DataSet1] C:\Users\Lin\Documents\math 096 fall 2001 with classrooms.sav

Case Processing Summary

Unweighted Cases[a]		N	Percent
Selected Cases	Included in Analysis	17	6.7
	Missing Cases	235	93.3
	Total	252	100.0
Unselected Cases		0	.0
Total		252	100.0

a. If weight is in effect, see classification table for the total number of cases.

Dependent Variable Encoding

Original Value	Internal Value
0	0
1	1

Block 0: Beginning Block

Iteration History[a,b,c]

Iteration		-2 Log likelihood	Coefficients
			Constant
Step 0	1	23.035	.353
	2	23.035	.357
	3	23.035	.357

a. Constant is included in the model.

b. Initial -2 Log Likelihood: 23.035

c. Estimation terminated at iteration number 3 because parameter estimates changed by less than .001.

Classification Table[a,b]

Observed			Predicted fnlgrd 0	Predicted fnlgrd 1	Percentage Correct
Step 0	fnlgrd	0	0	7	.0
		1	0	10	100.0
	Overall Percentage				58.8

a. Constant is included in the model.

b. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 0	Constant	.357	.493	.524	1	.469	1.429

Variables not in the Equation

			Score	df	Sig.
Step 0	Variables	sat	.278	1	.598
	Overall Statistics		.278	1	.598

Block 1: Method = Enter

Iteration History[a,b,c,d]

Iteration		-2 Log likelihood	Coefficients Constant	Coefficients sat
Step 1	1	22.760	-1.408	.005
	2	22.759	-1.440	.005
	3	22.759	-1.440	.005

a. Method: Enter

b. Constant is included in the model.

c. Initial -2 Log Likelihood: 23.035

Iteration History[a,b,c,d]

Iteration		-2 Log likelihood	Coefficients	
			Constant	sat
Step 1	1	22.760	-1.408	.005
	2	22.759	-1.440	.005
	3	22.759	-1.440	.005

a. Method: Enter

b. Constant is included in the model.

c. Initial -2 Log Likelihood: 23.035

d. Estimation terminated at iteration number 3 because parameter estimates changed by less than .001.

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	.276	1	.600
	Block	.276	1	.600
	Model	.276	1	.600

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	22.759[a]	.016	.022

a. Estimation terminated at iteration number 3 because parameter estimates changed by less than .001.

Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	5.157	4	.272

Contingency Table for Hosmer and Lemeshow Test

		fnlgrd = 0		fnlgrd = 1		Total
		Observed	Expected	Observed	Expected	
Step 1	1	0	.595	1	.405	1
	2	2	1.434	1	1.566	3
	3	2	.865	0	1.135	2
	4	1	1.163	2	1.837	3
	5	1	1.126	2	1.874	3
	6	1	1.815	4	3.185	5

Classification Table[a]

Observed			Predicted		
			fnlgrd		Percentage Correct
			0	1	
Step 1	fnlgrd	0	0	7	.0
		1	1	9	90.0
	Overall Percentage				52.9

a. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	sat	.005	.010	.272	1	.602	1.005
	Constant	-1.440	3.481	.171	1	.679	.237

a. Variable(s) entered on step 1: sat.

Variables in the Equation

		95% C.I.for EXP(B)	
		Lower	Upper
Step 1[a]	sat	.986	1.025
	Constant		

a. Variable(s) entered on step 1: sat.

Correlation Matrix

		Constant	sat
Step 1	Constant	1.000	-.990
	sat	-.990	1.000

Step number: 1

Observed Groups and Predicted Probabilities

```
    8 +                                                                  +
      I                                                                  I
      I                                                                  I
F     I                                                                  I
R   6 +                                                                  +
E     I                                                                  I
Q     I                                     1                            I
U     I                                     1                            I
E   4 +                                      1                           +
N     I                                     1                            I
C     I                               1    111                           I
Y     I                               1    111                           I
    2 +                               0    111                           +
      I                              0    111                            I
      I                        1      00  0 000                          I
      I                        1      00  0 000                          I
Predicted ---------+---------+---------+---------+---------+---------+---------+---------+--------
-+----------
  Prob:   0       .1       .2       .3       .4       .5       .6       .7       .8       .9       1
  Group:
000000000000000000000000000000000000000000000000000011111111111111
11111111111111111111111111111111111
```

Predicted Probability is of Membership for 1
The Cut Value is .50
Symbols: 0 - 0
1 - 1
Each Symbol Represents .5 Cases.

Casewise List[a]

a. The casewise plot is not produced because no outliers were found.

```
LOGISTIC REGRESSION VARIABLES fnlgrd
  /METHOD=ENTER comcol
  /CLASSPLOT
  /CASEWISE OUTLIER(2)
  /PRINT=GOODFIT CORR ITER(1) CI(95)
  /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).
```

Logistic Regression

Notes

Output Created		02-Oct-2011 14:52:54
Comments		
Input	Data	C:\Users\Lin\Documents\math 096 fall 2001 with classrooms.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	252
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing
Syntax		LOGISTIC REGRESSION VARIABLES fnlgrd /METHOD=ENTER comcol /CLASSPLOT /CASEWISE OUTLIER(2) /PRINT=GOODFIT CORR ITER(1) CI(95) /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).
Resources	Processor Time	00:00:00.031
	Elapsed Time	00:00:00.026

[DataSet1] C:\Users\Lin\Documents\math 096 fall 2001 with classrooms.sav

Case Processing Summary

Unweighted Cases[a]		N	Percent
Selected Cases	Included in Analysis	235	93.3
	Missing Cases	17	6.7
	Total	252	100.0
Unselected Cases		0	.0
Total		252	100.0

a. If weight is in effect, see classification table for the total number of cases.

Dependent Variable Encoding

Original Value	Internal Value
0	0
1	1

Block 0: Beginning Block

Iteration History[a,b,c]

Iteration			Coefficients
		-2 Log likelihood	Constant
Step 0	1	321.130	.281
	2	321.130	.283
	3	321.130	.283

a. Constant is included in the model.

b. Initial -2 Log Likelihood: 321.130

c. Estimation terminated at iteration number 3 because parameter estimates changed by less than .001.

Classification Table[a,b]

Observed			Predicted		
			fnlgrd		Percentage Correct
			0	1	
Step 0	fnlgrd	0	0	101	.0
		1	0	134	100.0
	Overall Percentage				57.0

a. Constant is included in the model.

b. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 0	Constant	.283	.132	4.603	1	.032	1.327

Variables not in the Equation

			Score	df	Sig.
Step 0	Variables	comcol	1.553	1	.213
	Overall Statistics		1.553	1	.213

Block 1: Method = Enter

Iteration History[a,b,c,d]

Iteration		-2 Log likelihood	Coefficients	
			Constant	comcol
Step 1	1	319.573	.462	-.324
	2	319.572	.470	-.332
	3	319.572	.470	-.332

a. Method: Enter

b. Constant is included in the model.

c. Initial -2 Log Likelihood: 321.130

Iteration History[a,b,c,d]

Iteration		-2 Log likelihood	Coefficients	
			Constant	comcol
Step 1	1	319.573	.462	-.324
	2	319.572	.470	-.332
	3	319.572	.470	-.332

a. Method: Enter

b. Constant is included in the model.

c. Initial -2 Log Likelihood: 321.130

d. Estimation terminated at iteration number 3 because parameter estimates changed by less than .001.

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	1.558	1	.212
	Block	1.558	1	.212
	Model	1.558	1	.212

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	319.572[a]	.007	.009

a. Estimation terminated at iteration number 3 because parameter estimates changed by less than .001.

Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	.000	0	.

Contingency Table for Hosmer and Lemeshow Test

		fnlgrd = 0		fnlgrd = 1		Total
		Observed	Expected	Observed	Expected	
Step 1	1	61	61.000	70	70.000	131
	2	40	40.000	64	64.000	104

Classification Table[a]

Observed			Predicted fnlgrd 0	Predicted fnlgrd 1	Percentage Correct
Step 1	fnlgrd	0	0	101	.0
		1	0	134	100.0
	Overall Percentage				57.0

a. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	comcol	-.332	.267	1.549	1	.213	.717
	Constant	.470	.202	5.438	1	.020	1.600

a. Variable(s) entered on step 1: comcol.

Variables in the Equation

		95% C.I.for EXP(B)	
		Lower	Upper
Step 1[a]	comcol	.425	1.210
	Constant		

a. Variable(s) entered on step 1: comcol.

Correlation Matrix

		Constant	comcol
Step 1	Constant	1.000	-.755
	comcol	-.755	1.000

Step number: 1

```
              Observed Groups and Predicted Probabilities

     160 +                                                                     +
         I                                                                     I
         I                                                                     I
F        I                                   1                                 I
R    120 +                                     1                               +
E        I                                   1                                 I
Q        I                                   1    1                            I
U        I                                   1    1                            I
E     80 +                                     1    1                          +
N        I                                   1    1                            I
C        I                                   0    1                            I
Y        I                                   0    1                            I
      40 +                                     0    0                          +
         I                                   0    0                            I
         I                                   0    0                            I
         I                                   0    0                            I
Predicted ---------+---------+---------+---------+---------+---------+---------+---------+--------
-+----------
  Prob:   0       .1       .2       .3       .4       .5       .6       .7       .8       .9       1
  Group:
000000000000000000000000000000000000000000000000000011111111111111
1111111111111111111111111111111111111

          Predicted Probability is of Membership for 1
          The Cut Value is .50
          Symbols: 0 - 0
                   1 - 1
          Each Symbol Represents 10 Cases.
```

Casewise List[a]

a. The casewise plot is not produced because no outliers were found.

LOGISTIC REGRESSION VARIABLES fnlgrd
  /METHOD=ENTER pretest
  /CLASSPLOT
  /CASEWISE OUTLIER(2)
  /PRINT=GOODFIT CORR ITER(1) CI(95)
  /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).

Logistic Regression

Notes

Output Created		02-Oct-2011 14:54:14
Comments		
Input	Data	C:\Users\Lin\Documents\math 096 fall 2001 with classrooms.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	252
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing
Syntax		LOGISTIC REGRESSION VARIABLES fnlgrd /METHOD=ENTER pretest /CLASSPLOT /CASEWISE OUTLIER(2) /PRINT=GOODFIT CORR ITER(1) CI(95) /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).
Resources	Processor Time	00:00:00.031
	Elapsed Time	00:00:00.024

[DataSet1] C:\Users\Lin\Documents\math 096 fall 2001 with classrooms.sav

Case Processing Summary

Unweighted Cases[a]		N	Percent
Selected Cases	Included in Analysis	235	93.3
	Missing Cases	17	6.7
	Total	252	100.0
Unselected Cases		0	.0
Total		252	100.0

a. If weight is in effect, see classification table for the total number of cases.

Dependent Variable Encoding

Original Value	Internal Value
0	0
1	1

Block 0: Beginning Block

Iteration History[a,b,c]

Iteration			Coefficients
		-2 Log likelihood	Constant
Step 0	1	321.130	.281
	2	321.130	.283
	3	321.130	.283

a. Constant is included in the model.

b. Initial -2 Log Likelihood: 321.130

c. Estimation terminated at iteration number 3 because parameter estimates changed by less than .001.

Classification Table[a,b]

Observed			Predicted fnlgrd 0	Predicted fnlgrd 1	Percentage Correct
Step 0	fnlgrd	0	0	101	.0
		1	0	134	100.0
	Overall Percentage				57.0

a. Constant is included in the model.

b. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 0	Constant	.283	.132	4.603	1	.032	1.327

Variables not in the Equation

			Score	df	Sig.
Step 0	Variables	Pretest	15.826	1	.000
	Overall Statistics		15.826	1	.000

Block 1: Method = Enter

Iteration History[a,b,c,d]

Iteration		-2 Log likelihood	Coefficients Constant	Coefficients pretest
Step 1	1	304.724	-1.043	.032
	2	304.531	-1.163	.036
	3	304.531	-1.166	.036
	4	304.531	-1.166	.036

a. Method: Enter

b. Constant is included in the model.

c. Initial -2 Log Likelihood: 321.130

Iteration History[a,b,c,d]

Iteration		-2 Log likelihood	Coefficients	
			Constant	pretest
Step 1	1	304.724	-1.043	.032
	2	304.531	-1.163	.036
	3	304.531	-1.166	.036
	4	304.531	-1.166	.036

a. Method: Enter

b. Constant is included in the model.

c. Initial -2 Log Likelihood: 321.130

d. Estimation terminated at iteration number 4 because parameter estimates changed by less than .001.

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	16.599	1	.000
	Block	16.599	1	.000
	Model	16.599	1	.000

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	304.531[a]	.068	.092

a. Estimation terminated at iteration number 4 because parameter estimates changed by less than .001.

Hosmer and Lemeshow Test

Step	Chi-square	Df	Sig.
1	6.195	7	.517

Contingency Table for Hosmer and Lemeshow Test

		fnlgrd = 0		fnlgrd = 1		Total
		Observed	Expected	Observed	Expected	
Step 1	1	20	18.690	10	11.310	30
	2	10	9.617	7	7.383	17
	3	14	18.755	22	17.245	36
	4	15	11.421	9	12.579	24
	5	13	13.367	18	17.633	31
	6	7	6.977	11	11.023	18
	7	7	8.644	18	16.356	25
	8	11	8.936	20	22.064	31
	9	4	4.593	19	18.407	23

Classification Table[a]

Observed			Predicted		
			fnlgrd		Percentage Correct
			0	1	
Step 1	fnlgrd	0	44	57	43.6
		1	39	95	70.9
	Overall Percentage				59.1

a. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	pretest	.036	.009	14.851	1	.000	1.037
	Constant	-1.166	.393	8.822	1	.003	.311

a. Variable(s) entered on step 1: pretest.

Variables in the Equation

		95% C.I.for EXP(B)	
		Lower	Upper
Step 1[a]	pretest	1.018	1.056
	Constant		

a. Variable(s) entered on step 1: pretest.

Correlation Matrix

		Constant	pretest
Step 1	Constant	1.000	-.938
	pretest	-.938	1.000

Step number: 1

```
          Observed Groups and Predicted Probabilities

     40 +                                                              +
        I                                                            I
        I                            1                               I
F       I                            1                               I
R    30 +                              1      1                        +
E       I                            1      1                          I
Q       I                       1     1   1  1      1                    I
U       I                       1     1   1  1      1                    I
E    20 +                         1     1   1  1      1                    +
N       I                       1  1  1   1  1   1  1                      I
C       I                       0  1  0   0  1   1  1  1  1                  I
Y       I                       0  1  0   0  0   1  1  1  1                  I
     10 +                        0  0  0   0  0   1  1  1  1 1                  +
        I                      0  0  0   0  0   0  0  0  1 1                   I
        I                      0  0  0   0  0   0  0  0  0 1 1                  I
        I                 0  0   0  0  0   0  0   0  0  0  0 0 1   1  1        I
Predicted ---------+---------+---------+---------+---------+---------+---------+---------+--------
-+----------
  Prob:   0       .1        .2        .3        .4        .5        .6        .7        .8        .9        1
  Group:
000000000000000000000000000000000000000000000000000011111111111111
11111111111111111111111111111111111

          Predicted Probability is of Membership for 1
          The Cut Value is .50
          Symbols: 0 - 0
                   1 - 1
          Each Symbol Represents 2.5 Cases.
```

Casewise List[a]

a. The casewise plot is not produced because no outliers were found.

```
LOGISTIC REGRESSION VARIABLES fnlgrd
  /METHOD=ENTER ascgr
  /CLASSPLOT
  /CASEWISE OUTLIER(2)
  /PRINT=GOODFIT CORR ITER(1) CI(95)
  /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).
```

Logistic Regression

Notes

Output Created		02-Oct-2011 14:56:59
Comments		
Input	Data	C:\Users\Lin\Documents\math 096 fall 2001 with classrooms.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	252
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing
Syntax		LOGISTIC REGRESSION VARIABLES fnlgrd /METHOD=ENTER ascgr /CLASSPLOT /CASEWISE OUTLIER(2) /PRINT=GOODFIT CORR ITER(1) CI(95) /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).
Resources	Processor Time	00:00:00.015
	Elapsed Time	00:00:00.034

[DataSet1] C:\Users\Lin\Documents\math 096 fall 2001 with classrooms.sav

Case Processing Summary

Unweighted Cases[a]		N	Percent
Selected Cases	Included in Analysis	235	93.3
	Missing Cases	17	6.7
	Total	252	100.0
Unselected Cases		0	.0
Total		252	100.0

a. If weight is in effect, see classification table for the total number of cases.

Dependent Variable Encoding

Original Value	Internal Value
0	0
1	1

Block 0: Beginning Block

Iteration History[a,b,c]

Iteration		-2 Log likelihood	Coefficients Constant
Step 0	1	321.130	.281
	2	321.130	.283
	3	321.130	.283

a. Constant is included in the model.

b. Initial -2 Log Likelihood: 321.130

c. Estimation terminated at iteration number 3 because parameter estimates changed by less than .001.

Classification Table[a,b]

Observed			Predicted fnlgrd 0	Predicted fnlgrd 1	Percentage Correct
Step 0	fnlgrd	0	0	101	.0
		1	0	134	100.0
	Overall Percentage				57.0

a. Constant is included in the model.

b. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 0	Constant	.283	.132	4.603	1	.032	1.327

Variables not in the Equation

			Score	df	Sig.
Step 0	Variables	Ascgr	49.372	1	.000
	Overall Statistics		49.372	1	.000

Block 1: Method = Enter

Iteration History[a,b,c,d]

Iteration		-2 Log likelihood	Coefficients: Constant	Coefficients: ascgr
Step 1	1	270.783	-1.099	1.977
	2	270.411	-1.230	2.171
	3	270.411	-1.235	2.177
	4	270.411	-1.235	2.177

a. Method: Enter

b. Constant is included in the model.

c. Initial -2 Log Likelihood: 321.130

Iteration History[a,b,c,d]

Iteration		-2 Log likelihood	Coefficients	
			Constant	ascgr
Step 1	1	270.783	-1.099	1.977
	2	270.411	-1.230	2.171
	3	270.411	-1.235	2.177
	4	270.411	-1.235	2.177

a. Method: Enter

b. Constant is included in the model.

c. Initial -2 Log Likelihood: 321.130

d. Estimation terminated at iteration number 4 because parameter estimates changed by less than .001.

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	50.719	1	.000
	Block	50.719	1	.000
	Model	50.719	1	.000

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	270.411[a]	.194	.261

a. Estimation terminated at iteration number 4 because parameter estimates changed by less than .001.

Hosmer and Lemeshow Test

Step	Chi-square	Df	Sig.
1	.000	0	.

Contingency Table for Hosmer and Lemeshow Test

		fnlgrd = 0		fnlgrd = 1		Total
		Observed	Expected	Observed	Expected	
Step 1	1	55	55.000	16	16.000	71
	2	46	46.000	118	118.000	164

Classification Table[a]

Observed			Predicted fnlgrd 0	Predicted fnlgrd 1	Percentage Correct
Step 1	fnlgrd	0	55	46	54.5
		1	16	118	88.1
	Overall Percentage				73.6

a. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	ascgr	2.177	.333	42.729	1	.000	8.818
	Constant	-1.235	.284	18.896	1	.000	.291

a. Variable(s) entered on step 1: ascgr.

Variables in the Equation

		95% C.I.for EXP(B)	
		Lower	Upper
Step 1[a]	ascgr	4.591	16.937
	Constant		

a. Variable(s) entered on step 1: ascgr.

Correlation Matrix

		Constant	ascgr
Step 1	Constant	1.000	-.853
	ascgr	-.853	1.000

Step number: 1

Observed Groups and Predicted Probabilities

```
    200 +                                                                +
        I                                                              I
        I                                                              I
F       I                                              1                 I
R   150 +                                                1                 +
E       I                                              1                 I
Q       I                                              1                 I
U       I                                              1                 I
E   100 +                                                1                 +
N       I                                              1                 I
C       I              1                               1                 I
Y       I              1                               1                 I
     50 +               0                                0               +
        I             0                                0                 I
        I             0                                0                 I
        I             0                                0                 I
Predicted ---------+---------+---------+---------+---------+---------+---------+---------+--------
-+----------
  Prob:   0      .1       .2       .3       .4       .5       .6       .7       .8       .9       1
  Group:
0000000000000000000000000000000000000000000000000111111111111111
1111111111111111111111111111111111111
```

Predicted Probability is of Membership for 1
The Cut Value is .50
Symbols: 0 - 0
1 - 1
Each Symbol Represents 12.5 Cases.

Casewise List[a]

a. The casewise plot is not produced because no outliers were found.

```
LOGISTIC REGRESSION VARIABLES fnlgrd
  /METHOD=ENTER techsex
  /CLASSPLOT
  /CASEWISE OUTLIER(2)
  /PRINT=GOODFIT CORR ITER(1) CI(95)
  /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).
```

Logistic Regression

Notes

Output Created		02-Oct-2011 14:58:15
Comments		
Input	Data	C:\Users\Lin\Documents\math 096 fall 2001 with classrooms.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	252
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing
Syntax		LOGISTIC REGRESSION VARIABLES fnlgrd /METHOD=ENTER techsex /CLASSPLOT /CASEWISE OUTLIER(2) /PRINT=GOODFIT CORR ITER(1) CI(95) /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).
Resources	Processor Time	00:00:00.000
	Elapsed Time	00:00:00.022

[DataSet1] C:\Users\Lin\Documents\math 096 fall 2001 with classrooms.sav

Case Processing Summary

Unweighted Cases[a]		N	Percent
Selected Cases	Included in Analysis	235	93.3
	Missing Cases	17	6.7
	Total	252	100.0
Unselected Cases		0	.0
Total		252	100.0

a. If weight is in effect, see classification table for the total number of cases.

Dependent Variable Encoding

Original Value	Internal Value
0	0
1	1

Block 0: Beginning Block

Iteration History[a,b,c]

Iteration		-2 Log likelihood	Coefficients Constant
Step 0	1	321.130	.281
	2	321.130	.283
	3	321.130	.283

a. Constant is included in the model.

b. Initial -2 Log Likelihood: 321.130

c. Estimation terminated at iteration number 3 because parameter estimates changed by less than .001.

Classification Table[a,b]

Observed			Predicted fnlgrd 0	Predicted fnlgrd 1	Percentage Correct
Step 0	fnlgrd	0	0	101	.0
		1	0	134	100.0
	Overall Percentage				57.0

a. Constant is included in the model.

b. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 0	Constant	.283	.132	4.603	1	.032	1.327

Variables not in the Equation

			Score	df	Sig.
Step 0	Variables	Techsex	6.833	1	.009
	Overall Statistics		6.833	1	.009

Block 1: Method = Enter

Iteration History[a,b,c,d]

Iteration		-2 Log likelihood	Coefficients Constant	Coefficients techsex
Step 1	1	314.205	.027	.703
	2	314.182	.027	.738
	3	314.182	.027	.738

a. Method: Enter

b. Constant is included in the model.

c. Initial -2 Log Likelihood: 321.130

Iteration History[a,b,c,d]

Iteration		-2 Log likelihood	Coefficients	
			Constant	techsex
Step 1	1	314.205	.027	.703
	2	314.182	.027	.738
	3	314.182	.027	.738

a. Method: Enter

b. Constant is included in the model.

c. Initial -2 Log Likelihood: 321.130

d. Estimation terminated at iteration number 3 because parameter estimates changed by less than .001.

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	6.948	1	.008
	Block	6.948	1	.008
	Model	6.948	1	.008

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	314.182[a]	.029	.039

a. Estimation terminated at iteration number 3 because parameter estimates changed by less than .001.

Hosmer and Lemeshow Test

Step	Chi-square	Df	Sig.
1	.000	0	.

Contingency Table for Hosmer and Lemeshow Test

		fnlgrd = 0		fnlgrd = 1		Total
		Observed	Expected	Observed	Expected	
Step 1	1	74	74.000	76	76.000	150
	2	27	27.000	58	58.000	85

Classification Table[a]

Observed			Predicted		
			fnlgrd		Percentage Correct
			0	1	
Step 1	fnlgrd	0	0	101	.0
		1	0	134	100.0
	Overall Percentage				57.0

a. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	techsex	.738	.285	6.727	1	.009	2.092
	Constant	.027	.163	.027	1	.870	1.027

a. Variable(s) entered on step 1: techsex.

Variables in the Equation

		95% C.I.for EXP(B)	
		Lower	Upper
Step 1[a]	techsex	1.198	3.653
	Constant		

a. Variable(s) entered on step 1: techsex.

Correlation Matrix

		Constant	techsex
Step 1	Constant	1.000	-.574
	techsex	-.574	1.000

Step number: 1

Observed Groups and Predicted Probabilities

```
    160 +                                                                  +
        I                        1                                        I
        I                        1                                        I
F       I                        1                                        I
R   120 +                          1                                       +
E       I                        1                                        I
Q       I                        1                                        I
U       I                        1         1                              I
E    80 +                          1         1                             +
N       I                        0         1                              I
C       I                        0         1                              I
Y       I                        0         1                              I
     40 +                          0         1                             +
        I                        0         0                              I
        I                        0         0                              I
        I                        0         0                              I
Predicted ---------+---------+---------+---------+---------+---------+---------+---------+--------
-+----------
  Prob:   0      .1      .2      .3      .4      .5      .6      .7      .8      .9      1
  Group:
000000000000000000000000000000000000000000000000001111111111111
11111111111111111111111111111111111
```

Predicted Probability is of Membership for 1
The Cut Value is .50
Symbols: 0 - 0
        1 - 1
Each Symbol Represents 10 Cases.

Casewise List[a]

a. The casewise plot is not produced because no outliers were found.

```
LOGISTIC REGRESSION VARIABLES fnlgrd
  /METHOD=ENTER adj096
  /CLASSPLOT
  /CASEWISE OUTLIER(2)
  /PRINT=GOODFIT CORR ITER(1) CI(95)
  /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).
```

Logistic Regression

Notes

Output Created		02-Oct-2011 14:59:57
Comments		
Input	Data	C:\Users\Lin\Documents\math 096 fall 2001 with classrooms.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	252
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing
Syntax		LOGISTIC REGRESSION VARIABLES fnlgrd /METHOD=ENTER adj096 /CLASSPLOT /CASEWISE OUTLIER(2) /PRINT=GOODFIT CORR ITER(1) CI(95) /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).
Resources	Processor Time	00:00:00.031
	Elapsed Time	00:00:00.024

[DataSet1] C:\Users\Lin\Documents\math 096 fall 2001 with classrooms.sav

Case Processing Summary

Unweighted Cases[a]		N	Percent
Selected Cases	Included in Analysis	235	93.3
	Missing Cases	17	6.7
	Total	252	100.0
Unselected Cases		0	.0
Total		252	100.0

a. If weight is in effect, see classification table for the total number of cases.

Dependent Variable Encoding

Original Value	Internal Value
0	0
1	1

Block 0: Beginning Block

Iteration History[a,b,c]

Iteration			Coefficients
		-2 Log likelihood	Constant
Step 0	1	321.130	.281
	2	321.130	.283
	3	321.130	.283

a. Constant is included in the model.

b. Initial -2 Log Likelihood: 321.130

c. Estimation terminated at iteration number 3 because parameter estimates changed by less than .001.

Classification Table[a,b]

Observed			Predicted fnlgrd 0	Predicted fnlgrd 1	Percentage Correct
Step 0	fnlgrd	0	0	101	.0
		1	0	134	100.0
	Overall Percentage				57.0

a. Constant is included in the model.

b. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 0	Constant	.283	.132	4.603	1	.032	1.327

Variables not in the Equation

			Score	df	Sig.
Step 0	Variables	adj096	11.809	1	.001
	Overall Statistics		11.809	1	.001

Block 1: Method = Enter

Iteration History[a,b,c,d]

Iteration		-2 Log likelihood	Coefficients Constant	Coefficients adj096
Step 1	1	309.199	-.125	.891
	2	309.160	-.125	.932
	3	309.160	-.125	.933

a. Method: Enter

b. Constant is included in the model.

c. Initial -2 Log Likelihood: 321.130

Iteration History[a,b,c,d]

Iteration		-2 Log likelihood	Coefficients	
			Constant	adj096
Step 1	1	309.199	-.125	.891
	2	309.160	-.125	.932
	3	309.160	-.125	.933

a. Method: Enter

b. Constant is included in the model.

c. Initial -2 Log Likelihood: 321.130

d. Estimation terminated at iteration number 3 because parameter estimates changed by less than .001.

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	11.970	1	.001
	Block	11.970	1	.001
	Model	11.970	1	.001

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	309.160[a]	.050	.067

a. Estimation terminated at iteration number 3 because parameter estimates changed by less than .001.

Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	.000	0	.

Contingency Table for Hosmer and Lemeshow Test

		fnlgrd = 0		fnlgrd = 1		Total
		Observed	Expected	Observed	Expected	
Step 1	1	68	68.000	60	60.000	128
	2	33	33.000	74	74.000	107

Classification Table[a]

Observed			Predicted fnlgrd 0	Predicted fnlgrd 1	Percentage Correct
Step 1	fnlgrd	0	68	33	67.3
		1	60	74	55.2
	Overall Percentage				60.4

a. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	adj096	.933	.274	11.570	1	.001	2.541
	Constant	-.125	.177	.499	1	.480	.882

a. Variable(s) entered on step 1: adj096.

Variables in the Equation

		95% C.I.for EXP(B) Lower	95% C.I.for EXP(B) Upper
Step 1[a]	adj096	1.485	4.350
	Constant		

a. Variable(s) entered on step 1: adj096.

Correlation Matrix

		Constant	adj096
Step 1	Constant	1.000	-.646
	adj096	-.646	1.000

Step number: 1

Observed Groups and Predicted Probabilities

```
    160 +                                                              +
        I                                                              I
        I                                                              I
F       I                         1                                    I
R   120 +                            1                                 +
E       I                         1               1                    I
Q       I                         1               1                    I
U       I                         1               1                    I
E    80 +                           1               1                  +
N       I                         0               1                    I
C       I                         0               1                    I
Y       I                         0               1                    I
     40 +                           0               1                  +
        I                         0               0                    I
        I                         0               0                    I
        I                         0               0                    I
Predicted ---------+---------+---------+---------+---------+---------+---------+---------+--------
-+----------
  Prob:   0       .1       .2       .3       .4       .5       .6       .7       .8       .9       1
  Group:
00000000000000000000000000000000000000000000000000111111111111
1111111111111111111111111111111111111
```

Predicted Probability is of Membership for 1
The Cut Value is .50
Symbols: 0 - 0
1 - 1
Each Symbol Represents 10 Cases.

Casewise List[a]

a. The casewise plot is not produced because no outliers were found.

```
LOGISTIC REGRESSION VARIABLES fnlgrd
  /METHOD=ENTER mozartuse
  /CLASSPLOT
  /CASEWISE OUTLIER(2)
  /PRINT=GOODFIT CORR ITER(1) CI(95)
  /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).
```

Logistic Regression

Notes

Output Created		02-Oct-2011 15:01:37
Comments		
Input	Data	C:\Users\Lin\Documents\math 096 fall 2001 with classrooms.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	252
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing
Syntax		LOGISTIC REGRESSION VARIABLES fnlgrd /METHOD=ENTER mozartuse /CLASSPLOT /CASEWISE OUTLIER(2) /PRINT=GOODFIT CORR ITER(1) CI(95) /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).
Resources	Processor Time	00:00:00.047
	Elapsed Time	00:00:00.027

[DataSet1] C:\Users\Lin\Documents\math 096 fall 2001 with classrooms.sav

Case Processing Summary

Unweighted Cases[a]		N	Percent
Selected Cases	Included in Analysis	235	93.3
	Missing Cases	17	6.7
	Total	252	100.0
Unselected Cases		0	.0
Total		252	100.0

a. If weight is in effect, see classification table for the total number of cases.

Dependent Variable Encoding

Original Value	Internal Value
0	0
1	1

Block 0: Beginning Block

Iteration History[a,b,c]

Iteration			Coefficients
		-2 Log likelihood	Constant
Step 0	1	321.130	.281
	2	321.130	.283
	3	321.130	.283

a. Constant is included in the model.

b. Initial -2 Log Likelihood: 321.130

c. Estimation terminated at iteration number 3 because parameter estimates changed by less than .001.

Classification Table[a,b]

Observed			Predicted fnlgrd 0	Predicted fnlgrd 1	Percentage Correct
Step 0	fnlgrd	0	0	101	.0
		1	0	134	100.0
	Overall Percentage				57.0

a. Constant is included in the model.

b. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 0	Constant	.283	.132	4.603	1	.032	1.327

Variables not in the Equation

			Score	df	Sig.
Step 0	Variables	Mozartuse	9.474	1	.002
	Overall Statistics		9.474	1	.002

Block 1: Method = Enter

Iteration History[a,b,c,d]

Iteration		-2 Log likelihood	Coefficients Constant	Coefficients mozartuse
Step 1	1	311.719	.466	-1.038
	2	311.713	.475	-1.063
	3	311.713	.475	-1.063

a. Method: Enter

b. Constant is included in the model.

c. Initial -2 Log Likelihood: 321.130

Iteration History[a,b,c,d]

Iteration		-2 Log likelihood	Coefficients	
			Constant	mozartuse
Step 1	1	311.719	.466	-1.038
	2	311.713	.475	-1.063
	3	311.713	.475	-1.063

a. Method: Enter

b. Constant is included in the model.

c. Initial -2 Log Likelihood: 321.130

d. Estimation terminated at iteration number 3 because parameter estimates changed by less than .001.

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	9.417	1	.002
	Block	9.417	1	.002
	Model	9.417	1	.002

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	311.713[a]	.039	.053

a. Estimation terminated at iteration number 3 because parameter estimates changed by less than .001.

Hosmer and Lemeshow Test

Step	Chi-square	Df	Sig.
1	.000	0	.

Contingency Table for Hosmer and Lemeshow Test

		fnlgrd = 0		fnlgrd = 1		Total
		Observed	Expected	Observed	Expected	
Step 1	1	27	27.000	15	15.000	42
	2	74	74.000	119	119.000	193

Classification Table[a]

Observed			Predicted: fnlgrd 0	Predicted: fnlgrd 1	Percentage Correct
Step 1	fnlgrd	0	27	74	26.7
		1	15	119	88.8
	Overall Percentage				62.1

a. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	mozartuse	-1.063	.354	8.992	1	.003	.345
	Constant	.475	.148	10.297	1	.001	1.608

a. Variable(s) entered on step 1: mozartuse.

Variables in the Equation

		95% C.I.for EXP(B)	
		Lower	Upper
Step 1[a]	mozartuse	.172	.692
	Constant		

a. Variable(s) entered on step 1: mozartuse.

Correlation Matrix

		Constant	mozartuse
Step 1	Constant	1.000	-.418
	mozartuse	-.418	1.000

Step number: 1

Observed Groups and Predicted Probabilities

```
    200 +                                                     +
        I                                1                    I
        I                                1                    I
F       I                                1                    I
R   150 +                                1                    +
E       I                                1                    I
Q       I                                1                    I
U       I                                1                    I
E   100 +                                1                    +
N       I                                1                    I
C       I                                0                    I
Y       I                                0                    I
     50 +                                0                    +
        I                  1             0                    I
        I                  0             0                    I
        I                  0             0                    I
Predicted ---------+---------+---------+---------+---------+---------+---------+---------+--------
-+----------
  Prob:   0       .1        .2        .3        .4        .5        .6        .7        .8        .9        1
  Group:
0000000000000000000000000000000000000000011111111111
11111111111111111111111111111
```

Predicted Probability is of Membership for 1
The Cut Value is .50
Symbols: 0 - 0
1 - 1
Each Symbol Represents 12.5 Cases.

Casewise List[a]

a. The casewise plot is not produced because no outliers were found.

```
LOGISTIC REGRESSION VARIABLES fnlgrd
  /METHOD=ENTER amisone
  /CLASSPLOT
  /CASEWISE OUTLIER(2)
  /PRINT=GOODFIT CORR ITER(1) CI(95)
  /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).
```

Logistic Regression

Notes

Output Created		02-Oct-2011 15:03:37
Comments		
Input	Data	C:\Users\Lin\Documents\math 096 fall 2001 with classrooms.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	252
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing
Syntax		LOGISTIC REGRESSION VARIABLES fnlgrd /METHOD=ENTER amisone /CLASSPLOT /CASEWISE OUTLIER(2) /PRINT=GOODFIT CORR ITER(1) CI(95) /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).
Resources	Processor Time	00:00:00.000
	Elapsed Time	00:00:00.033

[DataSet1] C:\Users\Lin\Documents\math 096 fall 2001 with classrooms.sav

Case Processing Summary

Unweighted Cases[a]		N	Percent
Selected Cases	Included in Analysis	223	88.5
	Missing Cases	29	11.5
	Total	252	100.0
Unselected Cases		0	.0
Total		252	100.0

a. If weight is in effect, see classification table for the total number of cases.

Dependent Variable Encoding

Original Value	Internal Value
0	0
1	1

Block 0: Beginning Block

Iteration History[a,b,c]

Iteration		-2 Log likelihood	Coefficients
			Constant
Step 0	1	300.801	.386
	2	300.800	.391
	3	300.800	.391

a. Constant is included in the model.

b. Initial -2 Log Likelihood: 300.800

c. Estimation terminated at iteration number 3 because parameter estimates changed by less than .001.

Classification Table[a,b]

Observed			Predicted: fnlgrd 0	Predicted: fnlgrd 1	Percentage Correct
Step 0	fnlgrd	0	0	90	.0
		1	0	133	100.0
	Overall Percentage				59.6

a. Constant is included in the model.

b. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 0	Constant	.391	.136	8.187	1	.004	1.478

Variables not in the Equation

			Score	df	Sig.
Step 0	Variables	Amisone	5.763	1	.016
	Overall Statistics		5.763	1	.016

Block 1: Method = Enter

Iteration History[a,b,c,d]

Iteration		-2 Log likelihood	Coefficients: Constant	Coefficients: amisone
Step 1	1	295.081	.629	-.653
	2	295.066	.651	-.675
	3	295.066	.651	-.675

a. Method: Enter

b. Constant is included in the model.

c. Initial -2 Log Likelihood: 300.800

Iteration History[a,b,c,d]

Iteration		-2 Log likelihood	Coefficients	
			Constant	amisone
Step 1	1	295.081	.629	-.653
	2	295.066	.651	-.675
	3	295.066	.651	-.675

a. Method: Enter

b. Constant is included in the model.

c. Initial -2 Log Likelihood: 300.800

d. Estimation terminated at iteration number 3 because parameter estimates changed by less than .001.

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	5.734	1	.017
	Block	5.734	1	.017
	Model	5.734	1	.017

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	295.066[a]	.025	.034

a. Estimation terminated at iteration number 3 because parameter estimates changed by less than .001.

Hosmer and Lemeshow Test

Step	Chi-square	Df	Sig.
1	.000	0	.

Contingency Table for Hosmer and Lemeshow Test

		fnlgrd = 0		fnlgrd = 1		Total
		Observed	Expected	Observed	Expected	
Step 1	1	42	42.000	41	41.000	83
	2	48	48.000	92	92.000	140

Classification Table[a]

Observed			Predicted: fnlgrd 0	Predicted: fnlgrd 1	Percentage Correct
Step 1	fnlgrd	0	42	48	46.7
		1	41	92	69.2
	Overall Percentage				60.1

a. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	amisone	-.675	.283	5.697	1	.017	.509
	Constant	.651	.178	13.351	1	.000	1.917

a. Variable(s) entered on step 1: amisone.

Variables in the Equation

		95% C.I.for EXP(B)	
		Lower	Upper
Step 1[a]	amisone	.293	.886
	Constant		

a. Variable(s) entered on step 1: amisone.

Correlation Matrix

		Constant	amisone
Step 1	Constant	1.000	-.630
	amisone	-.630	1.000

Step number: 1

```
          Observed Groups and Predicted Probabilities

    160 +                                                                 +
        I                                                                 I
        I                                           1                     I
F       I                                           1                     I
R   120 +                                             1                   +
E       I                                           1                     I
Q       I                                           1                     I
U       I                                           1                     I
E    80 +                                   1         1                   +
N       I                                 1          1                    I
C       I                                 1          1                    I
Y       I                                 1          0                    I
     40 +                                  0          0                   +
        I                                0          0                     I
        I                                0          0                     I
        I                                0          0                     I
Predicted ---------+---------+---------+---------+---------+---------+---------+---------+--------
-+----------
  Prob:   0       .1       .2       .3       .4       .5       .6       .7       .8       .9       1
  Group:
000000000000000000000000000000000000000000000000001111111111111
11111111111111111111111111111111111
```

Predicted Probability is of Membership for 1
The Cut Value is .50
Symbols: 0 - 0
1 - 1
Each Symbol Represents 10 Cases.

Casewise List[a]

a. The casewise plot is not produced because no outliers were found.

```
LOGISTIC REGRESSION VARIABLES fnlgrd
  /METHOD=ENTER numbmeet
  /CLASSPLOT
  /CASEWISE OUTLIER(2)
  /PRINT=GOODFIT CORR ITER(1) CI(95)
  /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).
```

Logistic Regression

Notes

Output Created		02-Oct-2011 15:05:10
Comments		
Input	Data	C:\Users\Lin\Documents\math 096 fall 2001 with classrooms.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	252
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing
Syntax		LOGISTIC REGRESSION VARIABLES fnlgrd /METHOD=ENTER numbmeet /CLASSPLOT /CASEWISE OUTLIER(2) /PRINT=GOODFIT CORR ITER(1) CI(95) /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).
Resources	Processor Time	00:00:00.031
	Elapsed Time	00:00:00.026

[DataSet1] C:\Users\Lin\Documents\math 096 fall 2001 with classrooms.sav

Case Processing Summary

Unweighted Cases[a]		N	Percent
Selected Cases	Included in Analysis	226	89.7
	Missing Cases	26	10.3
	Total	252	100.0
Unselected Cases		0	.0
Total		252	100.0

a. If weight is in effect, see classification table for the total number of cases.

Dependent Variable Encoding

Original Value	Internal Value
0	0
1	1

Block 0: Beginning Block

Iteration History[a,b,c]

Iteration			Coefficients
		-2 Log likelihood	Constant
Step 0	1	305.453	.372
	2	305.452	.376
	3	305.452	.376

a. Constant is included in the model.

b. Initial -2 Log Likelihood: 305.452

c. Estimation terminated at iteration number 3 because parameter estimates changed by less than .001.

Classification Table[a,b]

Observed			Predicted: fnlgrd 0	Predicted: fnlgrd 1	Percentage Correct
Step 0	fnlgrd	0	0	92	.0
		1	0	134	100.0
	Overall Percentage				59.3

a. Constant is included in the model.

b. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 0	Constant	.376	.135	7.714	1	.005	1.457

Variables not in the Equation

			Score	df	Sig.
Step 0	Variables	Numbmeet	9.660	1	.002
	Overall Statistics		9.660	1	.002

Block 1: Method = Enter

Iteration History[a,b,c,d]

Iteration		-2 Log likelihood	Coefficients: Constant	Coefficients: numbmeet
Step 1	1	295.686	1.484	-.309
	2	295.623	1.584	-.330
	3	295.623	1.585	-.330
	4	295.623	1.585	-.330

a. Method: Enter

b. Constant is included in the model.

c. Initial -2 Log Likelihood: 305.452

Iteration History[a,b,c,d]

Iteration		-2 Log likelihood	Coefficients	
			Constant	numbmeet
Step 1	1	295.686	1.484	-.309
	2	295.623	1.584	-.330
	3	295.623	1.585	-.330
	4	295.623	1.585	-.330

a. Method: Enter

b. Constant is included in the model.

c. Initial -2 Log Likelihood: 305.452

d. Estimation terminated at iteration number 4 because parameter estimates changed by less than .001.

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	9.828	1	.002
	Block	9.828	1	.002
	Model	9.828	1	.002

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	295.623[a]	.043	.057

a. Estimation terminated at iteration number 4 because parameter estimates changed by less than .001.

Hosmer and Lemeshow Test

Step	Chi-square	Df	Sig.
1	.157	1	.692

Contingency Table for Hosmer and Lemeshow Test

		fnlgrd = 0		fnlgrd = 1		Total
		Observed	Expected	Observed	Expected	
Step 1	1	42	42.839	41	40.161	83
	2	26	24.742	31	32.258	57

Contingency Table for Hosmer and Lemeshow Test

		fnlgrd = 0		fnlgrd = 1		Total
		Observed	Expected	Observed	Expected	
Step 1	1	42	42.839	41	40.161	83
	2	26	24.742	31	32.258	57
	3	24	24.419	62	61.581	86

Classification Table[a]

Observed			Predicted		
			fnlgrd		Percentage Correct
			0	1	
Step 1	fnlgrd	0	42	50	45.7
		1	41	93	69.4
	Overall Percentage				59.7

a. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	numbmeet	-.330	.107	9.442	1	.002	.719
	Constant	1.585	.423	14.011	1	.000	4.878

a. Variable(s) entered on step 1: numbmeet.

Variables in the Equation

		95% C.I.for EXP(B)	
		Lower	Upper
Step 1[a]	numbmeet	.583	.887
	Constant		

a. Variable(s) entered on step 1: numbmeet.

Correlation Matrix

		Constant	numbmeet
Step 1	Constant	1.000	-.945
	numbmeet	-.945	1.000

Step number: 1

```
          Observed Groups and Predicted Probabilities

    160 +                                                                    +
        I                                                                    I
        I                                                                    I
F       I                                                                    I
R   120 +                                                                    +
E       I                                                                    I
Q       I                                                                    I
U       I                                             1                      I
E    80 +                               1               1                    +
N       I                             1               1                      I
C       I                             1     1         1                      I
Y       I                             1     1         1                      I
     40 +                              0     1         1                     +
        I                            0     0          1                      I
        I                            0     0          0                      I
        I                            0     0          0                      I
Predicted ---------+---------+---------+---------+---------+---------+---------+---------+---------
-+----------
  Prob:   0       .1        .2        .3        .4        .5        .6        .7        .8        .9        1
  Group:
000000000000000000000000000000000000000000000000001111111111111
1111111111111111111111111111111111111

        Predicted Probability is of Membership for 1
        The Cut Value is .50
        Symbols: 0 - 0
                 1 - 1
        Each Symbol Represents 10 Cases.
```

Casewise List[a]

a. The casewise plot is not produced because no outliers were found.

```
LOGISTIC REGRESSION VARIABLES fnlgrd
  /METHOD=ENTER classize
  /CLASSPLOT
  /CASEWISE OUTLIER(2)
  /PRINT=GOODFIT CORR ITER(1) CI(95)
  /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).
```

Logistic Regression

Notes

Output Created		02-Oct-2011 15:07:00
Comments		
Input	Data	C:\Users\Lin\Documents\math 096 fall 2001 with classrooms.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	252
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing
Syntax		LOGISTIC REGRESSION VARIABLES fnlgrd /METHOD=ENTER classize /CLASSPLOT /CASEWISE OUTLIER(2) /PRINT=GOODFIT CORR ITER(1) CI(95) /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).
Resources	Processor Time	00:00:00.000
	Elapsed Time	00:00:00.032

[DataSet1] C:\Users\Lin\Documents\math 096 fall 2001 with classrooms.sav

Case Processing Summary

Unweighted Cases[a]		N	Percent
Selected Cases	Included in Analysis	235	93.3
	Missing Cases	17	6.7
	Total	252	100.0
Unselected Cases		0	.0
Total		252	100.0

a. If weight is in effect, see classification table for the total number of cases.

Dependent Variable Encoding

Original Value	Internal Value
0	0
1	1

Block 0: Beginning Block

Iteration History[a,b,c]

Iteration			Coefficients
		-2 Log likelihood	Constant
Step 0	1	321.130	.281
	2	321.130	.283
	3	321.130	.283

a. Constant is included in the model.

b. Initial -2 Log Likelihood: 321.130

c. Estimation terminated at iteration number 3 because parameter estimates changed by less than .001.

Classification Table[a,b]

Observed			Predicted		
			fnlgrd		Percentage Correct
			0	1	
Step 0	fnlgrd	0	0	101	.0
		1	0	134	100.0
	Overall Percentage				57.0

a. Constant is included in the model.

b. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 0	Constant	.283	.132	4.603	1	.032	1.327

Variables not in the Equation

			Score	df	Sig.
Step 0	Variables	Classize	.015	1	.902
	Overall Statistics		.015	1	.902

Block 1: Method = Enter

Iteration History[a,b,c,d]

Iteration		-2 Log likelihood	Coefficients	
			Constant	classize
Step 1	1	321.115	.325	-.001
	2	321.114	.327	-.001
	3	321.114	.327	-.001

a. Method: Enter

b. Constant is included in the model.

c. Initial -2 Log Likelihood: 321.130

Iteration History[a,b,c,d]

Iteration		-2 Log likelihood	Coefficients	
			Constant	classize
Step 1	1	321.115	.325	-.001
	2	321.114	.327	-.001
	3	321.114	.327	-.001

a. Method: Enter

b. Constant is included in the model.

c. Initial -2 Log Likelihood: 321.130

d. Estimation terminated at iteration number 3 because parameter estimates changed by less than .001.

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	.015	1	.902
	Block	.015	1	.902
	Model	.015	1	.902

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	321.114[a]	.000	.000

a. Estimation terminated at iteration number 3 because parameter estimates changed by less than .001.

Hosmer and Lemeshow Test

Step	Chi-square	Df	Sig.
1	19.779	5	.001

Contingency Table for Hosmer and Lemeshow Test

		fnlgrd = 0		fnlgrd = 1		Total
		Observed	Expected	Observed	Expected	
Step 1	1	19	19.556	26	25.444	45
	2	27	18.184	15	23.816	42
	3	8	17.293	32	22.707	40
	4	10	8.964	11	12.036	21
	5	12	8.524	8	11.476	20
	6	15	17.036	25	22.964	40
	7	10	11.442	17	15.558	27

Classification Table[a]

Observed			Predicted		
			fnlgrd		Percentage Correct
			0	1	
Step 1	fnlgrd	0	0	101	.0
		1	0	134	100.0
	Overall Percentage				57.0

a. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	classize	-.001	.011	.015	1	.902	.999
	Constant	.327	.385	.724	1	.395	1.387

a. Variable(s) entered on step 1: classize.

Variables in the Equation

		95% C.I.for EXP(B)	
		Lower	Upper
Step 1[a]	classize	.978	1.020
	Constant		

a. Variable(s) entered on step 1: classize.

Correlation Matrix

		Constant	classize
Step 1	Constant	1.000	-.940
	classize	-.940	1.000

```
           Step number: 1

           Observed Groups and Predicted Probabilities

     160 +                                                            +
         I                                                            I
         I                                                            I
F        I                          1                                 I
R    120 +                            1                               +
E        I                          11                                I
Q        I                          11                                I
U        I                          11                                I
E     80 +                           11                               +
N        I                          11                                I
C        I                          11                                I
Y        I                          00                                I
      40 +                           00                               +
         I                          00                                I
         I                          00                                I
         I                          00                                I
Predicted ---------+---------+---------+---------+---------+---------+---------+---------+--------
-+----------
  Prob:   0       .1        .2        .3        .4        .5        .6        .7        .8        .9        1
  Group:
00000000000000000000000000000000000000000000000000111111111111111
11111111111111111111111111111111111

         Predicted Probability is of Membership for 1
         The Cut Value is .50
         Symbols: 0 - 0
                  1 - 1
         Each Symbol Represents 10 Cases.
```

Casewise List[a]

a. The casewise plot is not produced because no outliers were found.

```
LOGISTIC REGRESSION VARIABLES fnlgrd
  /METHOD=ENTER gender
  /CLASSPLOT
  /CASEWISE OUTLIER(2)
  /PRINT=GOODFIT CORR ITER(1) CI(95)
  /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).
```

Logistic Regression

Notes

Output Created		02-Oct-2011 14:02:10
Comments		
Input	Data	C:\Users\Lin\Documents\math 097 fall 2001 with classrooms no names.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	675
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing
Syntax		LOGISTIC REGRESSION VARIABLES fnlgrd /METHOD=ENTER gender /CLASSPLOT /CASEWISE OUTLIER(2) /PRINT=GOODFIT CORR ITER(1) CI(95) /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).
Resources	Processor Time	00:00:00.031
	Elapsed Time	00:00:00.072

[DataSet1] C:\Users\Lin\Documents\math 097 fall 2001 with classrooms no names.sav

Case Processing Summary

Unweighted Cases[a]		N	Percent
Selected Cases	Included in Analysis	659	97.6
	Missing Cases	16	2.4
	Total	675	100.0
Unselected Cases		0	.0
Total		675	100.0

a. If weight is in effect, see classification table for the total number of cases.

Dependent Variable Encoding

Original Value	Internal Value
0	0
1	1

Block 0: Beginning Block

Iteration History[a,b,c]

Iteration			Coefficients
		-2 Log likelihood	Constant
Step 0	1	836.709	.677
	2	836.596	.704
	3	836.596	.705

a. Constant is included in the model.

b. Initial -2 Log Likelihood: 836.596

c. Estimation terminated at iteration number 3 because parameter estimates changed by less than .001.

Classification Table[a,b]

Observed			Predicted		
			fnlgrd		Percentage Correct
			0	1	
Step 0	fnlgrd	0	0	218	.0
		1	0	441	100.0
	Overall Percentage				66.9

a. Constant is included in the model.

b. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 0	Constant	.705	.083	72.416	1	.000	2.023

Variables not in the Equation

			Score	df	Sig.
Step 0	Variables	Gender	19.981	1	.000
	Overall Statistics		19.981	1	.000

Block 1: Method = Enter

Iteration History[a,b,c,d]

Iteration		-2 Log likelihood	Coefficients	
			Constant	gender
Step 1	1	817.244	.960	-.662
	2	816.700	1.045	-.744
	3	816.699	1.046	-.746
	4	816.699	1.046	-.746

a. Method: Enter

b. Constant is included in the model.

c. Initial -2 Log Likelihood: 836.596

Iteration History[a,b,c,d]

Iteration		-2 Log likelihood	Coefficients	
			Constant	gender
Step 1	1	817.244	.960	-.662
	2	816.700	1.045	-.744
	3	816.699	1.046	-.746
	4	816.699	1.046	-.746

a. Method: Enter

b. Constant is included in the model.

c. Initial -2 Log Likelihood: 836.596

d. Estimation terminated at iteration number 4 because parameter estimates changed by less than .001.

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	19.897	1	.000
	Block	19.897	1	.000
	Model	19.897	1	.000

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	816.699[a]	.030	.041

a. Estimation terminated at iteration number 4 because parameter estimates changed by less than .001.

Hosmer and Lemeshow Test

Step	Chi-square	Df	Sig.
1	.000	0	.

Contingency Table for Hosmer and Lemeshow Test

		fnlgrd = 0		fnlgrd = 1		Total
		Observed	Expected	Observed	Expected	
Step 1	1	120	120.000	162	162.000	282
	2	98	98.000	279	279.000	377

Classification Table[a]

Observed			Predicted: fnlgrd 0	Predicted: fnlgrd 1	Percentage Correct
Step 1	fnlgrd	0	0	218	.0
		1	0	441	100.0
	Overall Percentage				66.9

a. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	gender	-.746	.168	19.676	1	.000	.474
	Constant	1.046	.117	79.388	1	.000	2.847

a. Variable(s) entered on step 1: gender.

Variables in the Equation

		95% C.I.for EXP(B)	
		Lower	Upper
Step 1[a]	gender	.341	.659
	Constant		

a. Variable(s) entered on step 1: gender.

Correlation Matrix

		Constant	gender
Step 1	Constant	1.000	-.698
	gender	-.698	1.000

Step number: 1

Observed Groups and Predicted Probabilities

```
    400 +                                                                    +
        I                                            1                  I
        I                                            1                  I
F       I                                            1                  I
R   300 +                                              1                    +
E       I                                    1         1                    I
Q       I                                    1         1                    I
U       I                                    1         1                    I
E   200 +                                      1         1                    +
N       I                                    1         1                    I
C       I                                    1         1                    I
Y       I                                    0         1                    I
    100 +                                      0         0                  +
        I                                   0         0                 I
        I                                   0         0                 I
        I                                   0         0                 I
Predicted ---------+---------+---------+---------+---------+---------+---------+---------+--------
-+----------
  Prob:   0       .1        .2        .3        .4        .5        .6        .7        .8        .9        1
  Group:
00000000000000000000000000000000000000000000000000011111111111111
111111111111111111111111111111111111
```

Predicted Probability is of Membership for 1
The Cut Value is .50
Symbols: 0 - 0
        1 - 1
Each Symbol Represents 25 Cases.

Casewise List[a]

a. The casewise plot is not produced because no outliers were found.

```
LOGISTIC REGRESSION VARIABLES fnlgrd
  /METHOD=ENTER act
  /CLASSPLOT
  /CASEWISE OUTLIER(2)
  /PRINT=GOODFIT CORR ITER(1) CI(95)
  /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).
```

Logistic Regression

Notes

Output Created		02-Oct-2011 14:12:13
Comments		
Input	Data	C:\Users\Lin\Documents\math 097 fall 2001 with classrooms no names.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	675
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing
Syntax		LOGISTIC REGRESSION VARIABLES fnlgrd /METHOD=ENTER act /CLASSPLOT /CASEWISE OUTLIER(2) /PRINT=GOODFIT CORR ITER(1) CI(95) /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).
Resources	Processor Time	00:00:00.031
	Elapsed Time	00:00:00.037

[DataSet1] C:\Users\Lin\Documents\math 097 fall 2001 with classrooms no names.sav

Case Processing Summary

Unweighted Cases[a]		N	Percent
Selected Cases	Included in Analysis	608	90.1
	Missing Cases	67	9.9
	Total	675	100.0
Unselected Cases		0	.0
Total		675	100.0

a. If weight is in effect, see classification table for the total number of cases.

Dependent Variable Encoding

Original Value	Internal Value
0	0
1	1

Block 0: Beginning Block

Iteration History[a,b,c]

Iteration		-2 Log likelihood	Coefficients Constant
Step 0	1	775.924	.658
	2	775.836	.683
	3	775.836	.683

a. Constant is included in the model.

b. Initial -2 Log Likelihood: 775.836

c. Estimation terminated at iteration number 3 because parameter estimates changed by less than .001.

Classification Table[a,b]

Observed			Predicted fnlgrd 0	Predicted fnlgrd 1	Percentage Correct
Step 0	fnlgrd	0	0	204	.0
		1	0	404	100.0
	Overall Percentage				66.4

a. Constant is included in the model.

b. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 0	Constant	.683	.086	63.288	1	.000	1.980

Variables not in the Equation

			Score	df	Sig.
Step 0	Variables	Act	36.450	1	.000
	Overall Statistics		36.450	1	.000

Block 1: Method = Enter

Iteration History[a,b,c,d]

Iteration		-2 Log likelihood	Coefficients Constant	Coefficients act
Step 1	1	739.794	-5.516	.370
	2	738.454	-6.713	.445
	3	738.452	-6.767	.448
	4	738.452	-6.767	.448

a. Method: Enter

b. Constant is included in the model.

c. Initial -2 Log Likelihood: 775.836

Iteration History[a,b,c,d]

Iteration			Coefficients	
		-2 Log likelihood	Constant	act
Step 1	1	739.794	-5.516	.370
	2	738.454	-6.713	.445
	3	738.452	-6.767	.448
	4	738.452	-6.767	.448

a. Method: Enter

b. Constant is included in the model.

c. Initial -2 Log Likelihood: 775.836

d. Estimation terminated at iteration number 4 because parameter estimates changed by less than .001.

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	37.384	1	.000
	Block	37.384	1	.000
	Model	37.384	1	.000

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	738.452[a]	.060	.083

a. Estimation terminated at iteration number 4 because parameter estimates changed by less than .001.

Hosmer and Lemeshow Test

Step	Chi-square	Df	Sig.
1	5.224	2	.073

Contingency Table for Hosmer and Lemeshow Test

		fnlgrd = 0		fnlgrd = 1		
		Observed	Expected	Observed	Expected	Total
Step 1	1	37	39.555	31	28.445	68
	2	71	68.136	99	101.864	170
	3	70	61.375	135	143.625	205
	4	26	34.935	139	130.065	165

Classification Table[a]

Observed			Predicted		
			fnlgrd		Percentage Correct
			0	1	
Step 1	fnlgrd	0	37	167	18.1
		1	31	373	92.3
	Overall Percentage				67.4

a. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	act	.448	.078	32.678	1	.000	1.565
	Constant	-6.767	1.303	26.981	1	.000	.001

a. Variable(s) entered on step 1: act.

Variables in the Equation

		95% C.I.for EXP(B)	
		Lower	Upper
Step 1[a]	act	1.342	1.825
	Constant		

a. Variable(s) entered on step 1: act.

Correlation Matrix

		Constant	act
Step 1	Constant	1.000	-.998
	act	-.998	1.000

Step number: 1

Observed Groups and Predicted Probabilities

```
    320 +                                                                            +
        I                                                                            I
        I                                                                            I
F       I                                                                            I
R   240 +                                                                            +
E       I                                                                            I
Q       I                                                   1                        I
U       I                                          1        1                        I
E   160 +                                             1        1      1              +
N       I                                          1        1      1                 I
C       I                                          1        1      1                 I
Y       I                                          1        1      1                 I
     80 +                                           0        0      1                +
        I                                          0        0      1                 I
        I                                 1        0        0      1                 I
        I                     1      1        0        0        0      0             I
Predicted ---------+---------+---------+---------+---------+---------+---------+---------+--------
-+----------
  Prob:  0       .1        .2        .3        .4        .5        .6        .7        .8        .9        1
  Group:
000000000000000000000000000000000000000000000000001111111111111
11111111111111111111111111111111111
```

Predicted Probability is of Membership for 1
The Cut Value is .50
Symbols: 0 - 0
1 - 1
Each Symbol Represents 20 Cases.

Casewise List[a]

a. The casewise plot is not produced because no outliers were found.

```
LOGISTIC REGRESSION VARIABLES fnlgrd
  /METHOD=ENTER sat
  /CLASSPLOT
  /CASEWISE OUTLIER(2)
  /PRINT=GOODFIT CORR ITER(1) CI(95)
  /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).
```

Logistic Regression

Notes

Output Created		02-Oct-2011 14:13:39
Comments		
Input	Data	C:\Users\Lin\Documents\math 097 fall 2001 with classrooms no names.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	675
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing
Syntax		LOGISTIC REGRESSION VARIABLES fnlgrd /METHOD=ENTER sat /CLASSPLOT /CASEWISE OUTLIER(2) /PRINT=GOODFIT CORR ITER(1) CI(95) /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).
Resources	Processor Time	00:00:00.031
	Elapsed Time	00:00:00.028

[DataSet1] C:\Users\Lin\Documents\math 097 fall 2001 with classrooms no names.sav

Case Processing Summary

Unweighted Cases[a]		N	Percent
Selected Cases	Included in Analysis	80	11.9
	Missing Cases	595	88.1
	Total	675	100.0
Unselected Cases		0	.0
Total		675	100.0

a. If weight is in effect, see classification table for the total number of cases.

Dependent Variable Encoding

Original Value	Internal Value
0	0
1	1

Block 0: Beginning Block

Iteration History[a,b,c]

Iteration		-2 Log likelihood	Coefficients
			Constant
Step 0	1	100.910	.700
	2	100.893	.731
	3	100.893	.731

a. Constant is included in the model.

b. Initial -2 Log Likelihood: 100.893

c. Estimation terminated at iteration number 3 because parameter estimates changed by less than .001.

Classification Table[a,b]

Observed			Predicted fnlgrd 0	Predicted fnlgrd 1	Percentage Correct
Step 0	fnlgrd	0	0	26	.0
		1	0	54	100.0
	Overall Percentage				67.5

a. Constant is included in the model.

b. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 0	Constant	.731	.239	9.375	1	.002	2.077

Variables not in the Equation

			Score	df	Sig.
Step 0	Variables	Sat	.345	1	.557
	Overall Statistics		.345	1	.557

Block 1: Method = Enter

Iteration History[a,b,c,d]

Iteration		-2 Log likelihood	Coefficients Constant	Coefficients sat
Step 1	1	100.577	-.255	.002
	2	100.554	-.328	.003
	3	100.554	-.329	.003

a. Method: Enter

b. Constant is included in the model.

c. Initial -2 Log Likelihood: 100.893

Iteration History[a,b,c,d]

Iteration		-2 Log likelihood	Coefficients	
			Constant	sat
Step 1	1	100.577	-.255	.002
	2	100.554	-.328	.003
	3	100.554	-.329	.003

a. Method: Enter

b. Constant is included in the model.

c. Initial -2 Log Likelihood: 100.893

d. Estimation terminated at iteration number 3 because parameter estimates changed by less than .001.

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	.339	1	.561
	Block	.339	1	.561
	Model	.339	1	.561

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	100.554[a]	.004	.006

a. Estimation terminated at iteration number 3 because parameter estimates changed by less than .001.

Hosmer and Lemeshow Test

Step	Chi-square	Df	Sig.
1	7.578	8	.476

Contingency Table for Hosmer and Lemeshow Test

		fnlgrd = 0		fnlgrd = 1		Total
		Observed	Expected	Observed	Expected	
Step 1	1	2	2.800	5	4.200	7
	2	4	2.844	4	5.156	8
	3	2	3.341	8	6.659	10
	4	1	.657	1	1.343	2
	5	5	4.516	9	9.484	14
	6	4	2.218	3	4.782	7
	7	3	2.179	4	4.821	7
	8	2	2.140	5	4.860	7
	9	1	3.602	11	8.398	12
	10	2	1.705	4	4.295	6

Classification Table[a]

Observed			Predicted		
			fnlgrd		Percentage Correct
			0	1	
Step 1	fnlgrd	0	0	26	.0
		1	0	54	100.0
	Overall Percentage				67.5

a. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	sat	.003	.004	.342	1	.559	1.003
	Constant	-.329	1.824	.033	1	.857	.720

a. Variable(s) entered on step 1: sat.

Variables in the Equation

		95% C.I.for EXP(B)	
		Lower	Upper
Step 1[a]	sat	.994	1.011
	Constant		

a. Variable(s) entered on step 1: sat.

Correlation Matrix

		Constant	sat
Step 1	Constant	1.000	-.991
	sat	-.991	1.000

Step number: 1

Observed Groups and Predicted Probabilities

```
     20 +                                                  +
        I                              1                   I
        I                              1                   I
F       I                             1 1                  I
R    15 +                              1 1                 +
E       I                             111                  I
Q       I                             111                  I
U       I                             1111                 I
E    10 +                              1111                +
N       I                             1111                 I
C       I                             1101                 I
Y       I                             1001                 I
      5 +                             1001                 +
        I                          1  1001                 I
        I                        1   01 000011             I
        I                      1   10 010010000001 1       I
Predicted ---------+---------+---------+---------+---------+---------+---------+---------+--------
-+----------
  Prob:   0       .1       .2       .3       .4       .5       .6       .7       .8       .9       1
  Group:
0000000000000000000000000000000000000000000000000011111111111111
1111111111111111111111111111111111111
```

Predicted Probability is of Membership for 1
The Cut Value is .50
Symbols: 0 - 0
1 - 1
Each Symbol Represents 1.25 Cases.

Casewise List[a]

a. The casewise plot is not produced because no outliers were found.

```
LOGISTIC REGRESSION VARIABLES fnlgrd
  /METHOD=ENTER comcol
  /CLASSPLOT
  /CASEWISE OUTLIER(2)
  /PRINT=GOODFIT CORR ITER(1) CI(95)
  /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).
```

Logistic Regression

Notes

Output Created		02-Oct-2011 14:16:39
Comments		
Input	Data	C:\Users\Lin\Documents\math 097 fall 2001 with classrooms no names.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	675
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing
Syntax		LOGISTIC REGRESSION VARIABLES fnlgrd /METHOD=ENTER comcol /CLASSPLOT /CASEWISE OUTLIER(2) /PRINT=GOODFIT CORR ITER(1) CI(95) /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).
Resources	Processor Time	00:00:00.015
	Elapsed Time	00:00:00.038

[DataSet1] C:\Users\Lin\Documents\math 097 fall 2001 with classrooms no names.sav

Case Processing Summary

Unweighted Cases[a]		N	Percent
Selected Cases	Included in Analysis	670	99.3
	Missing Cases	5	.7
	Total	675	100.0
Unselected Cases		0	.0
Total		675	100.0

a. If weight is in effect, see classification table for the total number of cases.

Dependent Variable Encoding

Original Value	Internal Value
0	0
1	1

Block 0: Beginning Block

Iteration History[a,b,c]

Iteration		-2 Log likelihood	Coefficients
			Constant
Step 0	1	851.181	.675
	2	851.069	.702
	3	851.069	.702

a. Constant is included in the model.

b. Initial -2 Log Likelihood: 851.069

c. Estimation terminated at iteration number 3 because parameter estimates changed by less than .001.

Classification Table[a,b]

Observed			Predicted fnlgrd 0	Predicted fnlgrd 1	Percentage Correct
Step 0	fnlgrd	0	0	222	.0
		1	0	448	100.0
	Overall Percentage				66.9

a. Constant is included in the model.

b. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 0	Constant	.702	.082	73.177	1	.000	2.018

Variables not in the Equation

			Score	df	Sig.
Step 0	Variables	Comcol	20.127	1	.000
	Overall Statistics		20.127	1	.000

Block 1: Method = Enter

Iteration History[a,b,c,d]

Iteration		-2 Log likelihood	Coefficients Constant	Coefficients comcol
Step 1	1	832.089	.843	-.801
	2	831.744	.899	-.856
	3	831.744	.899	-.857

a. Method: Enter

b. Constant is included in the model.

c. Initial -2 Log Likelihood: 851.069

d. Estimation terminated at iteration number 3 because parameter estimates changed by less than .001.

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	19.324	1	.000
	Block	19.324	1	.000
	Model	19.324	1	.000

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	831.744[a]	.028	.040

a. Estimation terminated at iteration number 3 because parameter estimates changed by less than .001.

Hosmer and Lemeshow Test

Step	Chi-square	Df	Sig.
1	.000	0	.

Contingency Table for Hosmer and Lemeshow Test

		fnlgrd = 0		fnlgrd = 1		
		Observed	Expected	Observed	Expected	Total
Step 1	1	69	69.000	72	72.000	141
	2	153	153.000	376	376.000	529

Classification Table[a]

Observed			Predicted		
			fnlgrd		Percentage Correct
			0	1	
Step 1	fnlgrd	0	0	222	.0
		1	0	448	100.0
	Overall Percentage				66.9

a. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	comcol	-.857	.194	19.526	1	.000	.425
	Constant	.899	.096	87.920	1	.000	2.458

a. Variable(s) entered on step 1: comcol.

Variables in the Equation

		95% C.I.for EXP(B)	
		Lower	Upper
Step 1[a]	comcol	.290	.621
	Constant		

a. Variable(s) entered on step 1: comcol.

Correlation Matrix

		Constant	comcol
Step 1	Constant	1.000	-.495
	comcol	-.495	1.000

Step number: 1

Observed Groups and Predicted Probabilities

```
    800 +                                                                   +
        I                                                                  I
        I                                                                  I
F       I                                                                  I
R     600 +                                                                 +
E       I                                                   1              I
Q       I                                                   1              I
U       I                                                   1              I
E     400 +                                                   1             +
N       I                                                   1              I
C       I                                                   1              I
Y       I                                                   1              I
    200 +                                                    1              +
        I                                 1                0               I
        I                                 1                0               I
        I                                 0                0               I
Predicted ---------+---------+---------+---------+---------+---------+---------+---------+---------
-+----------
  Prob:   0       .1       .2       .3       .4       .5       .6       .7       .8       .9       1
  Group:
00000000000000000000000000000000000000000000000001111111111111
11111111111111111111111111111111111
```

Predicted Probability is of Membership for 1
The Cut Value is .50
Symbols: 0 - 0
1 - 1
Each Symbol Represents 50 Cases.

Casewise List[a]

a. The casewise plot is not produced because no outliers were found.

```
LOGISTIC REGRESSION VARIABLES fnlgrd
  /METHOD=ENTER pretest
  /CLASSPLOT
  /CASEWISE OUTLIER(2)
  /PRINT=GOODFIT CORR ITER(1) CI(95)
  /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).
```

Logistic Regression

Notes

Output Created		02-Oct-2011 14:19:02
Comments		
Input	Data	C:\Users\Lin\Documents\math 097 fall 2001 with classrooms no names.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	675
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing
Syntax		LOGISTIC REGRESSION VARIABLES fnlgrd /METHOD=ENTER pretest /CLASSPLOT /CASEWISE OUTLIER(2) /PRINT=GOODFIT CORR ITER(1) CI(95) /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).
Resources	Processor Time	00:00:00.000
	Elapsed Time	00:00:00.033

[DataSet1] C:\Users\Lin\Documents\math 097 fall 2001 with classrooms no names.sav

Case Processing Summary

Unweighted Cases[a]		N	Percent
Selected Cases	Included in Analysis	542	80.3
	Missing Cases	133	19.7
	Total	675	100.0
Unselected Cases		0	.0
Total		675	100.0

a. If weight is in effect, see classification table for the total number of cases.

Dependent Variable Encoding

Original Value	Internal Value
0	0
1	1

Block 0: Beginning Block

Iteration History[a,b,c]

Iteration		-2 Log likelihood	Coefficients Constant
Step 0	1	674.407	.745
	2	674.240	.783
	3	674.240	.783

a. Constant is included in the model.

b. Initial -2 Log Likelihood: 674.240

c. Estimation terminated at iteration number 3 because parameter estimates changed by less than .001.

Classification Table[a,b]

Observed			Predicted		
			fnlgrd		Percentage Correct
			0	1	
Step 0	fnlgrd	0	0	170	.0
		1	0	372	100.0
	Overall Percentage				68.6

a. Constant is included in the model.

b. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 0	Constant	.783	.093	71.552	1	.000	2.188

Variables not in the Equation

			Score	df	Sig.
Step 0	Variables	Pretest	24.733	1	.000
	Overall Statistics		24.733	1	.000

Block 1: Method = Enter

Iteration History[a,b,c,d]

Iteration		-2 Log likelihood	Coefficients	
			Constant	pretest
Step 1	1	650.113	-.509	.027
	2	648.792	-.701	.033
	3	648.789	-.711	.034
	4	648.789	-.711	.034

a. Method: Enter

b. Constant is included in the model.

c. Initial -2 Log Likelihood: 674.240

Iteration History[a,b,c,d]

Iteration		-2 Log likelihood	Coefficients	
			Constant	pretest
Step 1	1	650.113	-.509	.027
	2	648.792	-.701	.033
	3	648.789	-.711	.034
	4	648.789	-.711	.034

a. Method: Enter

b. Constant is included in the model.

c. Initial -2 Log Likelihood: 674.240

d. Estimation terminated at iteration number 4 because parameter estimates changed by less than .001.

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	25.451	1	.000
	Block	25.451	1	.000
	Model	25.451	1	.000

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	648.789[a]	.046	.064

a. Estimation terminated at iteration number 4 because parameter estimates changed by less than .001.

Hosmer and Lemeshow Test

Step	Chi-square	Df	Sig.
1	5.576	7	.590

Contingency Table for Hosmer and Lemeshow Test

		fnlgrd = 0		fnlgrd = 1		Total
		Observed	Expected	Observed	Expected	
Step 1	1	25	24.850	25	25.150	50
	2	17	22.613	36	30.387	53
	3	28	27.808	44	44.192	72
	4	25	20.491	34	38.509	59
	5	22	21.101	46	46.899	68
	6	20	16.536	40	43.464	60
	7	13	13.387	42	41.613	55
	8	9	10.479	40	38.521	49
	9	11	12.735	65	63.265	76

Classification Table[a]

Observed			Predicted		
			fnlgrd		Percentage Correct
			0	1	
Step 1	fnlgrd	0	14	156	8.2
		1	8	364	97.8
	Overall Percentage				69.7

a. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	pretest	.034	.007	23.706	1	.000	1.034
	Constant	-.711	.313	5.156	1	.023	.491

a. Variable(s) entered on step 1: pretest.

Variables in the Equation

		95% C.I.for EXP(B)	
		Lower	Upper
Step 1[a]	pretest	1.020	1.048
	Constant		

a. Variable(s) entered on step 1: pretest.

Correlation Matrix

		Constant	pretest
Step 1	Constant	1.000	-.953
	pretest	-.953	1.000

Step number: 1
Observed Groups and Predicted Probabilities

```
    80 +                                                            +
       I                                                           I
       I                          1     1                           I
F      I                           1     1                          I
R    60 +                              1   1 1   1                      +
E      I                         1   1   1 1   1 1                     I
Q      I                         1   1   1 1   1 1 1                   I
U      I                         1   1   1 1   1 1 1                   I
E    40 +                          1   1   1 1   1 1 1 1                  +
N      I                         1   1   1 1   1 1 1 1                 I
C      I                      1   1   0   1 1   1 1 1 1                I
Y      I                      1   1   0   0 1   1 1 1 1                I
    20 +                        1   1   0   0 0   0 1 1 1 1              +
       I                     1   0   0   0 0   0 0 1 1 1 1             I
       I                  0   0   0   0   0 0   0 0 0 1 1 1             I
       I               0  0   0   0   0   0 0   0 0 0 0 0 1 1           I
Predicted ---------+---------+---------+---------+---------+---------+---------+---------+--------
-+----------
  Prob:  0      .1       .2       .3       .4       .5       .6       .7       .8       .9       1
  Group:
000000000000000000000000000000000000000000000000001111111111111
11111111111111111111111111111111111
```

Predicted Probability is of Membership for 1
The Cut Value is .50
Symbols: 0 - 0
1 - 1
Each Symbol Represents 5 Cases.

Casewise List[b]

Case	Selected Status[a]	Observed fnlgrd	Predicted	Predicted Group	Temporary Variable Resid	Temporary Variable ZResid
460	S	0**	.878	1	-.878	-2.682

a. S = Selected, U = Unselected cases, and ** = Misclassified cases.

b. Cases with studentized residuals greater than 2.000 are listed.

```
LOGISTIC REGRESSION VARIABLES fnlgrd
  /METHOD=ENTER ascgr
  /CLASSPLOT
  /CASEWISE OUTLIER(2)
  /PRINT=GOODFIT CORR ITER(1) CI(95)
  /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).
```

Logistic Regression

Notes

Output Created		02-Oct-2011 14:20:23
Comments		
Input	Data	C:\Users\Lin\Documents\math 097 fall 2001 with classrooms no names.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	675
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing
Syntax		LOGISTIC REGRESSION VARIABLES fnlgrd /METHOD=ENTER ascgr /CLASSPLOT /CASEWISE OUTLIER(2) /PRINT=GOODFIT CORR ITER(1) CI(95) /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).
Resources	Processor Time	00:00:00.016
	Elapsed Time	00:00:00.044

[DataSet1] C:\Users\Lin\Documents\math 097 fall 2001 with classrooms no names.sav

Case Processing Summary

Unweighted Cases[a]		N	Percent
Selected Cases	Included in Analysis	665	98.5
	Missing Cases	10	1.5
	Total	675	100.0
Unselected Cases		0	.0
Total		675	100.0

a. If weight is in effect, see classification table for the total number of cases.

Dependent Variable Encoding

Original Value	Internal Value
0	0
1	1

Block 0: Beginning Block

Iteration History[a,b,c]

Iteration		-2 Log likelihood	Coefficients Constant
Step 0	1	842.939	.683
	2	842.819	.711
	3	842.819	.711

a. Constant is included in the model.

b. Initial -2 Log Likelihood: 842.819

c. Estimation terminated at iteration number 3 because parameter estimates changed by less than .001.

Classification Table[a,b]

Observed			Predicted fnlgrd 0	Predicted fnlgrd 1	Percentage Correct
Step 0	fnlgrd	0	0	219	.0
		1	0	446	100.0
	Overall Percentage				67.1

a. Constant is included in the model.

b. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 0	Constant	.711	.083	74.302	1	.000	2.037

Variables not in the Equation

			Score	df	Sig.
Step 0	Variables	Ascgr	197.749	1	.000
	Overall Statistics		197.749	1	.000

Block 1: Method = Enter

Iteration History[a,b,c,d]

Iteration		-2 Log likelihood	Coefficients Constant	Coefficients ascgr
Step 1	1	654.670	-1.000	2.307
	2	649.555	-1.096	2.641
	3	649.531	-1.099	2.662
	4	649.531	-1.099	2.662

a. Method: Enter

b. Constant is included in the model.

c. Initial -2 Log Likelihood: 842.819

Iteration History[a,b,c,d]

Iteration		-2 Log likelihood	Coefficients	
			Constant	ascgr
Step 1	1	654.670	-1.000	2.307
	2	649.555	-1.096	2.641
	3	649.531	-1.099	2.662
	4	649.531	-1.099	2.662

a. Method: Enter

b. Constant is included in the model.

c. Initial -2 Log Likelihood: 842.819

d. Estimation terminated at iteration number 4 because parameter estimates changed by less than .001.

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	193.288	1	.000
	Block	193.288	1	.000
	Model	193.288	1	.000

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	649.531[a]	.252	.351

a. Estimation terminated at iteration number 4 because parameter estimates changed by less than .001.

Hosmer and Lemeshow Test

Step	Chi-square	Df	Sig.
1	.000	0	.

Contingency Table for Hosmer and Lemeshow Test

		fnlgrd = 0		fnlgrd = 1		Total
		Observed	Expected	Observed	Expected	
Step 1	1	135	135.000	45	45.000	180
	2	84	84.000	401	401.000	485

Classification Table[a]

Observed			Predicted		
			fnlgrd		Percentage Correct
			0	1	
Step 1	fnlgrd	0	135	84	61.6
		1	45	401	89.9
	Overall Percentage				80.6

a. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	ascgr	2.662	.210	160.919	1	.000	14.321
	Constant	-1.099	.172	40.735	1	.000	.333

a. Variable(s) entered on step 1: ascgr.

Variables in the Equation

		95% C.I.for EXP(B)	
		Lower	Upper
Step 1[a]	ascgr	9.492	21.607
	Constant		

a. Variable(s) entered on step 1: ascgr.

Correlation Matrix

		Constant	ascgr
Step 1	Constant	1.000	-.820
	ascgr	-.820	1.000

Step number: 1

Observed Groups and Predicted Probabilities

```
    800 +                                                                      +
        I                                                                     I
        I                                                                     I
F       I                                                                     I
R     600 +                                                                    +
E       I                                                                     I
Q       I                                                    1                I
U       I                                                    1                I
E     400 +                                                    1               +
N       I                                                    1                I
C       I                                                    1                I
Y       I                                                    1                I
    200 +                   1                                  1               +
        I                 0                                  1                I
        I                 0                                  0                I
        I                 0                                  0                I
Predicted ---------+---------+---------+---------+---------+---------+---------+---------+--------
-+----------
  Prob:   0      .1       .2       .3       .4       .5       .6       .7       .8       .9       1
  Group:
000000000000000000000000000000000000000000000000000011111111111111
11111111111111111111111111111111111
```

Predicted Probability is of Membership for 1
The Cut Value is .50
Symbols: 0 - 0
1 - 1
Each Symbol Represents 50 Cases.

Casewise List[a]

a. The casewise plot is not produced because no outliers were found.

```
LOGISTIC REGRESSION VARIABLES fnlgrd
  /METHOD=ENTER techsex
  /CLASSPLOT
  /CASEWISE OUTLIER(2)
  /PRINT=GOODFIT CORR ITER(1) CI(95)
  /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).
```

Logistic Regression

Notes

Output Created		02-Oct-2011 14:22:49
Comments		
Input	Data	C:\Users\Lin\Documents\math 097 fall 2001 with classrooms no names.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	675
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing
Syntax		LOGISTIC REGRESSION VARIABLES fnlgrd /METHOD=ENTER techsex /CLASSPLOT /CASEWISE OUTLIER(2) /PRINT=GOODFIT CORR ITER(1) CI(95) /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).
Resources	Processor Time	00:00:00.031
	Elapsed Time	00:00:00.041

[DataSet1] C:\Users\Lin\Documents\math 097 fall 2001 with classrooms no names.sav

Case Processing Summary

Unweighted Cases[a]		N	Percent
Selected Cases	Included in Analysis	673	99.7
	Missing Cases	2	.3
	Total	675	100.0
Unselected Cases		0	.0
Total		675	100.0

a. If weight is in effect, see classification table for the total number of cases.

Dependent Variable Encoding

Original Value	Internal Value
0	0
1	1

Block 0: Beginning Block

Iteration History[a,b,c]

Iteration		-2 Log likelihood	Coefficients Constant
Step 0	1	855.001	.675
	2	854.888	.702
	3	854.888	.702

a. Constant is included in the model.

b. Initial -2 Log Likelihood: 854.888

c. Estimation terminated at iteration number 3 because parameter estimates changed by less than .001.

Classification Table[a,b]

Observed			Predicted fnlgrd 0	Predicted fnlgrd 1	Percentage Correct
Step 0	fnlgrd	0	0	223	.0
		1	0	450	100.0
	Overall Percentage				66.9

a. Constant is included in the model.

b. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 0	Constant	.702	.082	73.497	1	.000	2.018

Variables not in the Equation

			Score	df	Sig.
Step 0	Variables	Techsex	1.060	1	.303
	Overall Statistics		1.060	1	.303

Block 1: Method = Enter

Iteration History[a,b,c,d]

Iteration		-2 Log likelihood	Coefficients Constant	Coefficients techsex
Step 1	1	853.957	.623	.159
	2	853.820	.644	.182
	3	853.820	.644	.182

a. Method: Enter

b. Constant is included in the model.

c. Initial -2 Log Likelihood: 854.888

Iteration History[a,b,c,d]

Iteration		-2 Log likelihood	Coefficients	
			Constant	techsex
Step 1	1	853.957	.623	.159
	2	853.820	.644	.182
	3	853.820	.644	.182

a. Method: Enter

b. Constant is included in the model.

c. Initial -2 Log Likelihood: 854.888

d. Estimation terminated at iteration number 3 because parameter estimates changed by less than .001.

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	1.068	1	.301
	Block	1.068	1	.301
	Model	1.068	1	.301

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	853.820[a]	.002	.002

a. Estimation terminated at iteration number 3 because parameter estimates changed by less than .001.

Hosmer and Lemeshow Test

Step	Chi-square	Df	Sig.
1	.000	0	.

Contingency Table for Hosmer and Lemeshow Test

		fnlgrd = 0		fnlgrd = 1		Total
		Observed	Expected	Observed	Expected	
Step 1	1	156	156.000	297	297.000	453
	2	67	67.000	153	153.000	220

Classification Table[a]

Observed			Predicted fnlgrd 0	Predicted fnlgrd 1	Percentage Correct
Step 1	fnlgrd	0	0	223	.0
		1	0	450	100.0
	Overall Percentage				66.9

a. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	techsex	.182	.177	1.059	1	.303	1.199
	Constant	.644	.099	42.402	1	.000	1.904

a. Variable(s) entered on step 1: techsex.

Variables in the Equation

		95% C.I.for EXP(B)	
		Lower	Upper
Step 1[a]	techsex	.848	1.696
	Constant		

a. Variable(s) entered on step 1: techsex.

Correlation Matrix

		Constant	techsex
Step 1	Constant	1.000	-.559
	techsex	-.559	1.000

Step number: 1

Observed Groups and Predicted Probabilities

```
    800 +                                                                              +
        I                                                                             I
        I                                                                             I
F       I                                                                             I
R   600 +                                                                              +
E       I                                                                             I
Q       I                                                                             I
U       I                                                     1                       I
E   400 +                                                        1                      +
N       I                                                     1                       I
C       I                                                     1                       I
Y       I                                                     1                       I
    200 +                                                       1   1                   +
        I                                                   0   1                     I
        I                                                   0   1                     I
        I                                                   0   0                     I
Predicted ---------+---------+---------+---------+---------+---------+---------+---------+---------
-+----------
  Prob:   0       .1        .2        .3        .4        .5        .6        .7        .8        .9        1
  Group:
000000000000000000000000000000000000000000000000001111111111111
1111111111111111111111111111111111111
```

Predicted Probability is of Membership for 1
The Cut Value is .50
Symbols: 0 - 0
1 - 1
Each Symbol Represents 50 Cases.

Casewise List[a]

a. The casewise plot is not produced because no outliers were found.

```
LOGISTIC REGRESSION VARIABLES fnlgrd
  /METHOD=ENTER adj097
  /CLASSPLOT
  /CASEWISE OUTLIER(2)
  /PRINT=GOODFIT CORR ITER(1) CI(95)
  /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).
```

Logistic Regression

Notes

Output Created		02-Oct-2011 14:25:11
Comments		
Input	Data	C:\Users\Lin\Documents\math 097 fall 2001 with classrooms no names.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	675
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing
Syntax		LOGISTIC REGRESSION VARIABLES fnlgrd /METHOD=ENTER adj097 /CLASSPLOT /CASEWISE OUTLIER(2) /PRINT=GOODFIT CORR ITER(1) CI(95) /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).
Resources	Processor Time	00:00:00.016
	Elapsed Time	00:00:00.034

[DataSet1] C:\Users\Lin\Documents\math 097 fall 2001 with classrooms no names.sav

Case Processing Summary

Unweighted Cases[a]		N	Percent
Selected Cases	Included in Analysis	673	99.7
	Missing Cases	2	.3
	Total	675	100.0
Unselected Cases		0	.0
Total		675	100.0

a. If weight is in effect, see classification table for the total number of cases.

Dependent Variable Encoding

Original Value	Internal Value
0	0
1	1

Block 0: Beginning Block

Iteration History[a,b,c]

Iteration		-2 Log likelihood	Coefficients Constant
Step 0	1	855.001	.675
	2	854.888	.702
	3	854.888	.702

a. Constant is included in the model.

b. Initial -2 Log Likelihood: 854.888

c. Estimation terminated at iteration number 3 because parameter estimates changed by less than .001.

Classification Table[a,b]

Observed			Predicted		
			fnlgrd		Percentage Correct
			0	1	
Step 0	fnlgrd	0	0	223	.0
		1	0	450	100.0
	Overall Percentage				66.9

a. Constant is included in the model.

b. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 0	Constant	.702	.082	73.497	1	.000	2.018

Variables not in the Equation

			Score	df	Sig.
Step 0	Variables	adj097	1.572	1	.210
	Overall Statistics		1.572	1	.210

Block 1: Method = Enter

Iteration History[a,b,c,d]

Iteration		-2 Log likelihood	Coefficients	
			Constant	adj097
Step 1	1	853.461	.764	-.182
	2	853.315	.804	-.205
	3	853.315	.805	-.206

a. Method: Enter

b. Constant is included in the model.

c. Initial -2 Log Likelihood: 854.888

Iteration History[a,b,c,d]

Iteration		-2 Log likelihood	Coefficients	
			Constant	adj097
Step 1	1	853.461	.764	-.182
	2	853.315	.804	-.205
	3	853.315	.805	-.206

a. Method: Enter

b. Constant is included in the model.

c. Initial -2 Log Likelihood: 854.888

d. Estimation terminated at iteration number 3 because parameter estimates changed by less than .001.

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	1.572	1	.210
	Block	1.572	1	.210
	Model	1.572	1	.210

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	853.315[a]	.002	.003

a. Estimation terminated at iteration number 3 because parameter estimates changed by less than .001.

Hosmer and Lemeshow Test

Step	Chi-square	Df	Sig.
1	.000	0	.

Contingency Table for Hosmer and Lemeshow Test

		fnlgrd = 0		fnlgrd = 1		Total
		Observed	Expected	Observed	Expected	
Step 1	1	117	117.000	213	213.000	330
	2	106	106.000	237	237.000	343

Classification Table[a]

Observed			Predicted		
			fnlgrd		Percentage Correct
			0	1	
Step 1	fnlgrd	0	0	223	.0
		1	0	450	100.0
	Overall Percentage				66.9

a. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	adj097	-.206	.164	1.570	1	.210	.814
	Constant	.805	.117	47.418	1	.000	2.236

a. Variable(s) entered on step 1: adj097.

Variables in the Equation

		95% C.I.for EXP(B)	
		Lower	Upper
Step 1[a]	adj097	.590	1.123
	Constant		

a. Variable(s) entered on step 1: adj097.

Correlation Matrix

		Constant	adj097
Step 1	Constant	1.000	-.712
	adj097	-.712	1.000

Step number: 1

Observed Groups and Predicted Probabilities

```
    400 +                                                                  +
        I                                                                  I
        I                                                 1                I
F       I                                               1   1              I
R   300 +                                                 1   1            +
E       I                                               1   1              I
Q       I                                               1   1              I
U       I                                               1   1              I
E   200 +                                                 1   1            +
N       I                                               1   1              I
C       I                                               1   1              I
Y       I                                               0   1              I
    100 +                                                 0   0            +
        I                                               0   0              I
        I                                               0   0              I
        I                                               0   0              I
Predicted ---------+---------+---------+---------+---------+---------+---------+---------+---------
-+----------
  Prob:   0       .1       .2       .3       .4       .5       .6       .7       .8       .9       1
  Group:
000000000000000000000000000000000000000000000000001111111111111
11111111111111111111111111111111111
```

Predicted Probability is of Membership for 1
The Cut Value is .50
Symbols: 0 - 0
1 - 1
Each Symbol Represents 25 Cases.

Casewise List[a]

a. The casewise plot is not produced because no outliers were found.

```
LOGISTIC REGRESSION VARIABLES fnlgrd
  /METHOD=ENTER mozartuse
  /CLASSPLOT
  /CASEWISE OUTLIER(2)
  /PRINT=GOODFIT CORR ITER(1) CI(95)
  /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).
```

Logistic Regression

Notes

Output Created		02-Oct-2011 14:26:23
Comments		
Input	Data	C:\Users\Lin\Documents\math 097 fall 2001 with classrooms no names.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	675
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing
Syntax		LOGISTIC REGRESSION VARIABLES fnlgrd /METHOD=ENTER mozartuse /CLASSPLOT /CASEWISE OUTLIER(2) /PRINT=GOODFIT CORR ITER(1) CI(95) /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).
Resources	Processor Time	00:00:00.031
	Elapsed Time	00:00:00.035

[DataSet1] C:\Users\Lin\Documents\math 097 fall 2001 with classrooms no names.sav

Case Processing Summary

Unweighted Cases[a]		N	Percent
Selected Cases	Included in Analysis	673	99.7
	Missing Cases	2	.3
	Total	675	100.0
Unselected Cases		0	.0
Total		675	100.0

a. If weight is in effect, see classification table for the total number of cases.

Dependent Variable Encoding

Original Value	Internal Value
0	0
1	1

Block 0: Beginning Block

Iteration History[a,b,c]

Iteration		-2 Log likelihood	Coefficients Constant
Step 0	1	855.001	.675
	2	854.888	.702
	3	854.888	.702

a. Constant is included in the model.

b. Initial -2 Log Likelihood: 854.888

c. Estimation terminated at iteration number 3 because parameter estimates changed by less than .001.

Classification Table[a,b]

Observed			Predicted fnlgrd 0	Predicted fnlgrd 1	Percentage Correct
Step 0	fnlgrd	0	0	223	.0
		1	0	450	100.0
	Overall Percentage				66.9

a. Constant is included in the model.

b. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 0	Constant	.702	.082	73.497	1	.000	2.018

Variables not in the Equation

			Score	df	Sig.
Step 0	Variables	Mozartuse	2.877	1	.090
	Overall Statistics		2.877	1	.090

Block 1: Method = Enter

Iteration History[a,b,c,d]

Iteration		-2 Log likelihood	Coefficients Constant	Coefficients mozartuse
Step 1	1	852.249	.718	-.394
	2	852.102	.751	-.424
	3	852.102	.751	-.424

a. Method: Enter

b. Constant is included in the model.

c. Initial -2 Log Likelihood: 854.888

Iteration History[a,b,c,d]

Iteration		-2 Log likelihood	Coefficients	
			Constant	mozartuse
Step 1	1	852.249	.718	-.394
	2	852.102	.751	-.424
	3	852.102	.751	-.424

a. Method: Enter

b. Constant is included in the model.

c. Initial -2 Log Likelihood: 854.888

d. Estimation terminated at iteration number 3 because parameter estimates changed by less than .001.

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	2.785	1	.095
	Block	2.785	1	.095
	Model	2.785	1	.095

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	852.102[a]	.004	.006

a. Estimation terminated at iteration number 3 because parameter estimates changed by less than .001.

Hosmer and Lemeshow Test

Step	Chi-square	Df	Sig.
1	.000	0	.

Contingency Table for Hosmer and Lemeshow Test

		fnlgrd = 0		fnlgrd = 1		Total
		Observed	Expected	Observed	Expected	
Step 1	1	31	31.000	43	43.000	74
	2	192	192.000	407	407.000	599

Classification Table[a]

Observed			Predicted: fnlgrd 0	Predicted: fnlgrd 1	Percentage Correct
Step 1	fnlgrd	0	0	223	.0
		1	0	450	100.0
	Overall Percentage				66.9

a. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	mozartuse	-.424	.251	2.847	1	.092	.654
	Constant	.751	.088	73.640	1	.000	2.120

a. Variable(s) entered on step 1: mozartuse.

Variables in the Equation

		95% C.I.for EXP(B) Lower	95% C.I.for EXP(B) Upper
Step 1[a]	mozartuse	.400	1.071
	Constant		

a. Variable(s) entered on step 1: mozartuse.

Correlation Matrix

		Constant	mozartuse
Step 1	Constant	1.000	-.348
	mozartuse	-.348	1.000

Step number: 1

Observed Groups and Predicted Probabilities

```
    800 +                                                                  +
        I                                                                 I
        I                                                                 I
F       I                                                                 I
R   600 +                                                 1                 +
E       I                                               1                  I
Q       I                                               1                  I
U       I                                               1                  I
E   400 +                                                 1                 +
N       I                                               1                  I
C       I                                               1                  I
Y       I                                               1                  I
    200 +                                                0                 +
        I                                              0                  I
        I                                              0                  I
        I                                         0    0                  I
Predicted ---------+---------+---------+---------+---------+---------+---------+---------+---------
-+----------
  Prob:   0       .1        .2        .3        .4        .5        .6        .7        .8        .9        1
  Group:
000000000000000000000000000000000000000000000000001111111111111
1111111111111111111111111111111111
```

Predicted Probability is of Membership for 1
The Cut Value is .50
Symbols: 0 - 0
1 - 1
Each Symbol Represents 50 Cases.

Casewise List[a]

a. The casewise plot is not produced because no outliers were found.

```
LOGISTIC REGRESSION VARIABLES fnlgrd
  /METHOD=ENTER ALEKSuse
  /CLASSPLOT
  /CASEWISE OUTLIER(2)
  /PRINT=GOODFIT CORR ITER(1) CI(95)
  /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).
```

Logistic Regression

Notes

Output Created		02-Oct-2011 14:30:21
Comments		
Input	Data	C:\Users\Lin\Documents\math 097 fall 2001 with classrooms no names.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	675
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing
Syntax		LOGISTIC REGRESSION VARIABLES fnlgrd /METHOD=ENTER ALEKSuse /CLASSPLOT /CASEWISE OUTLIER(2) /PRINT=GOODFIT CORR ITER(1) CI(95) /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).
Resources	Processor Time	00:00:00.047
	Elapsed Time	00:00:00.036

[DataSet1] C:\Users\Lin\Documents\math 097 fall 2001 with classrooms no names.sav

Case Processing Summary

Unweighted Cases[a]		N	Percent
Selected Cases	Included in Analysis	673	99.7
	Missing Cases	2	.3
	Total	675	100.0
Unselected Cases		0	.0
Total		675	100.0

a. If weight is in effect, see classification table for the total number of cases.

Dependent Variable Encoding

Original Value	Internal Value
0	0
1	1

Block 0: Beginning Block

Iteration History[a,b,c]

Iteration			Coefficients
		-2 Log likelihood	Constant
Step 0	1	855.001	.675
	2	854.888	.702
	3	854.888	.702

a. Constant is included in the model.

b. Initial -2 Log Likelihood: 854.888

c. Estimation terminated at iteration number 3 because parameter estimates changed by less than .001.

Classification Table[a,b]

Observed			Predicted		
			fnlgrd		Percentage Correct
			0	1	
Step 0	fnlgrd	0	0	223	.0
		1	0	450	100.0
	Overall Percentage				66.9

a. Constant is included in the model.

b. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 0	Constant	.702	.082	73.497	1	.000	2.018

Variables not in the Equation

			Score	df	Sig.
Step 0	Variables	ALEKSuse	2.145	1	.143
	Overall Statistics		2.145	1	.143

Block 1: Method = Enter

Iteration History[a,b,c,d]

Iteration		-2 Log likelihood	Coefficients	
			Constant	ALEKSuse
Step 1	1	852.960	.703	-.430
	2	852.825	.734	-.459
	3	852.825	.734	-.460

a. Method: Enter

b. Constant is included in the model.

c. Initial -2 Log Likelihood: 854.888

Iteration History[a,b,c,d]

Iteration		-2 Log likelihood	Coefficients	
			Constant	ALEKSuse
Step 1	1	852.960	.703	-.430
	2	852.825	.734	-.459
	3	852.825	.734	-.460

a. Method: Enter

b. Constant is included in the model.

c. Initial -2 Log Likelihood: 854.888

d. Estimation terminated at iteration number 3 because parameter estimates changed by less than .001.

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	2.063	1	.151
	Block	2.063	1	.151
	Model	2.063	1	.151

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	852.825[a]	.003	.004

a. Estimation terminated at iteration number 3 because parameter estimates changed by less than .001.

Hosmer and Lemeshow Test

Step	Chi-square	Df	Sig.
1	.000	0	.

Contingency Table for Hosmer and Lemeshow Test

		fnlgrd = 0		fnlgrd = 1		Total
		Observed	Expected	Observed	Expected	
Step 1	1	19	19.000	25	25.000	44
	2	204	204.000	425	425.000	629

Classification Table[a]

Observed			Predicted fnlgrd 0	Predicted fnlgrd 1	Percentage Correct
Step 1	fnlgrd	0	0	223	.0
		1	0	450	100.0
	Overall Percentage				66.9

a. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	ALEKSuse	-.460	.316	2.114	1	.146	.632
	Constant	.734	.085	74.255	1	.000	2.083

a. Variable(s) entered on step 1: ALEKSuse.

Variables in the Equation

		95% C.I.for EXP(B) Lower	95% C.I.for EXP(B) Upper
Step 1[a]	ALEKSuse	.340	1.173
	Constant		

a. Variable(s) entered on step 1: ALEKSuse.

Correlation Matrix

		Constant	ALEKSuse
Step 1	Constant	1.000	-.270
	ALEKSuse	-.270	1.000

Step number: 1

Observed Groups and Predicted Probabilities

```
    800 +                                                                  +
        I                                                                  I
        I                                                                  I
F       I                                              1                   I
R   600 +                                                1                 +
E       I                                              1                   I
Q       I                                              1                   I
U       I                                              1                   I
E   400 +                                                1                 +
N       I                                              1                   I
C       I                                              1                   I
Y       I                                              1                   I
    200 +                                               0                  +
        I                                             0                    I
        I                                             0                    I
        I                                        1    0                    I
Predicted ---------+---------+---------+---------+---------+---------+---------+---------+---------
-+----------
  Prob:   0       .1       .2       .3       .4       .5       .6       .7       .8       .9       1
  Group:
00000000000000000000000000000000000000000000000000 1111111111111
1111111111111111111111111111111111111
```

Predicted Probability is of Membership for 1
The Cut Value is .50
Symbols: 0 - 0
1 - 1
Each Symbol Represents 50 Cases.

Casewise List[a]

a. The casewise plot is not produced because no outliers were found.

```
LOGISTIC REGRESSION VARIABLES fnlgrd
  /METHOD=ENTER amisone
  /CLASSPLOT
  /CASEWISE OUTLIER(2)
  /PRINT=GOODFIT CORR ITER(1) CI(95)
  /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).
```

Logistic Regression

Notes

Output Created		02-Oct-2011 14:35:07
Comments		
Input	Data	C:\Users\Lin\Documents\math 097 fall 2001 with classrooms no names.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	675
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing
Syntax		LOGISTIC REGRESSION VARIABLES fnlgrd /METHOD=ENTER amisone /CLASSPLOT /CASEWISE OUTLIER(2) /PRINT=GOODFIT CORR ITER(1) CI(95) /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).
Resources	Processor Time	00:00:00.015
	Elapsed Time	00:00:00.031

[DataSet1] C:\Users\Lin\Documents\math 097 fall 2001 with classrooms no names.sav

Case Processing Summary

Unweighted Cases[a]		N	Percent
Selected Cases	Included in Analysis	652	96.6
	Missing Cases	23	3.4
	Total	675	100.0
Unselected Cases		0	.0
Total		675	100.0

a. If weight is in effect, see classification table for the total number of cases.

Dependent Variable Encoding

Original Value	Internal Value
0	0
1	1

Block 0: Beginning Block

Iteration History[a,b,c]

Iteration		-2 Log likelihood	Coefficients
			Constant
Step 0	1	822.560	.699
	2	822.424	.730
	3	822.424	.730

a. Constant is included in the model.

b. Initial -2 Log Likelihood: 822.424

c. Estimation terminated at iteration number 3 because parameter estimates changed by less than .001.

Classification Table[a,b]

Observed			Predicted		
			fnlgrd		Percentage Correct
			0	1	
Step 0	fnlgrd	0	0	212	.0
		1	0	440	100.0
	Overall Percentage				67.5

a. Constant is included in the model.

b. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 0	Constant	.730	.084	76.280	1	.000	2.075

Variables not in the Equation

			Score	df	Sig.
Step 0	Variables	Amisone	.000	1	.991
	Overall Statistics		.000	1	.991

Block 1: Method = Enter

Iteration History[a,b,c,d]

Iteration		-2 Log likelihood	Coefficients	
			Constant	amisone
Step 1	1	822.560	.699	.002
	2	822.424	.729	.002
	3	822.424	.730	.002

a. Method: Enter

b. Constant is included in the model.

c. Initial -2 Log Likelihood: 822.424

Iteration History[a,b,c,d]

Iteration		-2 Log likelihood	Coefficients	
			Constant	amisone
Step 1	1	822.560	.699	.002
	2	822.424	.729	.002
	3	822.424	.730	.002

a. Method: Enter

b. Constant is included in the model.

c. Initial -2 Log Likelihood: 822.424

d. Estimation terminated at iteration number 3 because parameter estimates changed by less than .001.

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	.000	1	.991
	Block	.000	1	.991
	Model	.000	1	.991

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	822.424[a]	.000	.000

a. Estimation terminated at iteration number 3 because parameter estimates changed by less than .001.

Hosmer and Lemeshow Test

Step	Chi-square	Df	Sig.
1	.000	0	.

Contingency Table for Hosmer and Lemeshow Test

		fnlgrd = 0		fnlgrd = 1		Total
		Observed	Expected	Observed	Expected	
Step 1	1	135	135.000	280	280.000	415
	2	77	77.000	160	160.000	237

Classification Table[a]

Observed			Predicted: fnlgrd 0	Predicted: fnlgrd 1	Percentage Correct
Step 1	fnlgrd	0	0	212	.0
		1	0	440	100.0
	Overall Percentage				67.5

a. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	amisone	.002	.174	.000	1	.991	1.002
	Constant	.730	.105	48.474	1	.000	2.074

a. Variable(s) entered on step 1: amisone.

Variables in the Equation

		95% C.I.for EXP(B)	
		Lower	Upper
Step 1[a]	amisone	.713	1.409
	Constant		

a. Variable(s) entered on step 1: amisone.

Correlation Matrix

		Constant	amisone
Step 1	Constant	1.000	-.603
	amisone	-.603	1.000

Step number: 1

Observed Groups and Predicted Probabilities

```
    800 +                                                              +
        I                                                             I
        I                                                             I
F       I                                        1                     I
R   600 +                                           1                   +
E       I                                        1                     I
Q       I                                        1                     I
U       I                                        1                     I
E   400 +                                           1                   +
N       I                                        1                     I
C       I                                        1                     I
Y       I                                        1                     I
    200 +                                          0                   +
        I                                       0                     I
        I                                       0                     I
        I                                       0                     I
Predicted ---------+---------+---------+---------+---------+---------+---------+---------+--------
-+----------
  Prob:   0       .1       .2       .3       .4       .5       .6       .7       .8       .9       1
  Group:
000000000000000000000000000000000000000000000000000001111111111111
111111111111111111111111111111111
```

Predicted Probability is of Membership for 1
The Cut Value is .50
Symbols: 0 - 0
1 - 1
Each Symbol Represents 50 Cases.

Casewise List[a]

a. The casewise plot is not produced because no outliers were found.

```
LOGISTIC REGRESSION VARIABLES fnlgrd
  /METHOD=ENTER numbmeet
  /CLASSPLOT
  /CASEWISE OUTLIER(2)
  /PRINT=GOODFIT CORR ITER(1) CI(95)
  /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).
```

Logistic Regression

Notes

Output Created		02-Oct-2011 14:37:05
Comments		
Input	Data	C:\Users\Lin\Documents\math 097 fall 2001 with classrooms no names.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	675
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing
Syntax		LOGISTIC REGRESSION VARIABLES fnlgrd /METHOD=ENTER numbmeet /CLASSPLOT /CASEWISE OUTLIER(2) /PRINT=GOODFIT CORR ITER(1) CI(95) /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).
Resources	Processor Time	00:00:00.031
	Elapsed Time	00:00:00.038

[DataSet1] C:\Users\Lin\Documents\math 097 fall 2001 with classrooms no names.sav

Case Processing Summary

Unweighted Cases[a]		N	Percent
Selected Cases	Included in Analysis	652	96.6
	Missing Cases	23	3.4
	Total	675	100.0
Unselected Cases		0	.0
Total		675	100.0

a. If weight is in effect, see classification table for the total number of cases.

Dependent Variable Encoding

Original Value	Internal Value
0	0
1	1

Block 0: Beginning Block

Iteration History[a,b,c]

Iteration		-2 Log likelihood	Coefficients Constant
Step 0	1	822.560	.699
	2	822.424	.730
	3	822.424	.730

a. Constant is included in the model.

b. Initial -2 Log Likelihood: 822.424

c. Estimation terminated at iteration number 3 because parameter estimates changed by less than .001.

Classification Table[a,b]

Observed			Predicted: fnlgrd 0	Predicted: fnlgrd 1	Percentage Correct
Step 0	fnlgrd	0	0	212	.0
		1	0	440	100.0
	Overall Percentage				67.5

a. Constant is included in the model.

b. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 0	Constant	.730	.084	76.280	1	.000	2.075

Variables not in the Equation

			Score	df	Sig.
Step 0	Variables	numbmeet	.891	1	.345
	Overall Statistics		.891	1	.345

Block 1: Method = Enter

Iteration History[a,b,c,d]

Iteration		-2 Log likelihood	Coefficients: Constant	Coefficients: numbmeet
Step 1	1	821.688	.523	.055
	2	821.530	.530	.063
	3	821.530	.530	.063

a. Method: Enter

b. Constant is included in the model.

c. Initial -2 Log Likelihood: 822.424

Iteration History[a,b,c,d]

Iteration		-2 Log likelihood	Coefficients	
			Constant	numbmeet
Step 1	1	821.688	.523	.055
	2	821.530	.530	.063
	3	821.530	.530	.063

a. Method: Enter

b. Constant is included in the model.

c. Initial -2 Log Likelihood: 822.424

d. Estimation terminated at iteration number 3 because parameter estimates changed by less than .001.

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	.894	1	.344
	Block	.894	1	.344
	Model	.894	1	.344

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	821.530[a]	.001	.002

a. Estimation terminated at iteration number 3 because parameter estimates changed by less than .001.

Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	.958	2	.619

Contingency Table for Hosmer and Lemeshow Test

		fnlgrd = 0		fnlgrd = 1		Total
		Observed	Expected	Observed	Expected	
Step 1	1	111	109.351	209	210.649	320
	2	8	8.193	17	16.807	25
	3	46	50.560	115	110.440	161

Contingency Table for Hosmer and Lemeshow Test

		fnlgrd = 0		fnlgrd = 1		Total
		Observed	Expected	Observed	Expected	
Step 1	1	111	109.351	209	210.649	320
	2	8	8.193	17	16.807	25
	3	46	50.560	115	110.440	161
	4	47	43.896	99	102.104	146

Classification Table[a]

Observed			Predicted		
			fnlgrd		Percentage Correct
			0	1	
Step 1	fnlgrd	0	0	212	.0
		1	0	440	100.0
	Overall Percentage				67.5

a. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	numbmeet	.063	.067	.890	1	.345	1.065
	Constant	.530	.227	5.448	1	.020	1.699

a. Variable(s) entered on step 1: numbmeet.

Variables in the Equation

		95% C.I.for EXP(B)	
		Lower	Upper
Step 1[a]	numbmeet	.935	1.213
	Constant		

a. Variable(s) entered on step 1: numbmeet.

Correlation Matrix

		Constant	numbmeet
Step 1	Constant	1.000	-.930
	numbmeet	-.930	1.000

Step number: 1
Observed Groups and Predicted Probabilities

```
    320 +                                                 1                +
        I                                                1                I
        I                                                1                I
F       I                                                1                I
R   240 +                                                 1                +
E       I                                                1                I
Q       I                                                1                I
U       I                                                1                I
E   160 +                                                 1  1             +
N       I                                                1  11            I
C       I                                                0  11            I
Y       I                                                0  11            I
     80 +                                                 0  11            +
        I                                                0  11            I
        I                                                0  00            I
        I                                                0 100            I
Predicted ---------+---------+---------+---------+---------+---------+---------+---------+--------
-+----------
  Prob:   0      .1       .2       .3       .4       .5       .6       .7       .8       .9       1
  Group:
000000000000000000000000000000000000000000000000001111111111111
1111111111111111111111111111111111111
```

Predicted Probability is of Membership for 1
The Cut Value is .50
Symbols: 0 - 0
1 - 1
Each Symbol Represents 20 Cases.

Casewise List[a]

a. The casewise plot is not produced because no outliers were found.

```
LOGISTIC REGRESSION VARIABLES fnlgrd
  /METHOD=ENTER classize
  /CLASSPLOT
  /CASEWISE OUTLIER(2)
  /PRINT=GOODFIT CORR ITER(1) CI(95)
  /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).
```

Logistic Regression

Notes

Output Created		02-Oct-2011 14:38:25
Comments		
Input	Data	C:\Users\Lin\Documents\math 097 fall 2001 with classrooms no names.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	675
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing
Syntax		LOGISTIC REGRESSION VARIABLES fnlgrd /METHOD=ENTER classize /CLASSPLOT /CASEWISE OUTLIER(2) /PRINT=GOODFIT CORR ITER(1) CI(95) /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).
Resources	Processor Time	00:00:00.047
	Elapsed Time	00:00:00.038

[DataSet1] C:\Users\Lin\Documents\math 097 fall 2001 with classrooms no names.sav

Case Processing Summary

Unweighted Cases[a]		N	Percent
Selected Cases	Included in Analysis	673	99.7
	Missing Cases	2	.3
	Total	675	100.0
Unselected Cases		0	.0
Total		675	100.0

a. If weight is in effect, see classification table for the total number of cases.

Dependent Variable Encoding

Original Value	Internal Value
0	0
1	1

Block 0: Beginning Block

Iteration History[a,b,c]

Iteration			Coefficients
		-2 Log likelihood	Constant
Step 0	1	855.001	.675
	2	854.888	.702
	3	854.888	.702

a. Constant is included in the model.

b. Initial -2 Log Likelihood: 854.888

c. Estimation terminated at iteration number 3 because parameter estimates changed by less than .001.

Classification Table[a,b]

Observed			Predicted fnlgrd 0	Predicted fnlgrd 1	Percentage Correct
Step 0	fnlgrd	0	0	223	.0
		1	0	450	100.0
	Overall Percentage				66.9

a. Constant is included in the model.

b. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 0	Constant	.702	.082	73.497	1	.000	2.018

Variables not in the Equation

			Score	df	Sig.
Step 0	Variables	classize	.671	1	.413
	Overall Statistics		.671	1	.413

Block 1: Method = Enter

Iteration History[a,b,c,d]

Iteration		-2 Log likelihood	Coefficients Constant	Coefficients classize
Step 1	1	854.339	.421	.010
	2	854.210	.412	.011
	3	854.210	.412	.011

a. Method: Enter

b. Constant is included in the model.

c. Initial -2 Log Likelihood: 854.888

d. Estimation terminated at iteration number 3 because parameter estimates changed by less than .001.

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	.678	1	.410
	Block	.678	1	.410
	Model	.678	1	.410

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	854.210[a]	.001	.001

a. Estimation terminated at iteration number 3 because parameter estimates changed by less than .001.

Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	13.061	7	.071

Contingency Table for Hosmer and Lemeshow Test

		fnlgrd = 0		fnlgrd = 1		
		Observed	Expected	Observed	Expected	Total
Step 1	1	32	26.690	45	50.310	77
	2	33	28.794	51	55.206	84
	3	12	14.970	32	29.030	44
	4	50	45.923	86	90.077	136
	5	21	31.837	74	63.163	95
	6	18	16.630	32	33.370	50
	7	19	24.737	57	51.263	76
	8	10	10.158	23	22.842	33
	9	28	23.261	50	54.739	78

Classification Table[a]

Observed			Predicted		
			fnlgrd		Percentage Correct
			0	1	
Step 1	fnlgrd	0	0	223	.0
		1	0	450	100.0
	Overall Percentage				66.9

a. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	classize	.011	.014	.670	1	.413	1.011
	Constant	.412	.363	1.288	1	.256	1.510

a. Variable(s) entered on step 1: classize.

Variables in the Equation

		95% C.I.for EXP(B)	
		Lower	Upper
Step 1[a]	classize	.984	1.039
	Constant		

a. Variable(s) entered on step 1: classize.

Correlation Matrix

		Constant	classize
Step 1	Constant	1.000	-.974
	classize	-.974	1.000

Step number: 1

Observed Groups and Predicted Probabilities

```
    400 +                                                                     +
        I                                                                    I
        I                                                                    I
F       I                                        1                           I
R    300 +                                          1                           +
E       I                                        1                           I
Q       I                                        1                           I
U       I                                        1                           I
E    200 +                                         11                          +
N       I                                       11                           I
C       I                                       11                           I
Y       I                                       11                           I
    100 +                                         10                          +
        I                                      00   1                        I
        I                                      00   1                        I
        I                                      00 110                         I
Predicted ---------+---------+---------+---------+---------+---------+---------+---------+--------
-+----------
  Prob:   0        .1        .2        .3        .4        .5        .6        .7        .8        .9        1
  Group:
000000000000000000000000000000000000000000000000011111111111111
11111111111111111111111111111111111
```

Predicted Probability is of Membership for 1
The Cut Value is .50
Symbols: 0 - 0
1 - 1
Each Symbol Represents 25 Cases.

Casewise List[a]

a. The casewise plot is not produced because no outliers were found.

Appendix U: SPSS Multiple Regression Output for Elementary Algebra

```
GET
  FILE='C:\Users\Lin\Documents\math 096 fall 2001 with classrooms.sav'.
DATASET NAME DataSet1 WINDOW=FRONT.
REGRESSION
  /DESCRIPTIVES MEAN STDDEV CORR SIG N
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS BCOV R ANOVA COLLIN TOL CHANGE ZPP
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT fnlexam
  /METHOD=ENTER pretest act
  /SCATTERPLOT=(*ZRESID ,*ZPRED)
  /RESIDUALS DURBIN HISTOGRAM(ZRESID) NORMPROB(ZRESID)
  /CASEWISE PLOT(ZRESID) OUTLIERS(3)
  /SAVE MAHAL COOK.
```

Regression

Assumptions are discussed in bold.

Notes

Output Created		15-Oct-2011 14:09:50
Comments		
Input	Data	C:\Users\Lin\Documents\math 096 fall 2001 with classrooms.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	252
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.

Syntax		REGRESSION /DESCRIPTIVES MEAN STDDEV CORR SIG N /MISSING LISTWISE /STATISTICS COEFF OUTS BCOV R ANOVA COLLIN TOL CHANGE ZPP /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT fnlexam /METHOD=ENTER pretest act /SCATTERPLOT=(*ZRESID ,*ZPRED) /RESIDUALS DURBIN HISTOGRAM(ZRESID) NORMPROB(ZRESID) /CASEWISE PLOT(ZRESID) OUTLIERS(3) /SAVE MAHAL COOK.
Resources	Processor Time	00:00:02.761
	Elapsed Time	00:00:02.861
	Memory Required	2524 bytes
	Additional Memory Required for Residual Plots	904 bytes
Variables Created or Modified	MAH_1	Mahalanobis Distance
	COO_1	Cook's Distance

[DataSet1] C:\Users\Lin\Documents\math 096 fall 2001 with classrooms.sav

Descriptive Statistics

	Mean	Std. Deviation	N
fnlexam	64.37	14.173	129
pretest	40.43	15.996	129
Act	14.58	1.368	129

N = 129 with k = 2 predictors

N > 50 + 8k

Therefore, the sample size is appropriate.

Correlations

		fnlexam	pretest	act
Pearson Correlation	fnlexam	1.000	.334	.238
	pretest	.334	1.000	.201
	act	.238	.201	1.000
Sig. (1-tailed)	fnlexam	.	.000	.003
	pretest	.000	.	.011
	act	.003	.011	.
N	fnlexam	129	129	129
	pretest	129	129	129
	act	129	129	129

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	act, pretest[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: fnlexam

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics		
					R Square Change	F Change	df1
1	.377[a]	.142	.128	13.233	.142	10.415	2

a. Predictors: (Constant), act, pretest

b. Dependent Variable: fnlexam

Model Summary[b]

Model	Change Statistics		Durbin-Watson
	df2	Sig. F Change	
1	126	.000	1.821

b. Dependent Variable: fnlexam

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3647.484	2	1823.742	10.415	.000[a]
	Residual	22062.655	126	175.100		
	Total	25710.140	128			

a. Predictors: (Constant), act, pretest

b. Dependent Variable: fnlexam

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	26.810	12.533		2.139	.034
	pretest	.264	.075	.298	3.539	.001
	act	1.844	.873	.178	2.112	.037

a. Dependent Variable: fnlexam

Coefficients[a]

Model		Correlations			Collinearity Statistics	
		Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)					
	pretest	.334	.301	.292	.960	1.042
	act	.238	.185	.174	.960	1.042

a. Dependent Variable: fnlexam

Tolerance > 0.2 and VIF < 5 indicate that multicollinearity is not a problem.

Coefficient Correlations[a]

Model			act	pretest
1	Correlations	act	1.000	-.201
		pretest	-.201	1.000
	Covariances	act	.762	-.013
		pretest	-.013	.006

Coefficient Correlations[a]

Model			act	pretest
1	Correlations	act	1.000	-.201
		pretest	-.201	1.000
	Covariances	act	.762	-.013
		pretest	-.013	.006

a. Dependent Variable: fnlexam

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions		
				(Constant)	pretest	act
1	1	2.906	1.000	.00	.01	.00
	2	.089	5.706	.02	.98	.01
	3	.004	25.988	.98	.01	.99

a. Dependent Variable: fnlexam

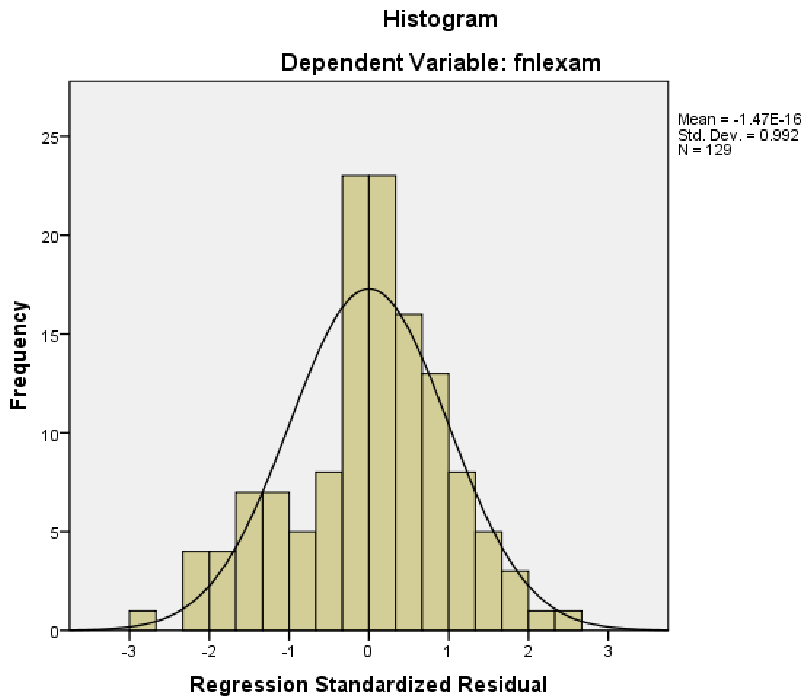
Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	50.53	82.70	64.37	5.338	129
Std. Predicted Value	-2.593	3.433	.000	1.000	129
Standard Error of Predicted Value	1.223	6.057	1.863	.778	129
Adjusted Predicted Value	51.24	80.62	64.40	5.358	129
Residual	-37.710	33.454	.000	13.129	129
Std. Residual	-2.850	2.528	.000	.992	129
Stud. Residual	-2.864	2.543	-.001	1.002	129
Deleted Residual	-38.083	33.853	-.024	13.391	129
Stud. Deleted Residual	-2.950	2.601	-.002	1.010	129
Mahal. Distance	.102	25.822	1.984	3.446	129
Cook's Distance	.000	.094	.007	.012	129
Centered Leverage Value	.001	.202	.016	.027	129

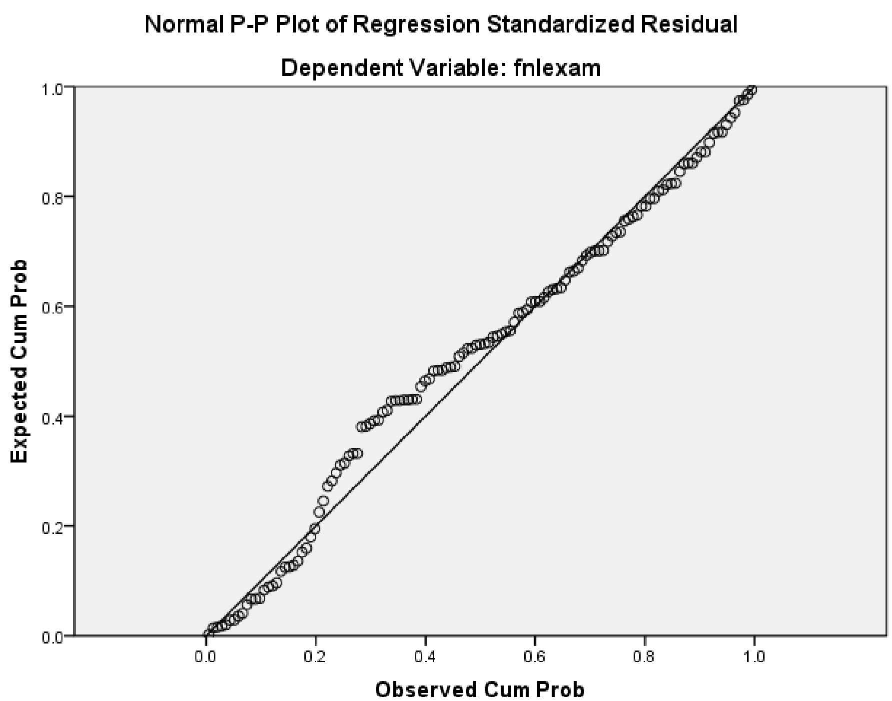
a. Dependent Variable: fnlexam

A maximum Mahalanobis distance 25.822 greater than the critical chi-square value of 13.816 for df = 2 at α = .001 indicates the presence of one or more multivariate outliers, but the maximum Cook's distance of .094 (which is less than one) means outliers should not be a concern.

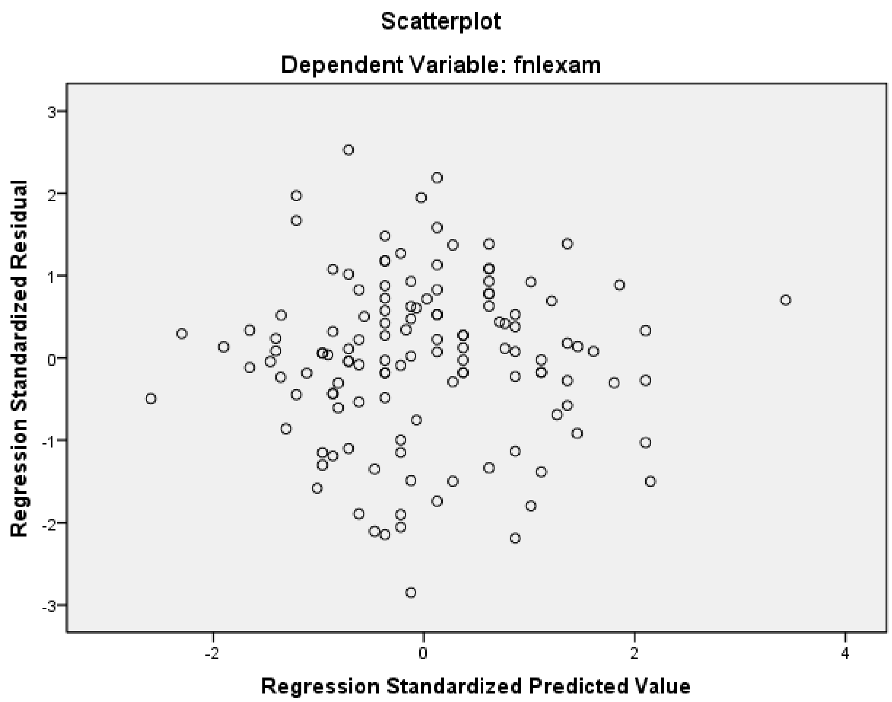
Charts



The points are clustered fairly close along the line indicating that the residuals are normally distributed.



The absence of a pattern in the scatterplot indicates normality, linearity, and homoscedasticity of residuals.




```
REGRESSION
  /DESCRIPTIVES MEAN STDDEV CORR SIG N
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS BCOV R ANOVA COLLIN TOL CHANGE ZPP
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT fnlexam
  /METHOD=ENTER pretest act adj096
  /SCATTERPLOT=(*ZRESID ,*ZPRED)
  /RESIDUALS DURBIN HISTOGRAM(ZRESID) NORMPROB(ZRESID)
  /CASEWISE PLOT(ZRESID) OUTLIERS(3)
  /SAVE MAHAL COOK.
```

Regression

Notes

Output Created		15-Oct-2011 14:13:48
Comments		
Input	Data	C:\Users\Lin\Documents\math 096 fall 2001 with classrooms.sav
	Active Dataset	DataSet1

	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	252
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.
Syntax		REGRESSION /DESCRIPTIVES MEAN STDDEV CORR SIG N /MISSING LISTWISE /STATISTICS COEFF OUTS BCOV R ANOVA COLLIN TOL CHANGE ZPP /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT fnlexam /METHOD=ENTER pretest act adj096 /SCATTERPLOT=(*ZRESID ,*ZPRED) /RESIDUALS DURBIN HISTOGRAM(ZRESID) NORMPROB(ZRESID) /CASEWISE PLOT(ZRESID) OUTLIERS(3) /SAVE MAHAL COOK.
Resources	Processor Time	00:00:01.357
	Elapsed Time	00:00:01.701
	Memory Required	2860 bytes
	Additional Memory Required for Residual Plots	896 bytes
Variables Created or Modified	MAH_2	Mahalanobis Distance
	COO_2	Cook's Distance

[DataSet1] C:\Users\Lin\Documents\math 096 fall 2001 with classrooms.sav

Descriptive Statistics

	Mean	Std. Deviation	N
fnlexam	64.37	14.173	129
pretest	40.43	15.996	129
act	14.58	1.368	129
adj096	.42	.495	129

N = 129 with k = 3 predictors

N > 50 + 8k

Therefore, the sample size is appropriate.

Correlations

		fnlexam	pretest	act	adj096
Pearson Correlation	Fnlexam	1.000	.334	.238	.214
	Pretest	.334	1.000	.201	.130
	Act	.238	.201	1.000	-.155
	adj096	.214	.130	-.155	1.000
Sig. (1-tailed)	Fnlexam	.	.000	.003	.008
	Pretest	.000	.	.011	.071
	Act	.003	.011	.	.040
	adj096	.008	.071	.040	.
N	Fnlexam	129	129	129	129
	Pretest	129	129	129	129
	Act	129	129	129	129
	adj096	129	129	129	129

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	adj096, pretest,	.	Enter

a. All requested variables entered.

b. Dependent Variable: fnlexam

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics		
					R Square Change	F Change	df1
1	.430[a]	.185	.165	12.947	.185	9.457	3

a. Predictors: (Constant), adj096, pretest, act

b. Dependent Variable: fnlexam

Model Summary[b]

Model	Change Statistics		Durbin-Watson
	df2	Sig. F Change	
1	125	.000	1.876

b. Dependent Variable: fnlexam

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4756.040	3	1585.347	9.457	.000[a]
	Residual	20954.099	125	167.633		
	Total	25710.140	128			

a. Predictors: (Constant), adj096, pretest, act

b. Dependent Variable: fnlexam

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	19.474	12.590		1.547	.124
	pretest	.232	.074	.262	3.138	.002
	act	2.260	.869	.218	2.599	.010
	adj096	6.100	2.372	.213	2.572	.011

a. Dependent Variable: fnlexam

Coefficients[a]

Model		Correlations			Collinearity Statistics	
		Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)					
	pretest	.334	.270	.253	.933	1.072
	act	.238	.226	.210	.926	1.079
	adj096	.214	.224	.208	.949	1.054

a. Dependent Variable: fnlexam

Tolerance > 0.2 and VIF < 5 indicate that multicollinearity is not a problem.

Coefficient Correlations[a]

Model			adj096	pretest	act
1	Correlations	adj096	1.000	-.167	.186
		pretest	-.167	1.000	-.226
		act	.186	-.226	1.000
	Covariances	adj096	5.626	-.029	.384
		pretest	-.029	.005	-.015
		act	.384	-.015	.756

a. Dependent Variable: fnlexam

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions			
				(Constant)	pretest	act	adj096
1	1	3.415	1.000	.00	.01	.00	.03
	2	.492	2.634	.00	.01	.00	.93
	3	.089	6.193	.02	.96	.01	.00
	4	.004	28.804	.98	.01	.99	.04

a. Dependent Variable: fnlexam

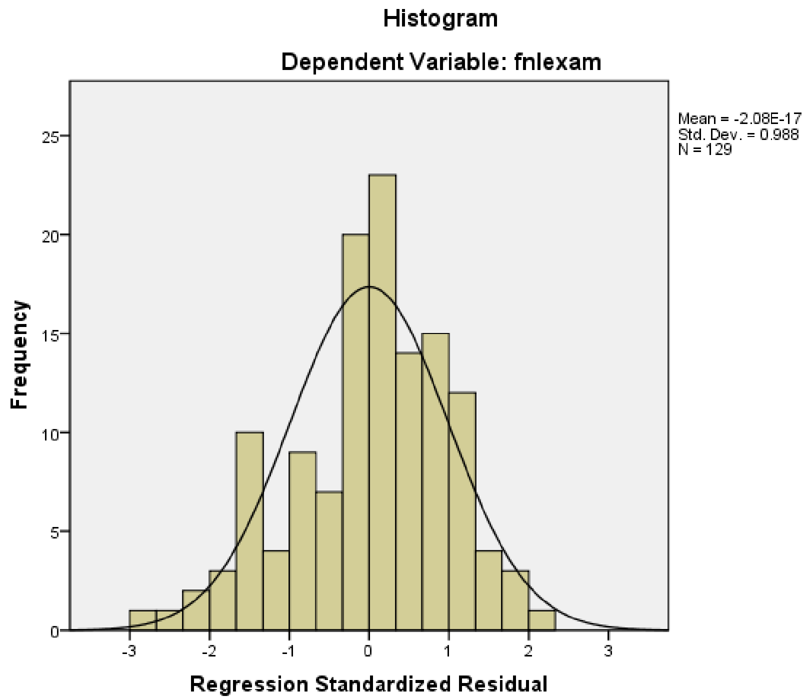
Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	46.72	82.03	64.37	6.096	129
Std. Predicted Value	-2.896	2.897	.000	1.000	129
Standard Error of Predicted Value	1.510	5.931	2.175	.687	129
Adjusted Predicted Value	47.06	79.80	64.40	6.123	129
Residual	-35.503	29.819	.000	12.795	129
Std. Residual	-2.742	2.303	.000	.988	129
Stud. Residual	-2.762	2.331	-.001	1.002	129
Deleted Residual	-36.014	30.542	-.024	13.160	129
Stud. Deleted Residual	-2.839	2.374	-.003	1.010	129
Mahal. Distance	.748	25.865	2.977	3.359	129
Cook's Distance	.000	.081	.007	.011	129
Centered Leverage Value	.006	.202	.023	.026	129

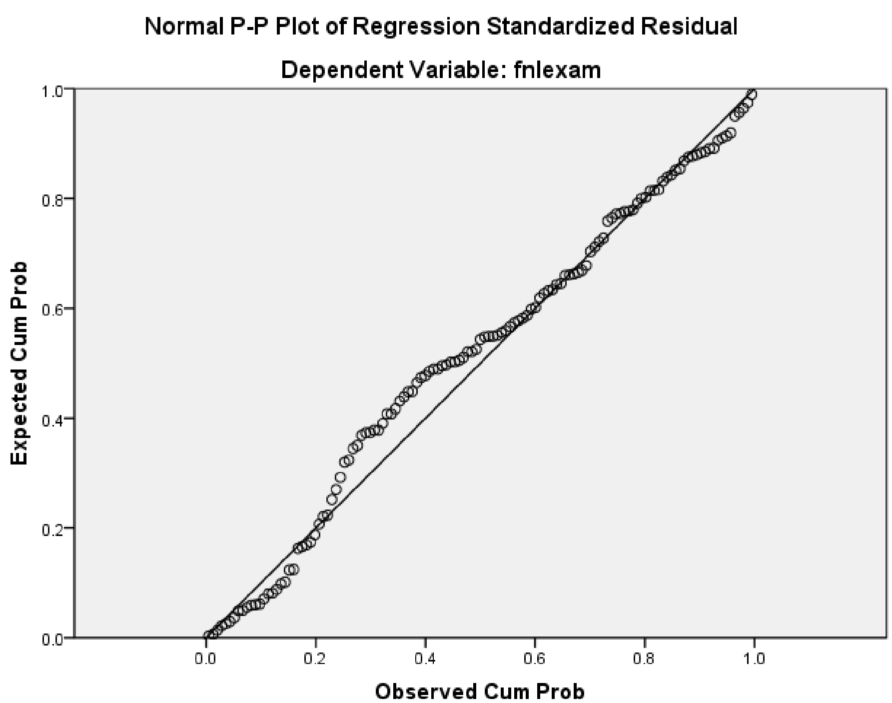
a. Dependent Variable: fnlexam

A maximum Mahalanobis distance 25.865 greater than the critical chi-square value of 16.266 for df = 3 at α = .001 indicates the presence of one or more multivariate outliers, but the maximum Cook's distance of .081 (which is less than one) means outliers should not be a concern.

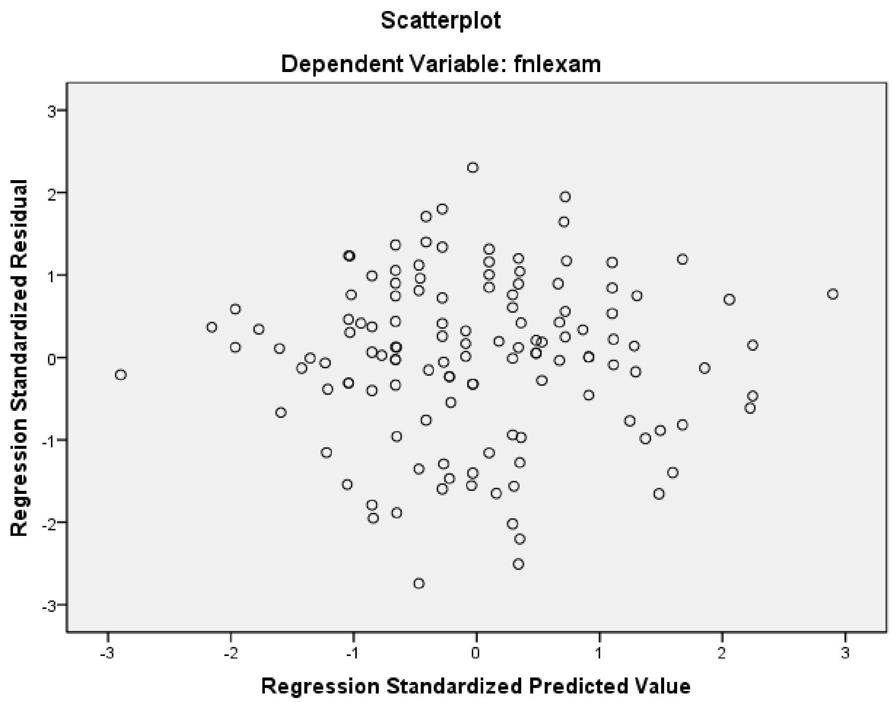
Charts



The points are clustered fairly close along the line indicating that the residuals are normally distributed.



The absence of a pattern in the scatterplot indicates normality, linearity, and homoscedasticity of residuals.




```
REGRESSION
  /DESCRIPTIVES MEAN STDDEV CORR SIG N
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS BCOV R ANOVA COLLIN TOL CHANGE ZPP
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT fnlexam
  /METHOD=ENTER pretest act adj096 comcol
  /SCATTERPLOT=(*ZRESID ,*ZPRED)
  /RESIDUALS DURBIN HISTOGRAM(ZRESID) NORMPROB(ZRESID)
  /CASEWISE PLOT(ZRESID) OUTLIERS(3)
  /SAVE MAHAL COOK.
```

Regression

Notes

Output Created		15-Oct-2011 14:14:51
Comments		
Input	Data	C:\Users\Lin\Documents\math 096 fall 2001 with classrooms.sav
	Active Dataset	DataSet1
	Filter	<none>

	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	252
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.
Syntax		REGRESSION /DESCRIPTIVES MEAN STDDEV CORR SIG N /MISSING LISTWISE /STATISTICS COEFF OUTS BCOV R ANOVA COLLIN TOL CHANGE ZPP /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT fnlexam /METHOD=ENTER pretest act adj096 comcol /SCATTERPLOT=(*ZRESID ,*ZPRED) /RESIDUALS DURBIN HISTOGRAM(ZRESID) NORMPROB(ZRESID) /CASEWISE PLOT(ZRESID) OUTLIERS(3) /SAVE MAHAL COOK.
Resources	Processor Time	00:00:01.435
	Elapsed Time	00:00:01.743
	Memory Required	3228 bytes
	Additional Memory Required for Residual Plots	888 bytes
Variables Created or Modified	MAH_3	Mahalanobis Distance
	COO_3	Cook's Distance

[DataSet1] C:\Users\Lin\Documents\math 096 fall 2001 with classrooms.sav

Descriptive Statistics

	Mean	Std. Deviation	N
fnlexam	64.37	14.173	129
pretest	40.43	15.996	129
act	14.58	1.368	129
adj096	.42	.495	129
comcol	.53	.501	129

N = 129 with k = 4 predictors
N > 50 + 8k
Therefore, the sample size is appropriate.

Correlations

		fnlexam	pretest	act	adj096	comcol
Pearson Correlation	fnlexam	1.000	.334	.238	.214	-.142
	pretest	.334	1.000	.201	.130	-.189
	act	.238	.201	1.000	-.155	-.211
	adj096	.214	.130	-.155	1.000	.017
	comcol	-.142	-.189	-.211	.017	1.000
Sig. (1-tailed)	fnlexam	.	.000	.003	.008	.054
	pretest	.000	.	.011	.071	.016
	act	.003	.011	.	.040	.008
	adj096	.008	.071	.040	.	.425
	comcol	.054	.016	.008	.425	.
N	fnlexam	129	129	129	129	129
	pretest	129	129	129	129	129
	act	129	129	129	129	129
	adj096	129	129	129	129	129
	comcol	129	129	129	129	129

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	comcol, adj096, pretest, act[a]	.	Enter

a. All requested variables entered.

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	comcol, adj096, pretest, act[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: fnlexam

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics		
					R Square Change	F Change	df1
1	.433[a]	.188	.161	12.978	.188	7.162	4

a. Predictors: (Constant), comcol, adj096, pretest, act

b. Dependent Variable: fnlexam

Model Summary[b]

Model	Change Statistics		Durbin-Watson
	df2	Sig. F Change	
1	124	.000	1.878

b. Dependent Variable: fnlexam

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4825.341	4	1206.335	7.162	.000[a]
	Residual	20884.798	124	168.426		
	Total	25710.140	128			

a. Predictors: (Constant), comcol, adj096, pretest, act

b. Dependent Variable: fnlexam

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	22.019	13.229		1.664	.099
	pretest	.225	.075	.254	2.996	.003
	act	2.160	.885	.208	2.440	.016
	adj096	6.114	2.378	.214	2.571	.011
	comcol	-1.520	2.370	-.054	-.641	.522

a. Dependent Variable: fnlexam

Coefficients[a]

Model		Correlations			Collinearity Statistics	
		Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)					
	pretest	.334	.260	.243	.911	1.097
	act	.238	.214	.197	.898	1.114
	adj096	.214	.225	.208	.949	1.054
	comcol	-.142	-.058	-.052	.933	1.072

a. Dependent Variable: fnlexam

Tolerance > 0.2 and VIF < 5 indicate that multicollinearity is not a problem.

Coefficient Correlations[a]

Model			comcol	adj096	pretest	act
1	Correlations	Comcol	1.000	-.009	.152	.175
		adj096	-.009	1.000	-.166	.181
		Pretest	.152	-.166	1.000	-.193
		Act	.175	.181	-.193	1.000
	Covariances	Comcol	5.615	-.053	.027	.368
		adj096	-.053	5.653	-.030	.382
		Pretest	.027	-.030	.006	-.013
		Act	.368	.382	-.013	.784

a. Dependent Variable: fnlexam

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions		
				(Constant)	pretest	act
1	1	3.969	1.000	.00	.01	.00
	2	.534	2.727	.00	.00	.00
	3	.413	3.100	.00	.05	.00
	4	.080	7.039	.02	.94	.02
	5	.004	31.999	.98	.01	.98

a. Dependent Variable: fnlexam

Collinearity Diagnostics[a]

Model	Dimension	Variance Proportions	
		adj096	comcol
1	1	.02	.02
	2	.72	.23
	3	.22	.58
	4	.00	.11
	5	.04	.06

a. Dependent Variable: fnlexam

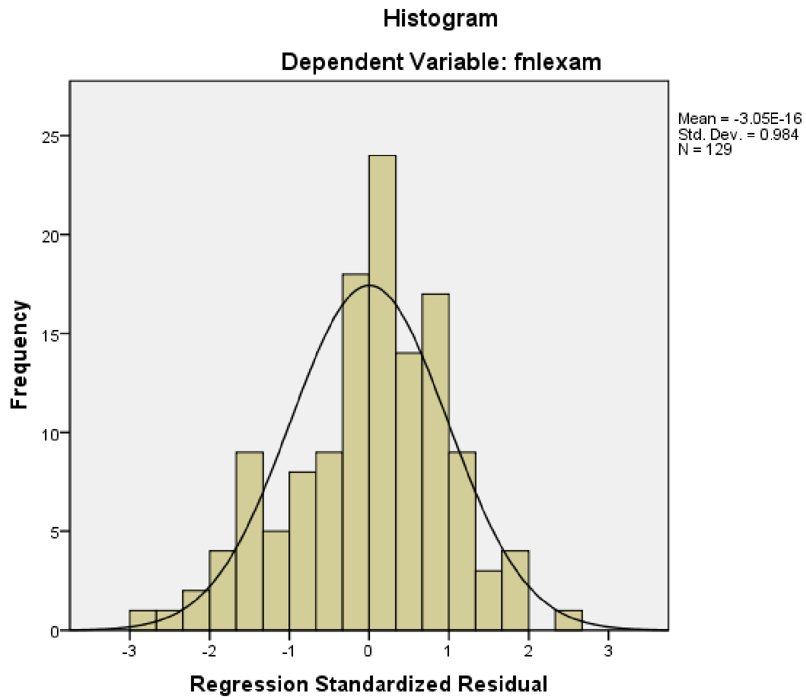
Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	46.60	80.49	64.37	6.140	129
Std. Predicted Value	-2.894	2.625	.000	1.000	129
Standard Error of Predicted Value	1.916	6.053	2.475	.638	129
Adjusted Predicted Value	46.93	78.84	64.40	6.164	129
Residual	-34.777	30.395	.000	12.774	129
Std. Residual	-2.680	2.342	.000	.984	129
Stud. Residual	-2.709	2.376	-.001	1.002	129
Deleted Residual	-35.552	31.286	-.025	13.256	129
Stud. Deleted Residual	-2.782	2.422	-.003	1.011	129
Mahal. Distance	1.798	26.851	3.969	3.441	129
Cook's Distance	.000	.068	.008	.012	129
Centered Leverage Value	.014	.210	.031	.027	129

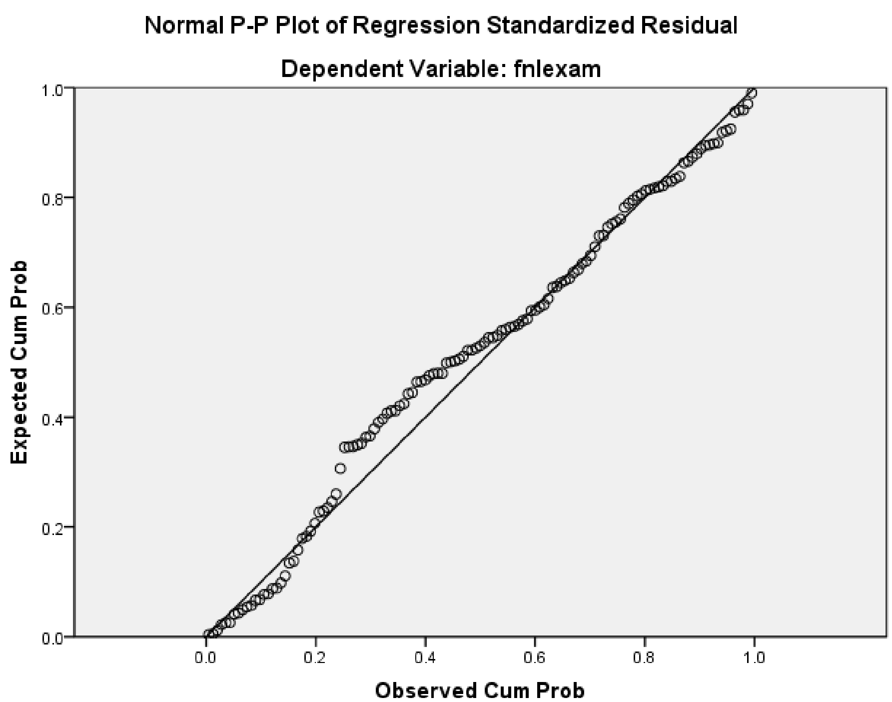
a. Dependent Variable: fnlexam

A maximum Mahalanobis distance 26.851 greater than the critical chi-square value of 18.467 for df = 4 at α = .001 indicates the presence of one or more multivariate outliers, but the maximum Cook's distance of .068 (which is less than one) means outliers should not be a concern.

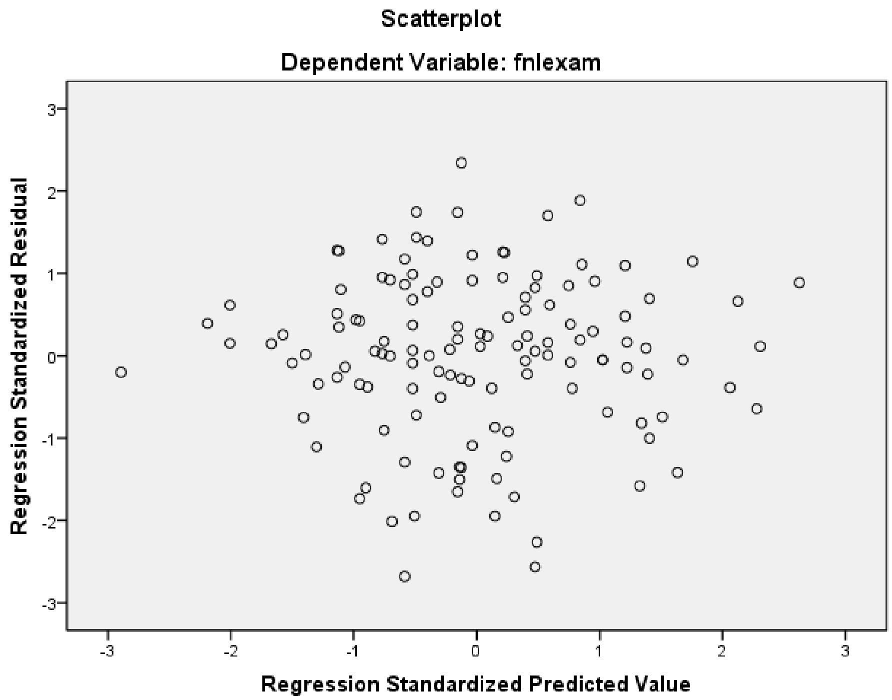
Charts



The points are clustered fairly close along the line indicating that the residuals are normally distributed.



The absence of a pattern in the scatterplot indicates normality, linearity, and homoscedasticity of residuals.




```
REGRESSION
  /DESCRIPTIVES MEAN STDDEV CORR SIG N
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS BCOV R ANOVA COLLIN TOL CHANGE ZPP
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT fnlexam
  /METHOD=ENTER pretest act adj096 numbmeet
  /SCATTERPLOT=(*ZRESID ,*ZPRED)
  /RESIDUALS DURBIN HISTOGRAM(ZRESID) NORMPROB(ZRESID)
  /CASEWISE PLOT(ZRESID) OUTLIERS(3)
  /SAVE MAHAL COOK.
```

Regression

Notes

Output Created		15-Oct-2011 14:16:37
Comments		
Input	Data	C:\Users\Lin\Documents\math 096 fall 2001 with classrooms.sav
	Active Dataset	DataSet1

	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	252
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.
Syntax		REGRESSION /DESCRIPTIVES MEAN STDDEV CORR SIG N /MISSING LISTWISE /STATISTICS COEFF OUTS BCOV R ANOVA COLLIN TOL CHANGE ZPP /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT fnlexam /METHOD=ENTER pretest act adj096 numbmeet /SCATTERPLOT=(*ZRESID ,*ZPRED) /RESIDUALS DURBIN HISTOGRAM(ZRESID) NORMPROB(ZRESID) /CASEWISE PLOT(ZRESID) OUTLIERS(3) /SAVE MAHAL COOK.
Resources	Processor Time	00:00:01.404
	Elapsed Time	00:00:01.746
	Memory Required	3268 bytes
	Additional Memory Required for Residual Plots	888 bytes
Variables Created or Modified	MAH_4	Mahalanobis Distance
	COO_4	Cook's Distance

[DataSet1] C:\Users\Lin\Documents\math 096 fall 2001 with classrooms.sav

Descriptive Statistics

	Mean	Std. Deviation	N
fnlexam	64.37	14.173	129
pretest	40.43	15.996	129
act	14.58	1.368	129
adj096	.42	.495	129
numbmeet	3.61	1.342	129

N = 129 with k = 4 predictors
N > 50 + 8k
Therefore, the sample size is appropriate.

Correlations

		fnlexam	pretest	act	adj096	numbmeet
Pearson Correlation	fnlexam	1.000	.334	.238	.214	-.180
	pretest	.334	1.000	.201	.130	-.074
	act	.238	.201	1.000	-.155	.141
	adj096	.214	.130	-.155	1.000	-.588
	numbmeet	-.180	-.074	.141	-.588	1.000
Sig. (1-tailed)	fnlexam	.	.000	.003	.008	.020
	pretest	.000	.	.011	.071	.202
	Act	.003	.011	.	.040	.056
	adj096	.008	.071	.040	.	.000
	numbmeet	.020	.202	.056	.000	.
N	Fnlexam	129	129	129	129	129
	Pretest	129	129	129	129	129
	Act	129	129	129	129	129
	adj096	129	129	129	129	129
	numbmeet	129	129	129	129	129

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	numbmeet, pretest, act, adj096[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: fnlexam

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics		
					R Square Change	F Change	df1
1	.438[a]	.192	.166	12.946	.192	7.354	4

a. Predictors: (Constant), numbmeet, pretest, act, adj096

b. Dependent Variable: fnlexam

Model Summary[b]

Model	Change Statistics		Durbin-Watson
	df2	Sig. F Change	
1	124	.000	1.891

b. Dependent Variable: fnlexam

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4929.457	4	1232.364	7.354	.000[a]
	Residual	20780.682	124	167.586		
	Total	25710.140	128			

a. Predictors: (Constant), numbmeet, pretest, act, adj096

b. Dependent Variable: fnlexam

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	23.279	13.132		1.773	.079
	pretest	.232	.074	.261	3.127	.002
	act	2.316	.871	.223	2.659	.009
	adj096	4.413	2.894	.154	1.525	.130
	numbmeet	-1.075	1.056	-.102	-1.017	.311

a. Dependent Variable: fnlexam

Coefficients[a]

Model		Correlations Zero-order	Correlations Partial	Correlations Part	Collinearity Statistics Tolerance	Collinearity Statistics VIF
1	(Constant)					
	pretest	.334	.270	.252	.933	1.072
	act	.238	.232	.215	.923	1.084
	adj096	.214	.136	.123	.638	1.569
	numbmeet	-.180	-.091	-.082	.651	1.536

a. Dependent Variable: fnlexam

Tolerance > 0.2 and VIF < 5 indicate that multicollinearity is not a problem.

Coefficient Correlations[a]

Model			numbmeet	pretest	act	adj096
1	Correlations	numbmeet	1.000	.011	-.063	.573
		pretest	.011	1.000	-.226	-.130
		act	-.063	-.226	1.000	.116
		adj096	.573	-.130	.116	1.000
	Covariances	numbmeet	1.116	.001	-.058	1.751
		pretest	.001	.005	-.015	-.028
		act	-.058	-.015	.759	.292
		adj096	1.751	-.028	.292	8.373

a. Dependent Variable: fnlexam

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions		
				(Constant)	pretest	act
1	1	4.236	1.000	.00	.01	.00
	2	.607	2.641	.00	.00	.00
	3	.111	6.182	.00	.83	.00
	4	.042	10.068	.04	.15	.05
	5	.004	32.320	.96	.01	.95

a. Dependent Variable: fnlexam

Collinearity Diagnostics[a]

Model	Dimension	Variance Proportions	
		adj096	numbmeet
1	1	.01	.00
	2	.49	.02
	3	.12	.14
	4	.32	.82
	5	.06	.02

a. Dependent Variable: fnlexam

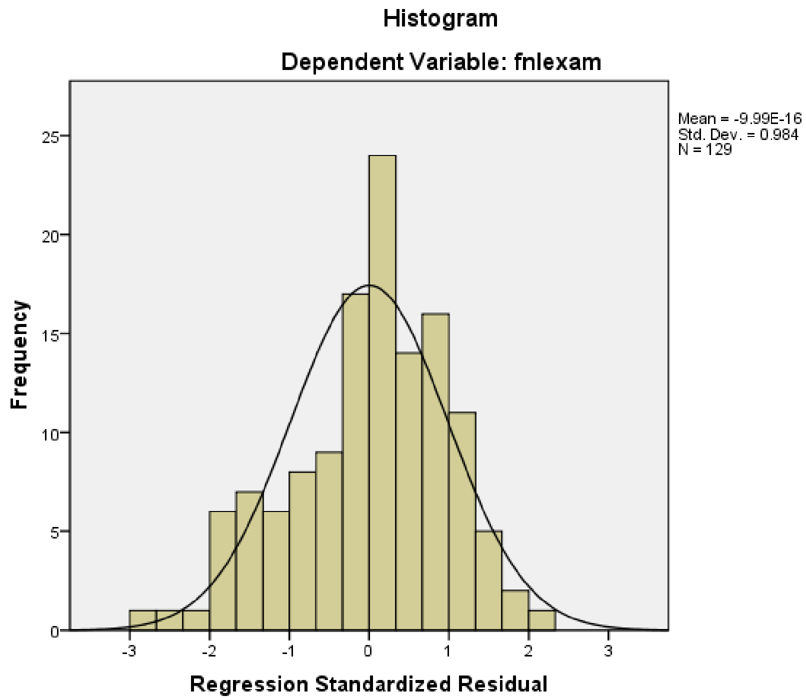
Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	48.92	82.66	64.37	6.206	129
Std. Predicted Value	-2.490	2.947	.000	1.000	129
Standard Error of Predicted Value	1.573	5.965	2.442	.733	129
Adjusted Predicted Value	49.71	80.54	64.41	6.227	129
Residual	-34.746	29.090	.000	12.742	129
Std. Residual	-2.684	2.247	.000	.984	129
Stud. Residual	-2.708	2.278	-.002	1.002	129
Deleted Residual	-35.365	29.890	-.043	13.199	129
Stud. Deleted Residual	-2.780	2.318	-.003	1.009	129
Mahal. Distance	.898	26.189	3.969	3.606	129
Cook's Distance	.000	.073	.007	.011	129
Centered Leverage Value	.007	.205	.031	.028	129

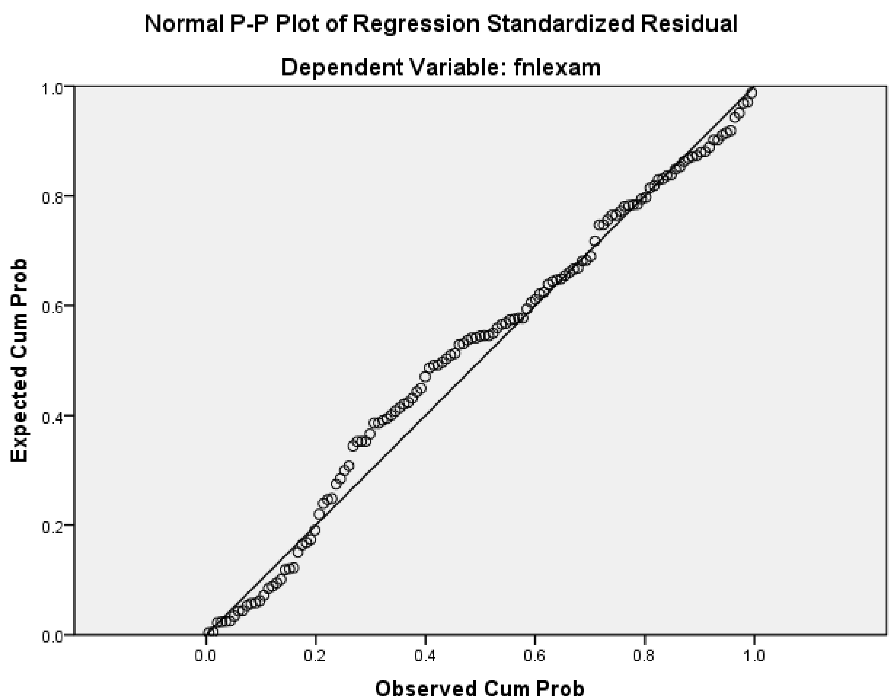
a. Dependent Variable: fnlexam

A maximum Mahalanobis distance 26.189 greater than the critical chi-square value of 18.467 for df = 4 at α = .001 indicates the presence of one or more multivariate outliers, but the maximum Cook's distance of .073 (which is less than one) means outliers should not be a concern.

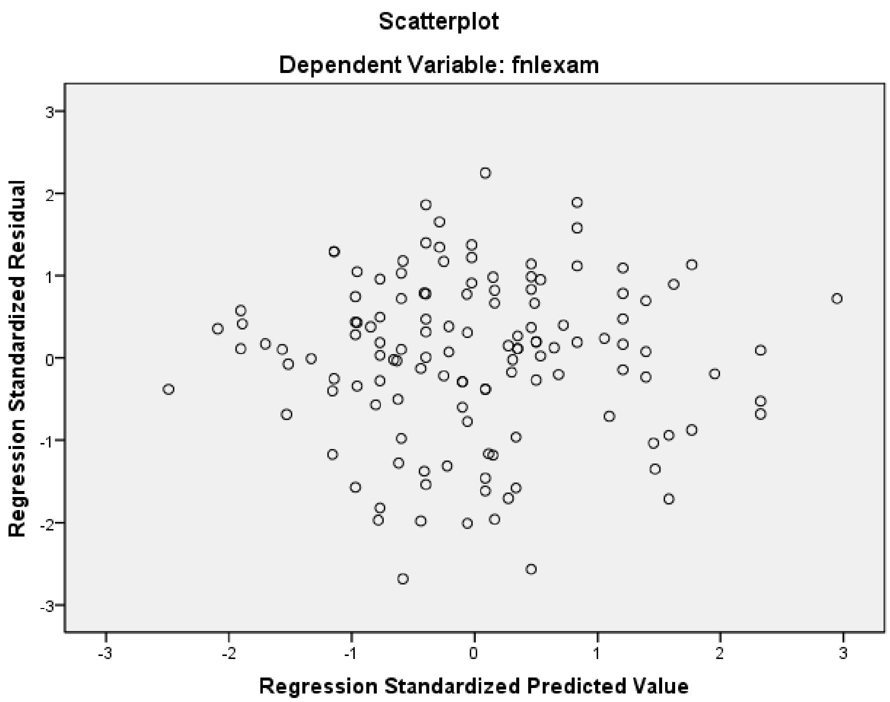
Charts



The points are clustered fairly close along the line indicating that the residuals are normally distributed.



The absence of a pattern in the scatterplot indicates normality, linearity, and homoscedasticity of residuals.




```
REGRESSION

  /DESCRIPTIVES MEAN STDDEV CORR SIG N
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS BCOV R ANOVA COLLIN TOL CHANGE ZPP
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT fnlexam
  /METHOD=ENTER pretest act adj096
  /METHOD=ENTER comcol numbmeet
  /SCATTERPLOT=(*ZRESID ,*ZPRED)
  /RESIDUALS DURBIN HISTOGRAM(ZRESID) NORMPROB(ZRESID)
  /CASEWISE PLOT(ZRESID) OUTLIERS(3)
  /SAVE MAHAL COOK.
```

Regression

Notes

Output Created	15-Oct-2011 14:20:30
Comments	

Input	Data	C:\Users\Lin\Documents\math 096 fall 2001 with classrooms.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	252
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.
Syntax		REGRESSION /DESCRIPTIVES MEAN STDDEV CORR SIG N /MISSING LISTWISE /STATISTICS COEFF OUTS BCOV R ANOVA COLLIN TOL CHANGE ZPP /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT fnlexam /METHOD=ENTER pretest act adj096 /METHOD=ENTER comcol numbmeet /SCATTERPLOT=(*ZRESID ,*ZPRED) /RESIDUALS DURBIN HISTOGRAM(ZRESID) NORMPROB(ZRESID) /CASEWISE PLOT(ZRESID) OUTLIERS(3) /SAVE MAHAL COOK.
Resources	Processor Time	00:00:01.420
	Elapsed Time	00:00:01.709
	Memory Required	3724 bytes
	Additional Memory Required for Residual Plots	880 bytes
Variables Created or Modified	MAH_5	Mahalanobis Distance
	COO_5	Cook's Distance

[DataSet1] C:\Users\Lin\Documents\math 096 fall 2001 with classrooms.sav

Descriptive Statistics

	Mean	Std. Deviation	N
fnlexam	64.37	14.173	129
pretest	40.43	15.996	129
act	14.58	1.368	129
adj096	.42	.495	129
comcol	.53	.501	129
numbmeet	3.61	1.342	129

N = 129 with k = 5 predictors
N > 50 + 8k
Therefore, the sample size is appropriate.

Correlations

		fnlexam	pretest	act	adj096
Pearson Correlation	fnlexam	1.000	.334	.238	.214
	pretest	.334	1.000	.201	.130
	act	.238	.201	1.000	-.155
	adj096	.214	.130	-.155	1.000
	comcol	-.142	-.189	-.211	.017
	numbmeet	-.180	-.074	.141	-.588
Sig. (1-tailed)	fnlexam	.	.000	.003	.008
	pretest	.000	.	.011	.071
	act	.003	.011	.	.040
	adj096	.008	.071	.040	.
	comcol	.054	.016	.008	.425
	numbmeet	.020	.202	.056	.000
N	fnlexam	129	129	129	129
	pretest	129	129	129	129
	act	129	129	129	129
	adj096	129	129	129	129
	comcol	129	129	129	129
	numbmeet	129	129	129	129

Correlations

		comcol	numbmeet
Pearson Correlation	fnlexam	-.142	-.180
	pretest	-.189	-.074
	act	-.211	.141
	adj096	.017	-.588
	comcol	1.000	.027
	numbmeet	.027	1.000
Sig. (1-tailed)	fnlexam	.054	.020
	pretest	.016	.202
	act	.008	.056
	adj096	.425	.000
	comcol	.	.379
	numbmeet	.379	.
N	fnlexam	129	129
	pretest	129	129
	act	129	129
	adj096	129	129
	comcol	129	129
	numbmeet	129	129

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	adj096, pretest, act[a]	.	Enter
2	comcol, numbmeet[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: fnlexam

Model Summary[c]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics		
					R Square Change	F Change	df1
1	.430[a]	.185	.165	12.947	.185	9.457	3
2	.440[b]	.194	.161	12.980	.009	.684	2

a. Predictors: (Constant), adj096, pretest, act

b. Predictors: (Constant), adj096, pretest, act, comcol, numbmeet

c. Dependent Variable: fnlexam

Model Summary[c]

Model	Change Statistics		Durbin-Watson
	df2	Sig. F Change	
1	125	.000	
2	123	.507	1.892

c. Dependent Variable: fnlexam

ANOVA[c]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4756.040	3	1585.347	9.457	.000[a]
	Residual	20954.099	125	167.633		
	Total	25710.140	128			
2	Regression	4986.482	5	997.296	5.919	.000[b]
	Residual	20723.657	123	168.485		
	Total	25710.140	128			

a. Predictors: (Constant), adj096, pretest, act

b. Predictors: (Constant), adj096, pretest, act, comcol, numbmeet

c. Dependent Variable: fnlexam

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	19.474	12.590		1.547	.124
	pretest	.232	.074	.262	3.138	.002
	act	2.260	.869	.218	2.599	.010
	adj096	6.100	2.372	.213	2.572	.011
2	(Constant)	25.461	13.691		1.860	.065
	pretest	.225	.075	.254	2.994	.003
	act	2.223	.888	.215	2.504	.014
	adj096	4.484	2.904	.157	1.544	.125
	comcol	-1.381	2.374	-.049	-.582	.562
	numbmeet	-1.038	1.061	-.098	-.978	.330

a. Dependent Variable: fnlexam

Coefficients[a]

Model		Correlations Zero-order	Correlations Partial	Correlations Part	Collinearity Statistics Tolerance	Collinearity Statistics VIF
1	(Constant)					
	pretest	.334	.270	.253	.933	1.072
	act	.238	.226	.210	.926	1.079
	adj096	.214	.224	.208	.949	1.054
2	(Constant)					
	pretest	.334	.261	.242	.911	1.097
	act	.238	.220	.203	.893	1.120
	adj096	.214	.138	.125	.636	1.571
	comcol	-.142	-.052	-.047	.930	1.076
	numbmeet	-.180	-.088	-.079	.649	1.541

a. Dependent Variable: fnlexam

Tolerance > 0.2 and VIF < 5 indicate that multicollinearity is not a problem.

Excluded Variables[b]

Model		Beta In	t	Sig.	Partial Correlation
1	comcol	-.054[a]	-.641	.522	-.058
	numbmeet	-.102[a]	-1.017	.311	-.091

a. Predictors in the Model: (Constant), adj096, pretest, act

b. Dependent Variable: fnlexam

Excluded Variables[b]

Model		Collinearity Statistics		
		Tolerance	VIF	Minimum Tolerance
1	comcol	.933	1.072	.898
	numbmeet	.651	1.536	.638

b. Dependent Variable: fnlexam

Coefficient Correlations[a]

Model			adj096	pretest	act	comcol	Numbmeet
1	Correlations	adj096	1.000	-.167	.186		
		pretest	-.167	1.000	-.226		
		act	.186	-.226	1.000		
	Covariances	adj096	5.626	-.029	.384		
		pretest	-.029	.005	-.015		
		act	.384	-.015	.756		
2	Correlations	adj096	1.000	-.135	.106	-.042	.574
		pretest	-.135	1.000	-.193	.152	.002
		act	.106	-.193	1.000	.179	-.073
		comcol	-.042	.152	.179	1.000	-.060
		numbmeet	.574	.002	-.073	-.060	1.000
	Covariances	adj096	8.432	-.029	.274	-.289	1.768
		pretest	-.029	.006	-.013	.027	.000
		act	.274	-.013	.788	.377	-.069
		comcol	-.289	.027	.377	5.637	-.151
		numbmeet	1.768	.000	-.069	-.151	1.126

a. Dependent Variable: fnlexam

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions (Constant)	pretest	act	adj096
1	1	3.415	1.000	.00	.01	.00	.03
	2	.492	2.634	.00	.01	.00	.93
	3	.089	6.193	.02	.96	.01	.00
	4	.004	28.804	.98	.01	.99	.04
2	1	4.795	1.000	.00	.00	.00	.01
	2	.614	2.795	.00	.00	.00	.49
	3	.443	3.289	.00	.03	.00	.01
	4	.103	6.840	.00	.79	.00	.15
	5	.041	10.758	.04	.17	.05	.30
	6	.004	35.368	.96	.01	.95	.05

a. Dependent Variable: fnlexam

Collinearity Diagnostics[a]

Model	Dimension	Variance Proportions comcol	numbmeet
1	1		
	2		
	3		
	4		
2	1	.01	.00
	2	.02	.02
	3	.81	.01
	4	.09	.18
	5	.01	.78
	6	.06	.01

a. Dependent Variable: fnlexam

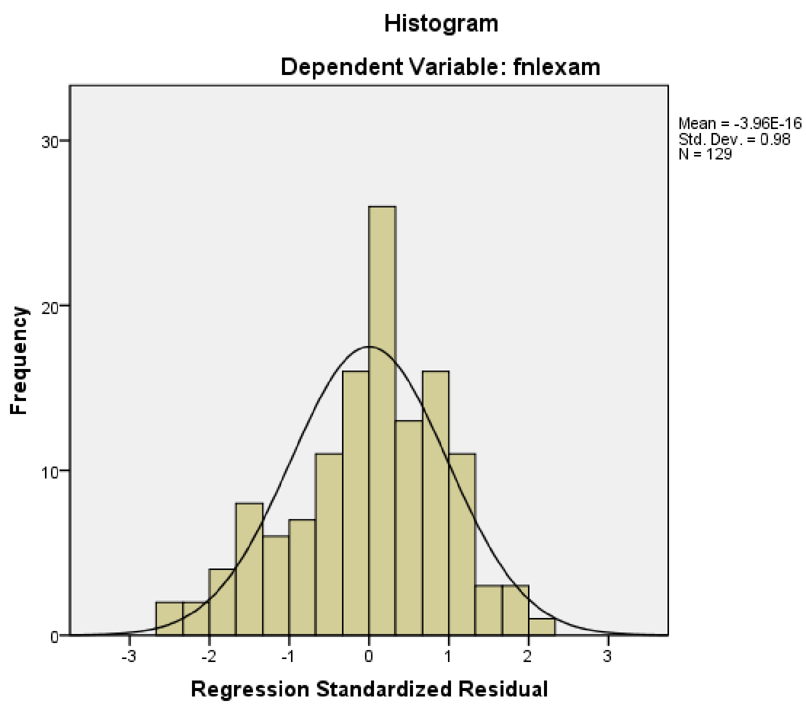
Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	48.74	81.24	64.37	6.242	129
Std. Predicted Value	-2.505	2.702	.000	1.000	129
Standard Error of Predicted Value	1.954	6.102	2.715	.686	129
Adjusted Predicted Value	49.51	79.73	64.42	6.262	129
Residual	-34.112	29.638	.000	12.724	129
Std. Residual	-2.628	2.283	.000	.980	129
Stud. Residual	-2.672	2.321	-.002	1.002	129
Deleted Residual	-35.403	30.619	-.046	13.301	129
Stud. Deleted Residual	-2.741	2.364	-.004	1.010	129
Mahal. Distance	1.909	27.295	4.961	3.684	129
Cook's Distance	.000	.063	.008	.012	129
Centered Leverage Value	.015	.213	.039	.029	129

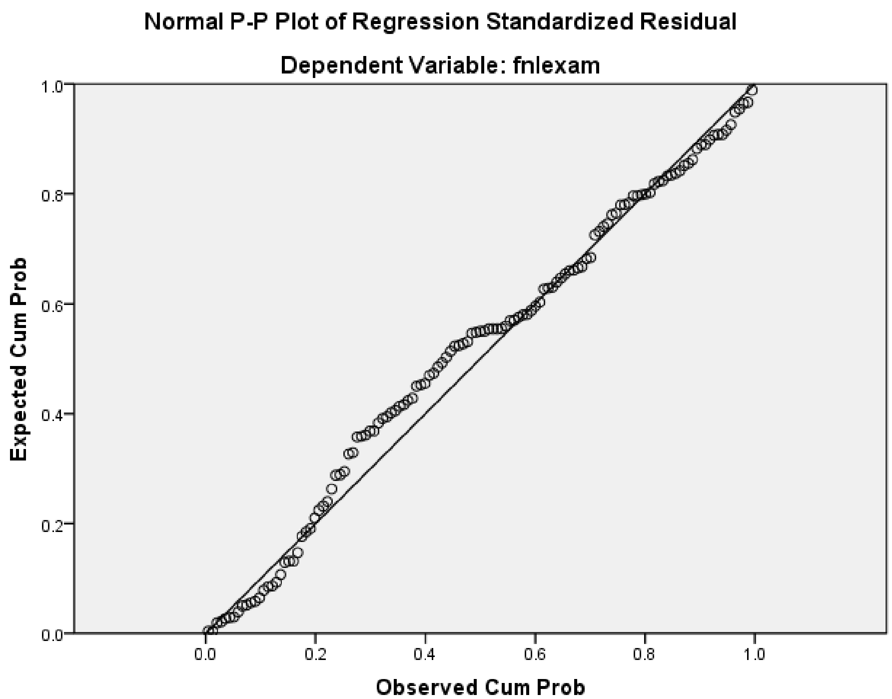
a. Dependent Variable: fnlexam

A maximum Mahalanobis distance 27.295 greater than the critical chi-square value of 20.515 for df = 5 at α = .001 indicates the presence of one or more multivariate outliers, but the maximum Cook's distance of .063 (which is less than one) means outliers should not be a concern.

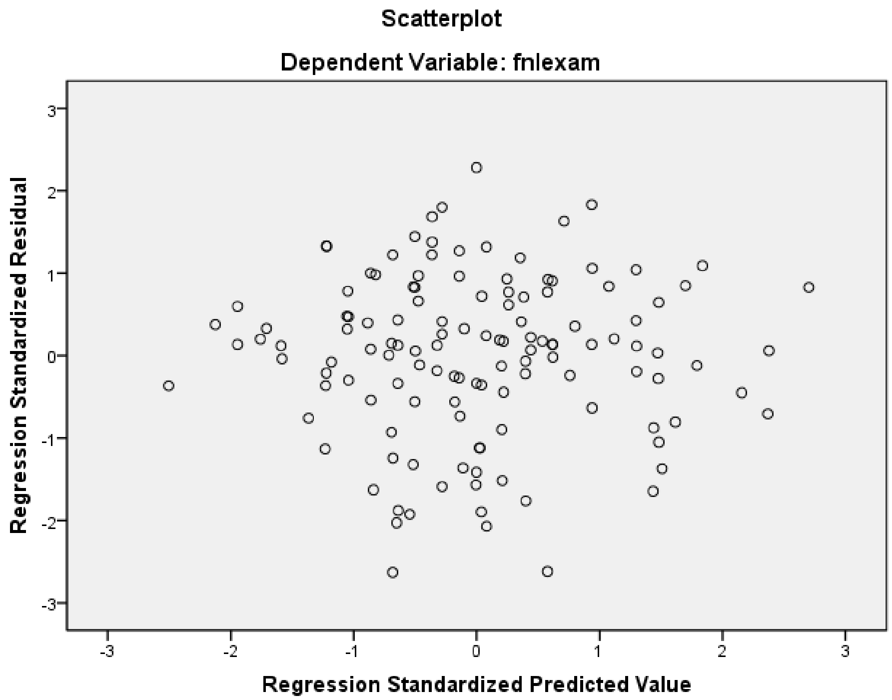
Charts



The points are clustered fairly close along the line indicating that the residuals are normally distributed.



The absence of a pattern in the scatterplot indicates normality, linearity, and homoscedasticity of residuals.



Appendix V: SPSS Multiple Regression Output for Intermediate Algebra

```
GET
  FILE='C:\Users\Lin\Documents\math 097 fall 2001 with classrooms no
names.sav'.
DATASET NAME DataSet1 WINDOW=FRONT.
REGRESSION
  /DESCRIPTIVES MEAN STDDEV CORR SIG N
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS CI(95) BCOV R ANOVA COLLIN TOL CHANGE
ZPP
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT fnlexam
  /METHOD=ENTER pretest act
  /SCATTERPLOT=(*ZRESID ,*ZPRED)
  /RESIDUALS DURBIN HISTOGRAM(ZRESID) NORMPROB(ZRESID)
  /CASEWISE PLOT(ZRESID) OUTLIERS(3)
  /SAVE MAHAL COOK.
```

Regression

Notes

Output Created		20-Oct-2011 14:30:20
Comments		
Input	Data	C:\Users\Lin\Documents\math 097 fall 2001 with classrooms no names.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	675
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.

Syntax		REGRESSION /DESCRIPTIVES MEAN STDDEV CORR SIG N /MISSING LISTWISE /STATISTICS COEFF OUTS CI(95) BCOV R ANOVA COLLIN TOL CHANGE ZPP /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT fnlexam /METHOD=ENTER pretest act /SCATTERPLOT=(*ZRESID ,*ZPRED) /RESIDUALS DURBIN HISTOGRAM(ZRESID) NORMPROB(ZRESID) /CASEWISE PLOT(ZRESID) OUTLIERS(3) /SAVE MAHAL COOK.
Resources	Processor Time	00:00:01.810
	Elapsed Time	00:00:02.857
	Memory Required	2524 bytes
	Additional Memory Required for Residual Plots	904 bytes
Variables Created or Modified	MAH_1	Mahalanobis Distance
	COO_1	Cook's Distance

[DataSet1] C:\Users\Lin\Documents\math 097 fall 2001 with classrooms no names.sav

Descriptive Statistics

	Mean	Std. Deviation	N
fnlexam	68.84	14.532	394
pretest	47.14	14.380	394
act	16.86	1.147	394

N = 394 with k = 2 predictors
N > 50 + 8k
Therefore, the sample size is appropriate.

Correlations

		fnlexam	pretest	act
Pearson Correlation	fnlexam	1.000	.299	.219
	pretest	.299	1.000	.188
	act	.219	.188	1.000
Sig. (1-tailed)	fnlexam	.	.000	.000
	pretest	.000	.	.000
	act	.000	.000	.
N	fnlexam	394	394	394
	pretest	394	394	394
	act	394	394	394

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	act, pretest[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: fnlexam

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics		
					R Square Change	F Change	df1
1	.342[a]	.117	.112	13.690	.117	25.902	2

a. Predictors: (Constant), act, pretest

b. Dependent Variable: fnlexam

Model Summary[b]

Model	Change Statistics		Durbin-Watson
	df2	Sig. F Change	
1	391	.000	1.644

b. Dependent Variable: fnlexam

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	9708.947	2	4854.473	25.902	.000[a]
	Residual	73279.979	391	187.417		
	Total	82988.926	393			

a. Predictors: (Constant), act, pretest

b. Dependent Variable: fnlexam

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	20.067	10.187		1.970	.050
	pretest	.271	.049	.268	5.533	.000
	Act	2.136	.613	.169	3.483	.001

a. Dependent Variable: fnlexam

Coefficients[a]

Model		95.0% Confidence Interval for B		Correlations		
		Lower Bound	Upper Bound	Zero-order	Partial	Part
1	(Constant)	.039	40.095			
	pretest	.174	.367	.299	.269	.263
	Act	.930	3.342	.219	.173	.166

a. Dependent Variable: fnlexam

Coefficients[a]

Model		Collinearity Statistics	
		Tolerance	VIF
1	(Constant)		
	pretest	.965	1.036
	Act	.965	1.036

a. Dependent Variable: fnlexam

Tolerance > 0.2 and VIF < 5 indicate that multicollinearity is not a problem.

Coefficient Correlations[a]

Model			act	pretest
1	Correlations	Act	1.000	-.188
		Pretest	-.188	1.000
	Covariances	Act	.376	-.006
		Pretest	-.006	.002

a. Dependent Variable: fnlexam

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions (Constant)	pretest	act
1	1	2.942	1.000	.00	.01	.00
	2	.056	7.249	.01	.98	.01
	3	.002	35.895	.99	.01	.99

a. Dependent Variable: fnlexam

Casewise Diagnostics[a]

Case Number	Std. Residual	fnlexam	Predicted Value	Residual
192	3.119	100	57.30	42.697

a. Dependent Variable: fnlexam

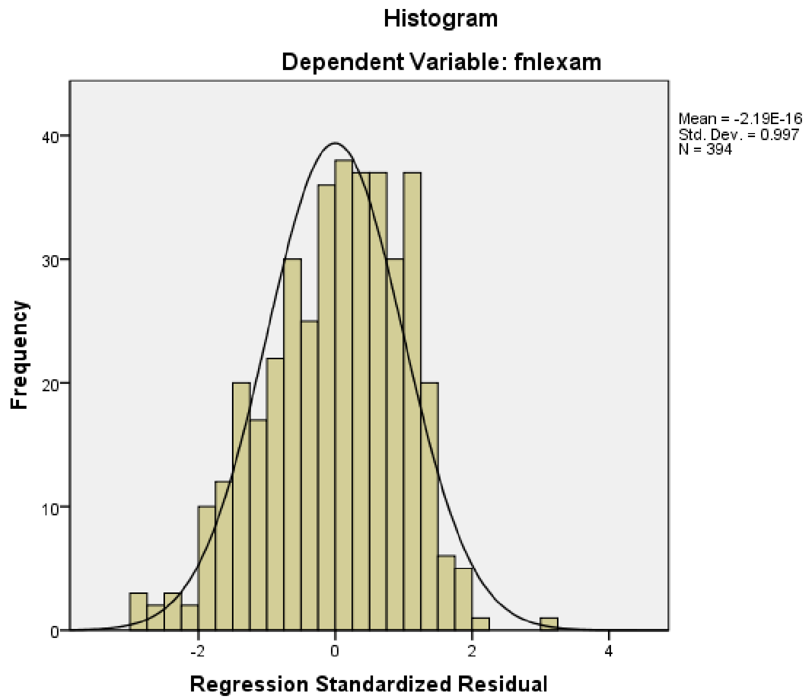
Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	55.38	87.35	68.84	4.970	394
Std. Predicted Value	-2.708	3.724	.000	1.000	394
Standard Error of Predicted Value	.705	3.262	1.137	.368	394
Adjusted Predicted Value	55.27	87.01	68.84	4.970	394
Residual	-38.963	42.697	.000	13.655	394
Std. Residual	-2.846	3.119	.000	.997	394
Stud. Residual	-2.855	3.169	.000	1.002	394
Deleted Residual	-39.218	44.087	.001	13.767	394
Stud. Deleted Residual	-2.882	3.207	.000	1.004	394
Mahal. Distance	.045	21.321	1.995	2.374	394
Cook's Distance	.000	.109	.003	.008	394
Centered Leverage Value	.000	.054	.005	.006	394

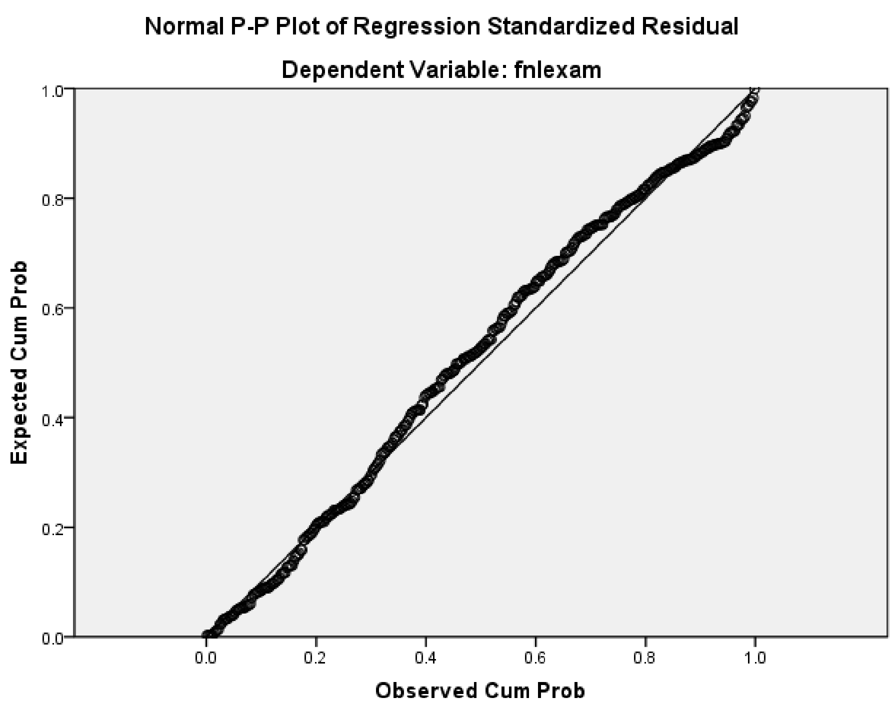
a. Dependent Variable: fnlexam

A maximum Mahalanobis distance 21.321 greater than the critical chi-square value of 13.816 for df = 2 at α = .001 indicates the presence of one or more multivariate outliers, but the maximum Cook's distance of .109 (which is less than one) means outliers should not be a concern.

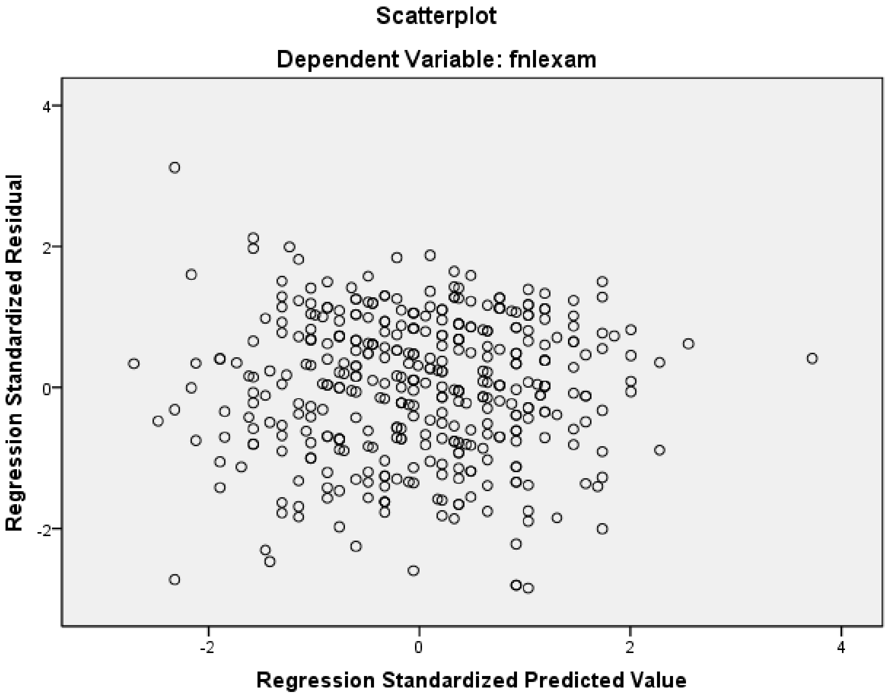
Charts



The points clustered fairly close to the line indicate that the residuals are normally distributed.



The absence of a pattern in the scatterplot indicates normality, linearity, and homoscedasticity of residuals.




```
REGRESSION

  /DESCRIPTIVES MEAN STDDEV CORR SIG N
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS CI(95) BCOV R ANOVA COLLIN TOL CHANGE
ZPP
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT fnlexam
  /METHOD=ENTER pretest act ascgr
  /SCATTERPLOT=(*ZRESID ,*ZPRED)
  /RESIDUALS DURBIN HISTOGRAM(ZRESID) NORMPROB(ZRESID)
  /CASEWISE PLOT(ZRESID) OUTLIERS(3)
  /SAVE MAHAL COOK.
```

Regression

Notes

Output Created		20-Oct-2011 14:37:44
Comments		
Input	Data	C:\Users\Lin\Documents\math 097 fall 2001 with classrooms no names.sav

	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	675
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.
Syntax		REGRESSION /DESCRIPTIVES MEAN STDDEV CORR SIG N /MISSING LISTWISE /STATISTICS COEFF OUTS CI(95) BCOV R ANOVA COLLIN TOL CHANGE ZPP /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT fnlexam /METHOD=ENTER pretest act ascgr /SCATTERPLOT=(*ZRESID ,*ZPRED) /RESIDUALS DURBIN HISTOGRAM(ZRESID) NORMPROB(ZRESID) /CASEWISE PLOT(ZRESID) OUTLIERS(3) /SAVE MAHAL COOK.
Resources	Processor Time	00:00:01.232
	Elapsed Time	00:00:01.932
	Memory Required	2860 bytes
	Additional Memory Required for Residual Plots	896 bytes
Variables Created or Modified	MAH_2	Mahalanobis Distance
	COO_2	Cook's Distance

[DataSet1] C:\Users\Lin\Documents\math 097 fall 2001 with classrooms no names.sav

Descriptive Statistics

	Mean	Std. Deviation	N
fnlexam	68.89	14.550	391
pretest	47.11	14.392	391
act	16.87	1.143	391
ascgr	.87	.340	391

N = 391 with k = 3 predictors
N > 50 + 8k
Therefore, the sample size is appropriate.

Correlations

		fnlexam	pretest	act	Ascgr
Pearson Correlation	fnlexam	1.000	.306	.217	.163
	pretest	.306	1.000	.189	.031
	Act	.217	.189	1.000	.029
	Ascgr	.163	.031	.029	1.000
Sig. (1-tailed)	fnlexam	.	.000	.000	.001
	pretest	.000	.	.000	.269
	Act	.000	.000	.	.286
	Ascgr	.001	.269	.286	.
N	fnlexam	391	391	391	391
	pretest	391	391	391	391
	Act	391	391	391	391
	Ascgr	391	391	391	391

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	ascgr, act, pretest[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: fnlexam

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics		
					R Square Change	F Change	df1
1	.377[a]	.142	.136	13.528	.142	21.389	3

a. Predictors: (Constant), ascgr, act, pretest

b. Dependent Variable: fnlexam

Model Summary[b]

Model	Change Statistics		Durbin-Watson
	df2	Sig. F Change	
1	387	.000	1.688

b. Dependent Variable: fnlexam

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	11742.375	3	3914.125	21.389	.000[a]
	Residual	70818.674	387	182.994		
	Total	82561.049	390			

a. Predictors: (Constant), ascgr, act, pretest

b. Dependent Variable: fnlexam

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	15.716	10.242		1.534	.126
	pretest	.273	.048	.270	5.639	.000
	act	2.059	.610	.162	3.373	.001
	ascgr	6.407	2.016	.150	3.178	.002

a. Dependent Variable: fnlexam

Coefficients[a]

Model		95.0% Confidence Interval for B		Correlations		
		Lower Bound	Upper Bound	Zero-order	Partial	Part
1	(Constant)	-4.421	35.853			
	pretest	.178	.369	.306	.276	.265
	act	.859	3.259	.217	.169	.159
	ascgr	2.443	10.371	.163	.159	.150

a. Dependent Variable: fnlexam

Coefficients[a]

Model		Collinearity Statistics	
		Tolerance	VIF
1	(Constant)		
	pretest	.963	1.038
	act	.964	1.038
	ascgr	.998	1.002

a. Dependent Variable: fnlexam

Tolerance > 0.2 and VIF < 5 indicate that multicollinearity is not a problem.

Coefficient Correlations[a]

Model			ascgr	act	pretest
1	Correlations	ascgr	1.000	-.023	-.026
		act	-.023	1.000	-.189
		pretest	-.026	-.189	1.000
	Covariances	ascgr	4.065	-.029	-.003
		act	-.029	.373	-.006
		pretest	-.003	-.006	.002

a. Dependent Variable: fnlexam

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions (Constant)	pretest	act	ascgr
1	1	3.834	1.000	.00	.01	.00	.01
	2	.112	5.842	.00	.19	.00	.82
	3	.051	8.664	.02	.80	.02	.16
	4	.002	41.206	.98	.01	.98	.00

a. Dependent Variable: fnlexam

Casewise Diagnostics[a]

Case Number	Std. Residual	fnlexam	Predicted Value	Residual
192	3.071	100	58.46	41.543

a. Dependent Variable: fnlexam

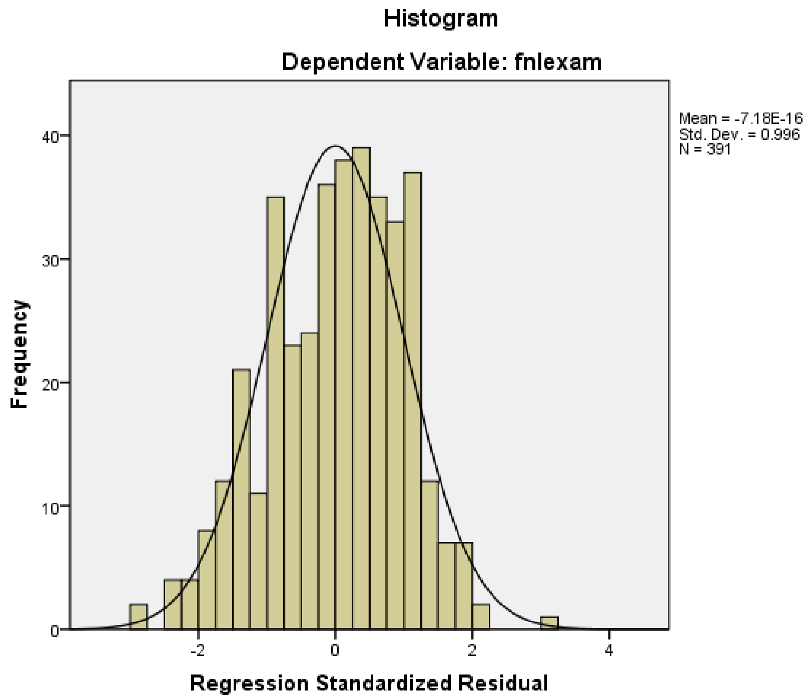
Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	51.36	87.92	68.89	5.487	391
Std. Predicted Value	-3.195	3.469	.000	1.000	391
Standard Error of Predicted Value	.747	3.439	1.284	.473	391
Adjusted Predicted Value	51.45	87.61	68.89	5.483	391
Residual	-39.894	41.543	.000	13.475	391
Std. Residual	-2.949	3.071	.000	.996	391
Stud. Residual	-2.959	3.123	.000	1.002	391
Deleted Residual	-40.171	42.948	.002	13.632	391
Stud. Deleted Residual	-2.990	3.159	.000	1.004	391
Mahal. Distance	.193	24.212	2.992	3.289	391
Cook's Distance	.000	.082	.003	.007	391
Centered Leverage Value	.000	.062	.008	.008	391

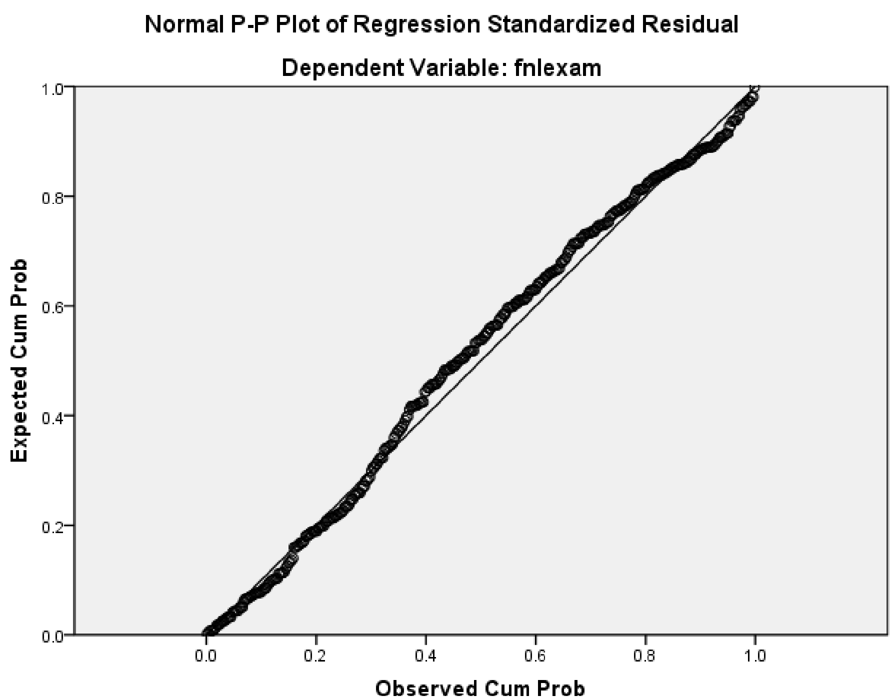
a. Dependent Variable: fnlexam

A maximum Mahalanobis distance 24.212 greater than the critical chi-square value of 16.266 for df = 3 at α = .001 indicates the presence of one or more multivariate outliers, but the maximum Cook's distance of .082 (which is less than one) means outliers should not be a concern.

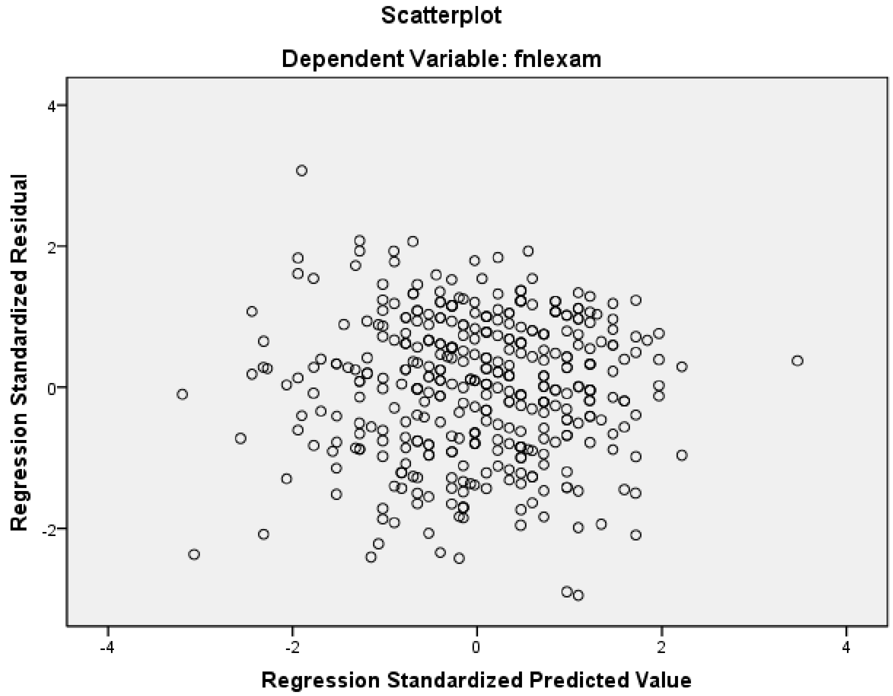
Charts



The points clustering farily close to the line indicate that the residuals are normally distributed.



The absence of a pattern in the scatterplot indicates normality, linearity, and homoscedasticity of residuals.




```
REGRESSION
  /DESCRIPTIVES MEAN STDDEV CORR SIG N
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS CI(95) BCOV R ANOVA COLLIN TOL CHANGE
ZPP
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT fnlexam
  /METHOD=ENTER pretest act ascgr gender
  /SCATTERPLOT=(*ZRESID ,*ZPRED)
  /RESIDUALS DURBIN HISTOGRAM(ZRESID) NORMPROB(ZRESID)
  /CASEWISE PLOT(ZRESID) OUTLIERS(3)
  /SAVE MAHAL COOK.
```

Regression

Notes

Output Created		20-Oct-2011 14:43:43
Comments		
Input	Data	C:\Users\Lin\Documents\math 097 fall 2001 with classrooms no names.sav

	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	675
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.
Syntax		REGRESSION /DESCRIPTIVES MEAN STDDEV CORR SIG N /MISSING LISTWISE /STATISTICS COEFF OUTS CI(95) BCOV R ANOVA COLLIN TOL CHANGE ZPP /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT fnlexam /METHOD=ENTER pretest act ascgr gender /SCATTERPLOT=(*ZRESID ,*ZPRED) /RESIDUALS DURBIN HISTOGRAM(ZRESID) NORMPROB(ZRESID) /CASEWISE PLOT(ZRESID) OUTLIERS(3) /SAVE MAHAL COOK.
Resources	Processor Time	00:00:01.903
	Elapsed Time	00:00:01.889
	Memory Required	3228 bytes
	Additional Memory Required for Residual Plots	888 bytes
Variables Created or Modified	MAH_3	Mahalanobis Distance
	COO_3	Cook's Distance

[DataSet1] C:\Users\Lin\Documents\math 097 fall 2001 with classrooms no names.sav

Descriptive Statistics

	Mean	Std. Deviation	N
fnlexam	68.99	14.508	383
pretest	47.02	14.486	383
act	16.86	1.152	383
ascgr	.87	.340	383
gender	.38	.486	383

N = 383 with k = 4 predictors
N > 50 + 8k
Therefore, the sample size is appropriate.

Correlations

		fnlexam	pretest	act	ascgr	gender
Pearson Correlation	fnlexam	1.000	.318	.222	.169	-.173
	pretest	.318	1.000	.191	.023	-.119
	act	.222	.191	1.000	.034	-.015
	ascgr	.169	.023	.034	1.000	-.104
	gender	-.173	-.119	-.015	-.104	1.000
Sig. (1-tailed)	fnlexam	.	.000	.000	.000	.000
	pretest	.000	.	.000	.327	.010
	act	.000	.000	.	.254	.386
	ascgr	.000	.327	.254	.	.021
	gender	.000	.010	.386	.021	.
N	fnlexam	383	383	383	383	383
	pretest	383	383	383	383	383
	act	383	383	383	383	383
	ascgr	383	383	383	383	383
	gender	383	383	383	383	383

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	gender, act, ascgr, pretest[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: fnlexam

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics		
					R Square Change	F Change	df1
1	.409[a]	.168	.159	13.307	.168	19.029	4

a. Predictors: (Constant), gender, act, ascgr, pretest

b. Dependent Variable: fnlexam

Model Summary[b]

Model	Change Statistics		Durbin-Watson
	df2	Sig. F Change	
1	378	.000	1.697

b. Dependent Variable: fnlexam

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	13477.658	4	3369.415	19.029	.000[a]
	Residual	66930.300	378	177.064		
	Total	80407.958	382			

a. Predictors: (Constant), gender, act, ascgr, pretest

b. Dependent Variable: fnlexam

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	17.532	10.129		1.731	.084
	pretest	.269	.048	.269	5.579	.000
	act	2.068	.602	.164	3.432	.001
	ascgr	6.158	2.013	.144	3.059	.002
	gender	-3.678	1.417	-.123	-2.595	.010

a. Dependent Variable: fnlexam

Coefficients[a]

Model		95.0% Confidence Interval for B		Correlations		
		Lower Bound	Upper Bound	Zero-order	Partial	Part
1	(Constant)	-2.384	37.447			
	pretest	.174	.364	.318	.276	.262
	act	.883	3.252	.222	.174	.161
	ascgr	2.199	10.116	.169	.155	.144
	gender	-6.465	-.891	-.173	-.132	-.122

a. Dependent Variable: fnlexam

Coefficients[a]

Model		Collinearity Statistics	
		Tolerance	VIF
1	(Constant)		
	pretest	.950	1.053
	act	.962	1.039
	ascgr	.988	1.012
	gender	.975	1.025

a. Dependent Variable: fnlexam

Tolerance > 0.2 and VIF < 5 indicate that multicollinearity is not a problem.

Coefficient Correlations[a]

Model			gender	act	ascgr	pretest
1	Correlations	Gender	1.000	-.011	.102	.117
		Act	-.011	1.000	-.031	-.191
		Ascgr	.102	-.031	1.000	-.005
		Pretest	.117	-.191	-.005	1.000
	Covariances	Gender	2.009	-.010	.291	.008
		Act	-.010	.363	-.038	-.006
		Ascgr	.291	-.038	4.053	.000
		Pretest	.008	-.006	.000	.002

a. Dependent Variable: fnlexam

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions		
				(Constant)	pretest	act
1	1	4.254	1.000	.00	.00	.00
	2	.582	2.703	.00	.01	.00
	3	.113	6.142	.00	.21	.00
	4	.048	9.380	.02	.77	.02
	5	.002	43.075	.98	.01	.98

a. Dependent Variable: fnlexam

Collinearity Diagnostics[a]

Model	Dimension	Variance Proportions	
		Ascgr	gender
1	1	.01	.02
	2	.01	.91
	3	.78	.01
	4	.20	.06
	5	.00	.00

a. Dependent Variable: fnlexam

Casewise Diagnostics[a]

Case Number	Std. Residual	fnlexam	Predicted Value	Residual
192	3.007	100	59.99	40.013
582	-3.059	35	75.71	-40.706

a. Dependent Variable: fnlexam

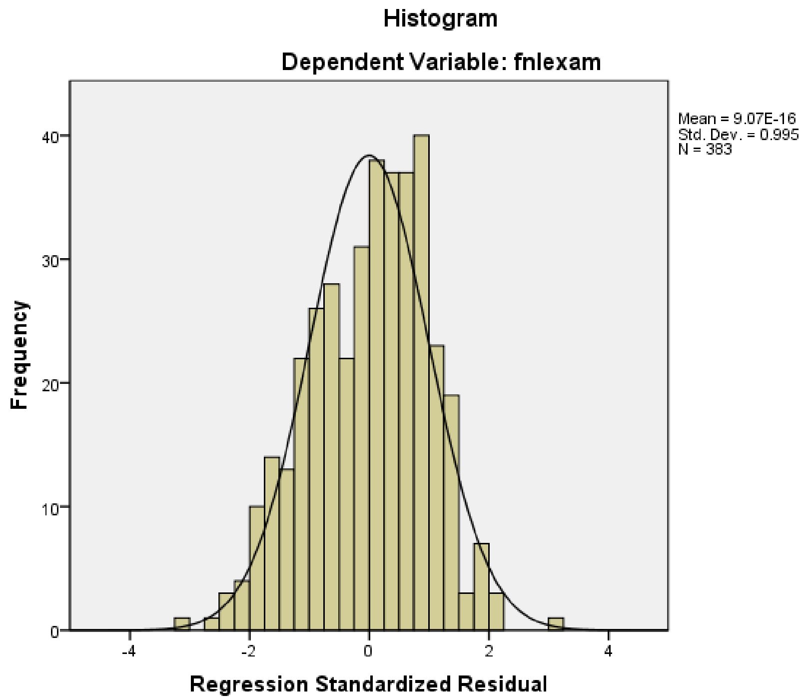
Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	49.43	85.68	68.99	5.940	383
Std. Predicted Value	-3.293	2.810	.000	1.000	383
Standard Error of Predicted Value	.895	3.457	1.457	.436	383
Adjusted Predicted Value	49.39	85.18	68.99	5.937	383
Residual	-40.706	40.013	.000	13.237	383
Std. Residual	-3.059	3.007	.000	.995	383
Stud. Residual	-3.070	3.060	.000	1.002	383
Deleted Residual	-40.998	41.447	.001	13.432	383
Stud. Deleted Residual	-3.105	3.095	.000	1.004	383
Mahal. Distance	.730	24.790	3.990	3.337	383
Cook's Distance	.000	.073	.003	.007	383
Centered Leverage Value	.002	.065	.010	.009	383

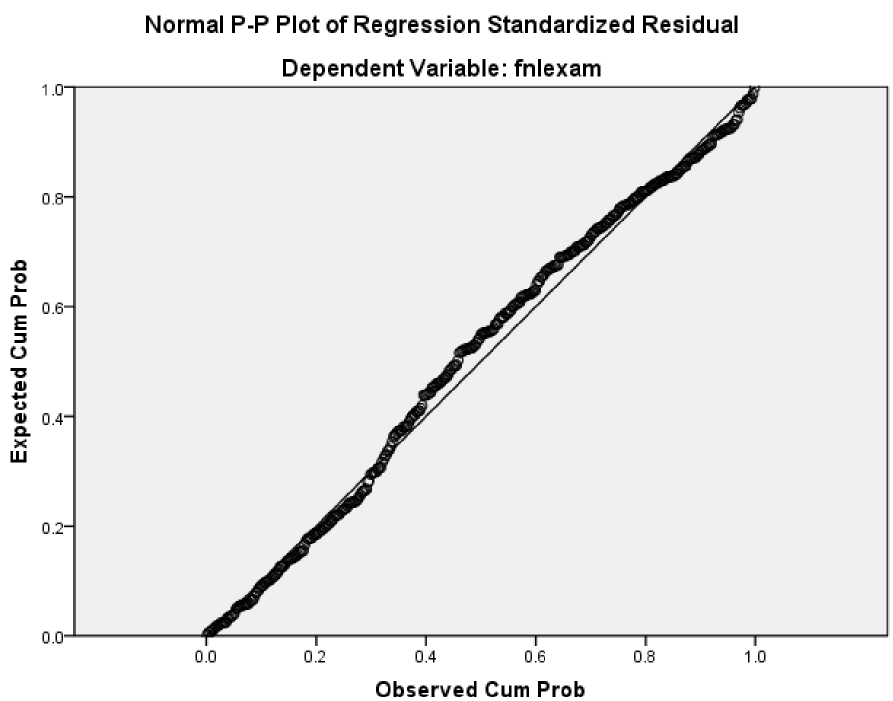
a. Dependent Variable: fnlexam

A maximum Mahalanobis distance 24.790 greater than the critical chi-square value of 18.467 for df = 4 at α = .001 indicates the presence of one or more multivariate outliers, but the maximum Cook's distance of .073 (which is less than one) means outliers should not be a concern.

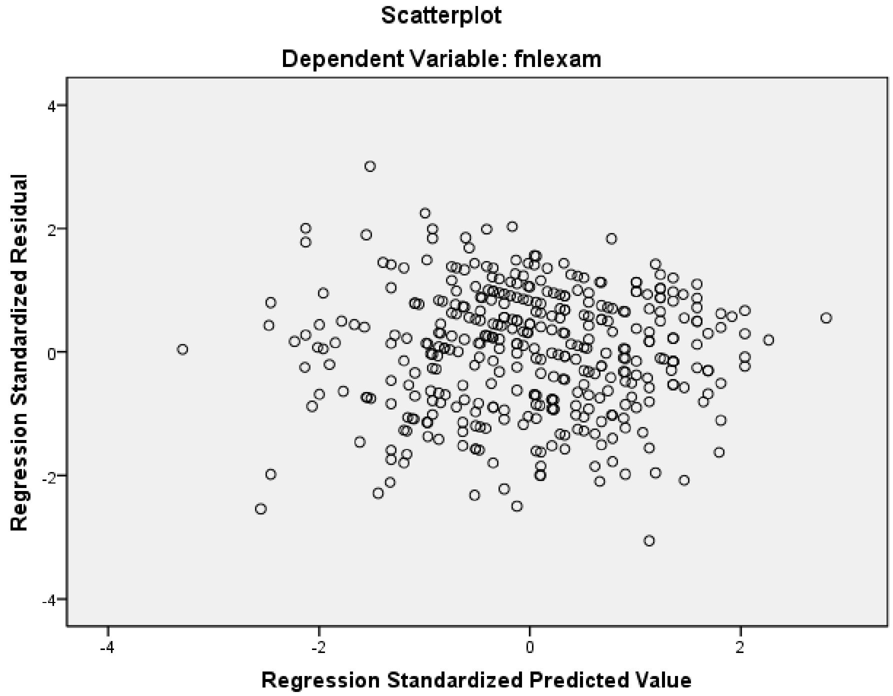
Charts



The points clustered fairly close to the line indicate that the residuals are normally distributed.



The absence of a pattern in the scatterplot indicates normality, linearity, and homoscedasticity of residuals.




```
REGRESSION
  /DESCRIPTIVES MEAN STDDEV CORR SIG N
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS CI(95) BCOV R ANOVA COLLIN TOL CHANGE
ZPP
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT fnlexam
  /METHOD=ENTER pretest act ascgr gender mozartuse
  /SCATTERPLOT=(*ZRESID ,*ZPRED)
  /RESIDUALS DURBIN HISTOGRAM(ZRESID) NORMPROB(ZRESID)
  /CASEWISE PLOT(ZRESID) OUTLIERS(3)
  /SAVE MAHAL COOK.
```

Regression

Notes

Output Created		20-Oct-2011 14:51:37
Comments		
Input	Data	C:\Users\Lin\Documents\math 097 fall 2001 with classrooms no names.sav

	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	675
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.
Syntax		REGRESSION /DESCRIPTIVES MEAN STDDEV CORR SIG N /MISSING LISTWISE /STATISTICS COEFF OUTS CI(95) BCOV R ANOVA COLLIN TOL CHANGE ZPP /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT fnlexam /METHOD=ENTER pretest act ascgr gender mozartuse /SCATTERPLOT=(*ZRESID ,*ZPRED) /RESIDUALS DURBIN HISTOGRAM(ZRESID) NORMPROB(ZRESID) /CASEWISE PLOT(ZRESID) OUTLIERS(3) /SAVE MAHAL COOK.
Resources	Processor Time	00:00:01.279
	Elapsed Time	00:00:01.827
	Memory Required	3628 bytes
	Additional Memory Required for Residual Plots	880 bytes
Variables Created or Modified	MAH_4	Mahalanobis Distance
	COO_4	Cook's Distance

[DataSet1] C:\Users\Lin\Documents\math 097 fall 2001 with classrooms no names.sav

Descriptive Statistics

	Mean	Std. Deviation	N
fnlexam	68.99	14.508	383
pretest	47.02	14.486	383
act	16.86	1.152	383
ascgr	.87	.340	383
gender	.38	.486	383
mozartuse	.12	.322	383

N = 383 with k = 5 predictors
N > 50 + 8k
Therefore, the sample size is appropriate.

Correlations

		fnlexam	pretest	act	ascgr	gender	mozartuse
Pearson Correlation	fnlexam	1.000	.318	.222	.169	-.173	.117
	pretest	.318	1.000	.191	.023	-.119	.016
	act	.222	.191	1.000	.034	-.015	-.020
	ascgr	.169	.023	.034	1.000	-.104	.024
	gender	-.173	-.119	-.015	-.104	1.000	-.036
	mozartuse	.117	.016	-.020	.024	-.036	1.000
Sig. (1-tailed)	fnlexam	.	.000	.000	.000	.000	.011
	pretest	.000	.	.000	.327	.010	.376
	act	.000	.000	.	.254	.386	.346
	ascgr	.000	.327	.254	.	.021	.322
	gender	.000	.010	.386	.021	.	.241
	mozartuse	.011	.376	.346	.322	.241	.
N	fnlexam	383	383	383	383	383	383
	pretest	383	383	383	383	383	383
	act	383	383	383	383	383	383
	ascgr	383	383	383	383	383	383
	gender	383	383	383	383	383	383
	mozartuse	383	383	383	383	383	383

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	mozartuse, pretest, ascgr, gender, act[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: fnlexam

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics		
					R Square Change	F Change	df1
1	.423[a]	.179	.168	13.231	.179	16.469	5

a. Predictors: (Constant), mozartuse, pretest, ascgr, gender, act

b. Dependent Variable: fnlexam

Model Summary[b]

Model	Change Statistics		Durbin-Watson
	df2	Sig. F Change	
1	377	.000	1.721

b. Dependent Variable: fnlexam

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	14414.268	5	2882.854	16.469	.000[a]
	Residual	65993.690	377	175.050		
	Total	80407.958	382			

a. Predictors: (Constant), mozartuse, pretest, ascgr, gender, act

b. Dependent Variable: fnlexam

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	16.521	10.080		1.639	.102
	pretest	.267	.048	.267	5.573	.000
	act	2.101	.599	.167	3.507	.001
	ascgr	6.062	2.002	.142	3.028	.003
	gender	-3.574	1.410	-.120	-2.535	.012
	mozartuse	4.862	2.102	.108	2.313	.021

a. Dependent Variable: fnlexam

Coefficients[a]

Model		95.0% Confidence Interval for B		Correlations		
		Lower Bound	Upper Bound	Zero-order	Partial	Part
1	(Constant)	-3.300	36.342			
	pretest	.173	.362	.318	.276	.260
	act	.923	3.280	.222	.178	.164
	ascgr	2.125	9.999	.169	.154	.141
	gender	-6.347	-.802	-.173	-.129	-.118
	mozartuse	.729	8.995	.117	.118	.108

a. Dependent Variable: fnlexam

Coefficients[a]

Model		Collinearity Statistics	
		Tolerance	VIF
1	(Constant)		
	pretest	.950	1.053
	act	.962	1.040
	ascgr	.988	1.012
	gender	.974	1.026
	mozartuse	.998	1.002

a. Dependent Variable: fnlexam

Tolerance > 0.2 and VIF < 5 indicate that multicollinearity is not a problem.

Coefficient Correlations[a]

Model			mozartuse	pretest	ascgr	gender	Act
1	Correlations	Mozartuse	1.000	-.016	-.021	.032	.024
		Pretest	-.016	1.000	-.004	.117	-.191
		Ascgr	-.021	-.004	1.000	.101	-.032
		Gender	.032	.117	.101	1.000	-.010
		Act	.024	-.191	-.032	-.010	1.000
	Covariances	Mozartuse	4.419	-.002	-.087	.094	.031
		Pretest	-.002	.002	.000	.008	-.005
		Ascgr	-.087	.000	4.009	.286	-.038
		Gender	.094	.008	.286	1.988	-.009
		Act	.031	-.005	-.038	-.009	.359

a. Dependent Variable: fnlexam

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions			
				(Constant)	pretest	act	ascgr
1	1	4.396	1.000	.00	.00	.00	.01
	2	.867	2.251	.00	.00	.00	.00
	3	.573	2.770	.00	.01	.00	.01
	4	.113	6.244	.00	.21	.00	.78
	5	.048	9.537	.02	.77	.02	.20
	6	.002	43.814	.98	.01	.98	.00

a. Dependent Variable: fnlexam

Collinearity Diagnostics[a]

Model	Dimension	Variance Proportions	
		gender	mozartuse
1	1	.01	.01
	2	.04	.94
	3	.87	.05
	4	.01	.00
	5	.06	.00
	6	.00	.00

a. Dependent Variable: fnlexam

Casewise Diagnostics[a]

Case Number	Std. Residual	fnlexam	Predicted Value	Residual
192	3.080	100	59.25	40.745
582	-3.031	35	75.11	-40.106

a. Dependent Variable: fnlexam

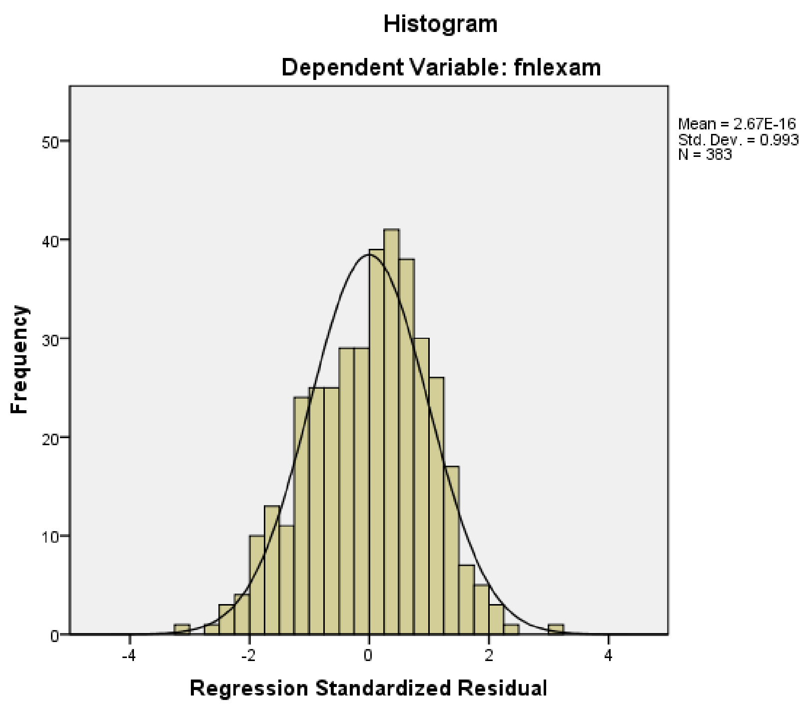
Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	48.85	85.31	68.99	6.143	383
Std. Predicted Value	-3.278	2.657	.000	1.000	383
Standard Error of Predicted Value	.930	3.447	1.580	.496	383
Adjusted Predicted Value	48.77	85.50	68.99	6.138	383
Residual	-40.106	40.745	.000	13.144	383
Std. Residual	-3.031	3.080	.000	.993	383
Stud. Residual	-3.043	3.135	.000	1.002	383
Deleted Residual	-40.409	42.230	.002	13.362	383
Stud. Deleted Residual	-3.077	3.173	.000	1.004	383
Mahal. Distance	.889	24.925	4.987	3.993	383
Cook's Distance	.000	.060	.003	.006	383
Centered Leverage Value	.002	.065	.013	.010	383

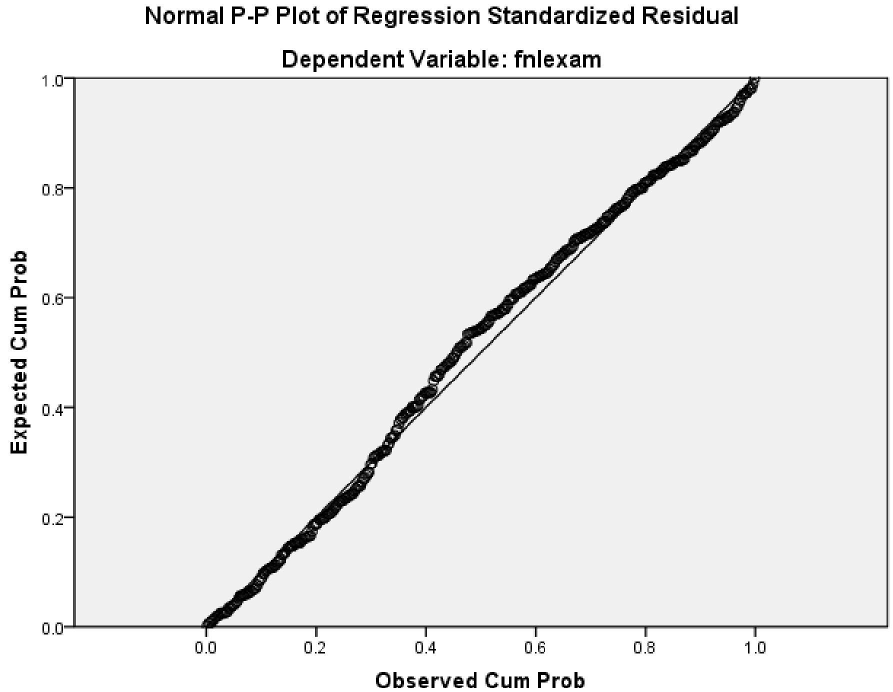
a. Dependent Variable: fnlexam

A maximum Mahalanobis distance 24.925 greater than the critical chi-square value of 20.515 for df = 5 at α = .001 indicates the presence of one or more multivariate outliers, but the maximum Cook's distance of .060 (which is less than one) means outliers should not be a concern.

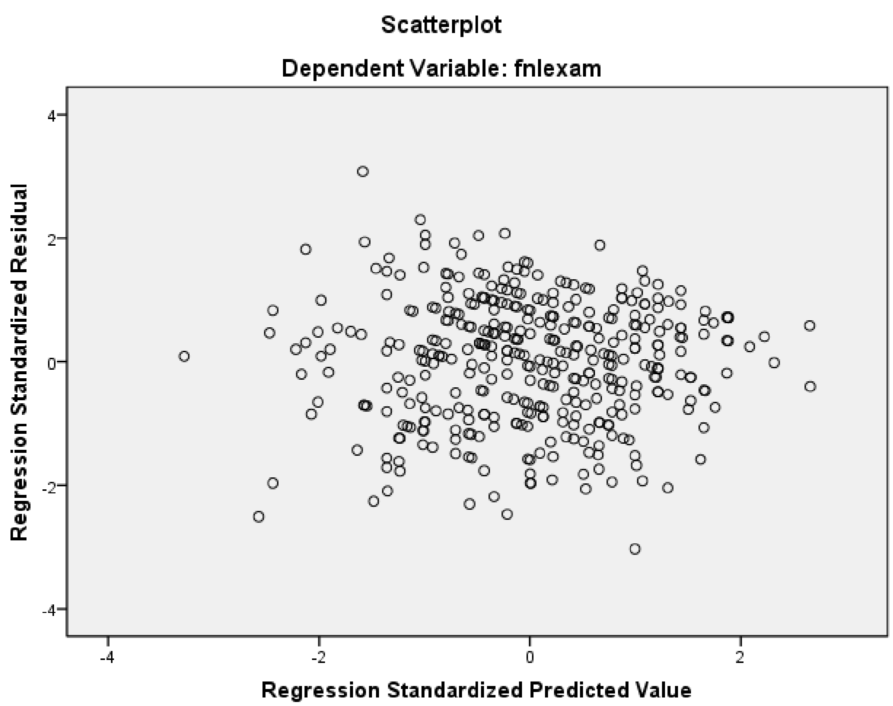
Charts



The points clustering fairly close to the line indicate that the residuals are normally distribute



The absence of a pattern in the scatterplot indicates normality, linearity, and homoscedasticity of residuals.



```
REGRESSION
  /DESCRIPTIVES MEAN STDDEV CORR SIG N
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS CI(95) BCOV R ANOVA COLLIN TOL CHANGE
ZPP
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT fnlexam
  /METHOD=ENTER pretest act ascgr gender mozartuse sat
  /SCATTERPLOT=(*ZRESID ,*ZPRED)
  /RESIDUALS DURBIN HISTOGRAM(ZRESID) NORMPROB(ZRESID)
  /CASEWISE PLOT(ZRESID) OUTLIERS(3)
  /SAVE MAHAL COOK.
```

Regression

Notes

Output Created		20-Oct-2011 14:57:16
Comments		
Input	Data	C:\Users\Lin\Documents\math 097 fall 2001 with classrooms no names.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	675
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.

Syntax		REGRESSION /DESCRIPTIVES MEAN STDDEV CORR SIG N /MISSING LISTWISE /STATISTICS COEFF OUTS CI(95) BCOV R ANOVA COLLIN TOL CHANGE ZPP /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT fnlexam /METHOD=ENTER pretest act ascgr gender mozartuse sat /SCATTERPLOT=(*ZRESID ,*ZPRED) /RESIDUALS DURBIN HISTOGRAM(ZRESID) NORMPROB(ZRESID) /CASEWISE PLOT(ZRESID) OUTLIERS(3) /SAVE MAHAL COOK.
Resources	Processor Time	00:00:01.373
	Elapsed Time	00:00:01.765
	Memory Required	4060 bytes
	Additional Memory Required for Residual Plots	872 bytes
Variables Created or Modified	MAH_5	Mahalanobis Distance
	COO_5	Cook's Distance

[DataSet1] C:\Users\Lin\Documents\math 097 fall 2001 with classrooms no names.sav

Descriptive Statistics

	Mean	Std. Deviation	N
fnlexam	69.93	16.955	27
pretest	50.56	16.428	27
Act	17.07	1.708	27
ascgr	.96	.192	27
gender	.26	.447	27
mozartuse	.11	.320	27
Sat	402.96	54.900	27

N = 27 with k = 6
N is not greater than 50 + 8k.
Therefore, the sample size is not appropriate.

Correlations

		fnlexam	pretest	act	ascgr	gender
Pearson Correlation	Fnlexam	1.000	.699	.622	.235	-.307
	Pretest	.699	1.000	.451	.128	-.335
	Act	.622	.451	1.000	.594	-.127
	Ascgr	.235	.128	.594	1.000	-.331
	Gender	-.307	-.335	-.127	-.331	1.000
	Mozartuse	.306	.317	.055	.069	-.209
	Sat	.492	.538	.449	.229	-.080
Sig. (1-tailed)	Fnlexam	.	.000	.000	.119	.060
	Pretest	.000	.	.009	.262	.044
	Act	.000	.009	.	.001	.264
	Ascgr	.119	.262	.001	.	.046
	Gender	.060	.044	.264	.046	.
	Mozartuse	.060	.054	.393	.366	.148
	Sat	.005	.002	.009	.125	.347
N	Fnlexam	27	27	27	27	27
	Pretest	27	27	27	27	27
	Act	27	27	27	27	27
	Ascgr	27	27	27	27	27
	Gender	27	27	27	27	27
	Mozartuse	27	27	27	27	27

Correlations

		fnlexam	pretest	act	ascgr	gender
Pearson Correlation	Fnlexam	1.000	.699	.622	.235	-.307
	Pretest	.699	1.000	.451	.128	-.335
	Act	.622	.451	1.000	.594	-.127
	Ascgr	.235	.128	.594	1.000	-.331
	Gender	-.307	-.335	-.127	-.331	1.000
	Mozartuse	.306	.317	.055	.069	-.209
	Sat	.492	.538	.449	.229	-.080
Sig. (1-tailed)	Fnlexam	.	.000	.000	.119	.060
	Pretest	.000	.	.009	.262	.044
	Act	.000	.009	.	.001	.264
	Ascgr	.119	.262	.001	.	.046
	Gender	.060	.044	.264	.046	.
	Mozartuse	.060	.054	.393	.366	.148
	Sat	.005	.002	.009	.125	.347
N	Fnlexam	27	27	27	27	27
	Pretest	27	27	27	27	27
	Act	27	27	27	27	27
	Ascgr	27	27	27	27	27
	Gender	27	27	27	27	27
	Mozartuse	27	27	27	27	27
	Sat	27	27	27	27	27

Correlations

		mozartuse	sat
Pearson Correlation	Fnlexam	.306	.492
	Pretest	.317	.538
	Act	.055	.449
	Ascgr	.069	.229
	Gender	-.209	-.080
	Mozartuse	1.000	.199
	Sat	.199	1.000
Sig. (1-tailed)	Fnlexam	.060	.005
	Pretest	.054	.002
	Act	.393	.009
	Ascgr	.366	.125
	Gender	.148	.347
	Mozartuse	.	.159
	Sat	.159	.
N	Fnlexam	27	27
	Pretest	27	27
	Act	27	27
	Ascgr	27	27
	Gender	27	27
	Mozartuse	27	27
	Sat	27	27

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	sat, gender, mozartuse, ascgr, pretest, act[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: fnlexam

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics		
					R Square Change	F Change	df1
1	.806[a]	.649	.544	11.450	.649	6.167	6

a. Predictors: (Constant), sat, gender, mozartuse, ascgr, pretest, act

b. Dependent Variable: fnlexam

Model Summary[b]

Model	Change Statistics		Durbin-Watson
	df2	Sig. F Change	
1	20	.001	2.205

b. Dependent Variable: fnlexam

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4851.618	6	808.603	6.167	.001[a]
	Residual	2622.234	20	131.112		
	Total	7473.852	26			

a. Predictors: (Constant), sat, gender, mozartuse, ascgr, pretest, act

b. Dependent Variable: fnlexam

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-28.150	25.050		-1.124	.274
	pretest	.371	.195	.359	1.898	.072
	act	5.113	1.973	.515	2.591	.017
	ascgr	-17.052	16.316	-.194	-1.045	.308
	gender	-5.784	5.940	-.152	-.974	.342
	mozartuse	6.935	7.526	.131	.921	.368
	sat	.023	.051	.074	.445	.661

a. Dependent Variable: fnlexam

Coefficients[a]

Model		95.0% Confidence Interval for B		Correlations		
		Lower Bound	Upper Bound	Zero-order	Partial	Part
1	(Constant)	-80.403	24.104			
	pretest	-.037	.779	.699	.391	.251
	act	.997	9.228	.622	.501	.343
	ascgr	-51.087	16.983	.235	-.228	-.138
	gender	-18.175	6.607	-.307	-.213	-.129
	mozartuse	-8.764	22.635	.306	.202	.122
	sat	-.084	.130	.492	.099	.059

a. Dependent Variable: fnlexam

Coefficients[a]

Model		Collinearity Statistics	
		Tolerance	VIF
1	(Constant)		
	pretest	.489	2.044
	act	.444	2.252
	ascgr	.511	1.955
	gender	.717	1.395
	mozartuse	.868	1.152
	sat	.638	1.567

a. Dependent Variable: fnlexam

Tolerance > 0.2 and VIF < 5 indicate that multicollinearity is not a problem.

Coefficient Correlations[a]

Model			sat	gender	mozartuse	ascgr
1	Correlations	Sat	1.000	-.156	-.076	-.087
		Gender	-.156	1.000	.082	.409
		Mozartuse	-.076	.082	1.000	-.072
		Ascgr	-.087	.409	-.072	1.000
		Pretest	-.407	.393	-.236	.340
		Act	-.164	-.240	.139	-.623
	Covariances	Sat	.003	-.047	-.029	-.072
		Gender	-.047	35.285	3.671	39.625
		Mozartuse	-.029	3.671	56.646	-8.848
		Ascgr	-.072	39.625	-8.848	266.215
		Pretest	-.004	.456	-.347	1.086
		Act	-.017	-2.810	2.060	-20.064

a. Dependent Variable: fnlexam

Coefficient Correlations[a]

Model			pretest	act
1	Correlations	Sat	-.407	-.164
		Gender	.393	-.240
		Mozartuse	-.236	.139
		Ascgr	.340	-.623
		Pretest	1.000	-.417
		Act	-.417	1.000
	Covariances	Sat	-.004	-.017
		Gender	.456	-2.810
		Mozartuse	-.347	2.060
		Ascgr	1.086	-20.064
		Pretest	.038	-.161
		Act	-.161	3.893

a. Dependent Variable: fnlexam

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions			
				(Constant)	pretest	act	ascgr
1	1	5.302	1.000	.00	.00	.00	.00
	2	1.011	2.290	.00	.00	.00	.00
	3	.601	2.970	.00	.00	.00	.00
	4	.059	9.474	.01	.53	.00	.08
	5	.017	17.830	.12	.21	.00	.54
	6	.008	25.844	.26	.07	.05	.04
	7	.003	41.624	.62	.20	.95	.34

a. Dependent Variable: fnlexam

Collinearity Diagnostics[a]

Model	Dimension	Variance Proportions		
		Gender	mozartuse	sat
1	1	.01	.00	.00
	2	.19	.48	.00
	3	.50	.44	.00
	4	.03	.06	.00
	5	.22	.00	.12
	6	.00	.01	.88
	7	.05	.01	.00

a. Dependent Variable: fnlexam

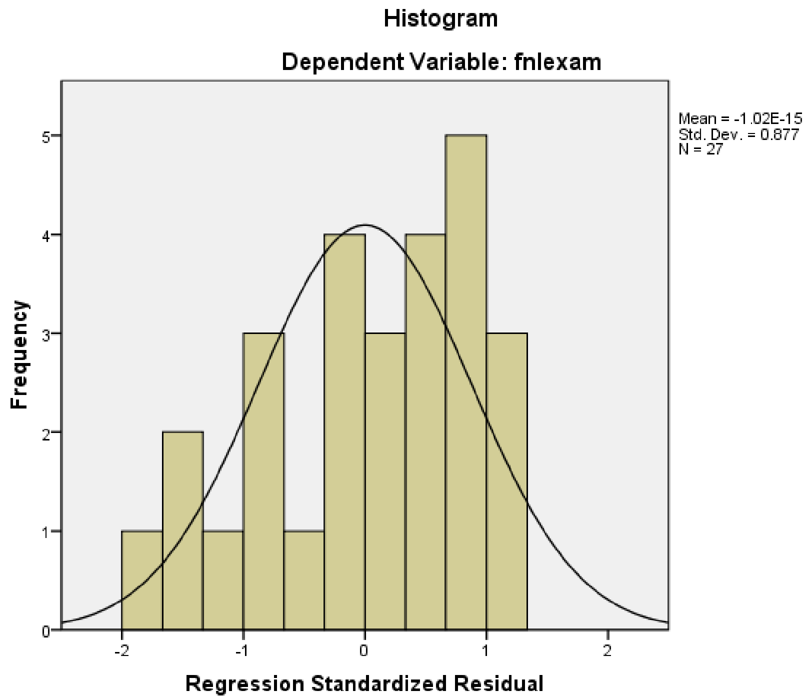
Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	47.57	101.38	69.93	13.660	27
Std. Predicted Value	-1.637	2.303	.000	1.000	27
Standard Error of Predicted Value	3.102	11.450	5.506	1.955	27
Adjusted Predicted Value	45.55	115.97	71.13	15.302	26
Residual	-21.067	13.015	.000	10.043	27
Std. Residual	-1.840	1.137	.000	.877	27
Stud. Residual	-1.984	1.310	-.014	1.025	26
Deleted Residual	-25.579	19.450	-.437	13.765	26
Stud. Deleted Residual	-2.157	1.335	-.032	1.059	26
Mahal. Distance	.945	25.037	5.778	5.233	27
Cook's Distance	.000	.365	.054	.085	26
Centered Leverage Value	.036	.963	.222	.201	27

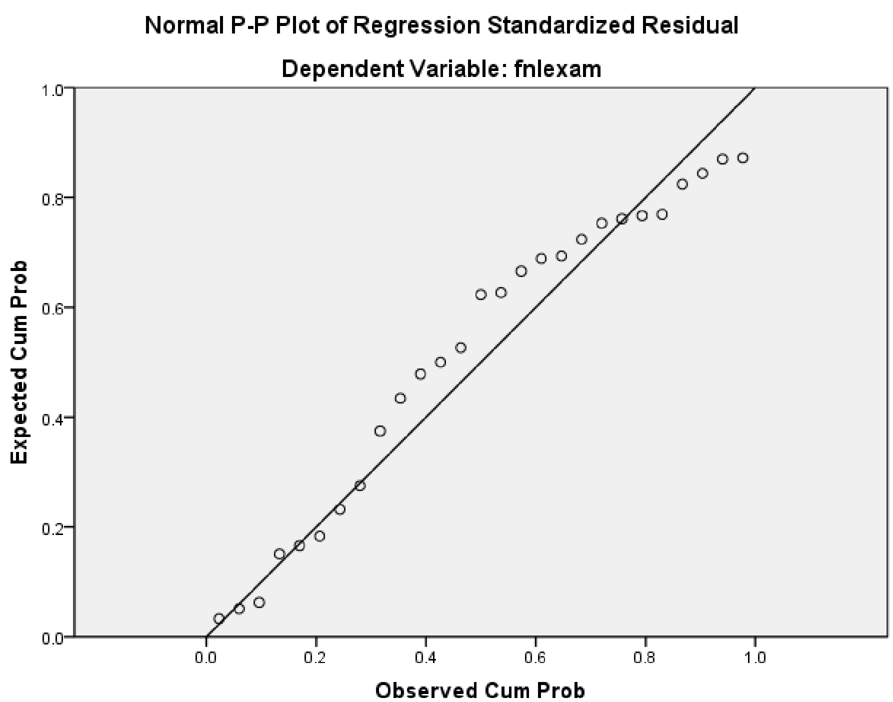
a. Dependent Variable: fnlexam

A maximum Mahalanobis distance 25.037 greater than the critical chi-square value of 22.458 for df = 6 at α = .001 indicates the presence of one or more multivariate outliers, but the maximum Cook's distance of .365 (which is less than one) means outliers should not be a concern.

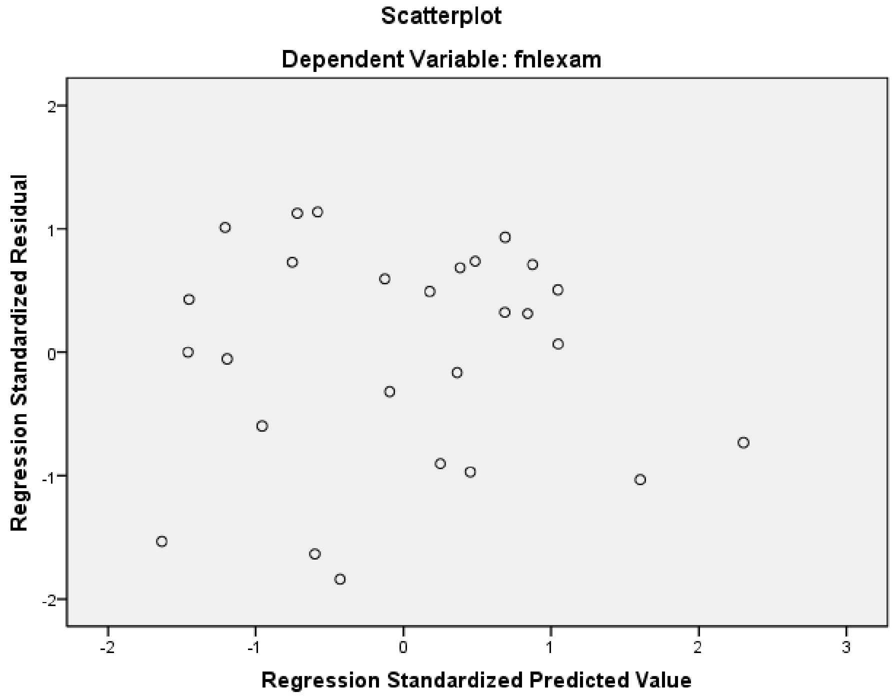
Charts



The points clustering fairly close to the line indicate that the residuals are normally distributed.



The absence of a pattern in the scatterplot indicates normality, linearity, and homoscedasticity of residuals.




```
REGRESSION
  /DESCRIPTIVES MEAN STDDEV CORR SIG N
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS CI(95) BCOV R ANOVA COLLIN TOL CHANGE
ZPP
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT fnlexam
  /METHOD=ENTER pretest act ascgr gender mozartuse techsex
  /SCATTERPLOT=(*ZRESID ,*ZPRED)
  /RESIDUALS DURBIN HISTOGRAM(ZRESID) NORMPROB(ZRESID)
  /CASEWISE PLOT(ZRESID) OUTLIERS(3)
  /SAVE MAHAL COOK.
```

Regression

Notes

Output Created		20-Oct-2011 14:58:14
Comments		
Input	Data	C:\Users\Lin\Documents\math 097 fall 2001 with classrooms no names.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	675
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.
Syntax		REGRESSION /DESCRIPTIVES MEAN STDDEV CORR SIG N /MISSING LISTWISE /STATISTICS COEFF OUTS CI(95) BCOV R ANOVA COLLIN TOL CHANGE ZPP /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT fnlexam /METHOD=ENTER pretest act ascgr gender mozartuse techsex /SCATTERPLOT=(*ZRESID ,*ZPRED) /RESIDUALS DURBIN HISTOGRAM(ZRESID) NORMPROB(ZRESID) /CASEWISE PLOT(ZRESID) OUTLIERS(3) /SAVE MAHAL COOK.
Resources	Processor Time	00:00:01.389
	Elapsed Time	00:00:01.821
	Memory Required	4100 bytes

	Additional Memory Required for Residual Plots		872 bytes
Variables Created or Modified	MAH_6	Mahalanobis Distance	
	COO_6	Cook's Distance	

[DataSet1] C:\Users\Lin\Documents\math 097 fall 2001 with classrooms no names.sav

Descriptive Statistics

	Mean	Std. Deviation	N
Fnlexam	68.99	14.508	383
Pretest	47.02	14.486	383
Act	16.86	1.152	383
Ascgr	.87	.340	383
Gender	.38	.486	383
Mozartuse	.12	.322	383
Techsex	.25	.431	383

N = 383 with k = 6 predictors
N > 50 + 8k
Therefore, the sample size is appropriate.

Correlations

		fnlexam	pretest	act	ascgr	gender
Pearson Correlation	fnlexam	1.000	.318	.222	.169	-.173
	pretest	.318	1.000	.191	.023	-.119
	act	.222	.191	1.000	.034	-.015
	ascgr	.169	.023	.034	1.000	-.104
	gender	-.173	-.119	-.015	-.104	1.000
	mozartuse	.117	.016	-.020	.024	-.036
	techsex	-.075	-.059	.004	-.009	-.060
Sig. (1-tailed)	fnlexam	.	.000	.000	.000	.000
	pretest	.000	.	.000	.327	.010
	act	.000	.000	.	.254	.386
	ascgr	.000	.327	.254	.	.021
	gender	.000	.010	.386	.021	.
	mozartuse	.011	.376	.346	.322	.241
	techsex	.070	.125	.469	.433	.119
N	fnlexam	383	383	383	383	383
	pretest	383	383	383	383	383
	act	383	383	383	383	383
	ascgr	383	383	383	383	383
	gender	383	383	383	383	383
	mozartuse	383	383	383	383	383
	techsex	383	383	383	383	383

Correlations

		mozartuse	techsex
Pearson Correlation	fnlexam	.117	-.075
	pretest	.016	-.059
	act	-.020	.004
	ascgr	.024	-.009
	gender	-.036	-.060
	mozartuse	1.000	-.208
	techsex	-.208	1.000
Sig. (1-tailed)	fnlexam	.011	.070
	pretest	.376	.125
	act	.346	.469
	ascgr	.322	.433
	gender	.241	.119
	mozartuse	.	.000
	techsex	.000	.
N	fnlexam	383	383
	pretest	383	383
	act	383	383
	ascgr	383	383
	gender	383	383
	mozartuse	383	383
	techsex	383	383

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	techsex, act, ascgr, gender, mozartuse, pretest[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: fnlexam

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics		
					R Square Change	F Change	df1
1	.426[a]	.181	.168	13.232	.181	13.877	6

a. Predictors: (Constant), techsex, act, ascgr, gender, mozartuse, pretest

b. Dependent Variable: fnlexam

Model Summary[b]

Model	Change Statistics		Durbin-Watson
	df2	Sig. F Change	
1	376	.000	1.727

b. Dependent Variable: fnlexam

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	14577.638	6	2429.606	13.877	.000[a]
	Residual	65830.320	376	175.081		
	Total	80407.958	382			

a. Predictors: (Constant), techsex, act, ascgr, gender, mozartuse, pretest

b. Dependent Variable: fnlexam

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	17.043	10.096		1.688	.092
	pretest	.264	.048	.264	5.496	.000
	act	2.108	.599	.167	3.518	.000
	ascgr	6.041	2.002	.142	3.017	.003
	gender	-3.680	1.414	-.123	-2.602	.010
	mozartuse	4.426	2.150	.098	2.059	.040
	techsex	-1.559	1.614	-.046	-.966	.335

a. Dependent Variable: fnlexam

Coefficients[a]

Model		95.0% Confidence Interval for B Lower Bound	95.0% Confidence Interval for B Upper Bound	Correlations Zero-order	Correlations Partial	Correlations Part
1	(Constant)	-2.808	36.894			
	pretest	.170	.359	.318	.273	.256
	act	.930	3.287	.222	.179	.164
	ascgr	2.104	9.979	.169	.154	.141
	gender	-6.462	-.899	-.173	-.133	-.121
	mozartuse	.198	8.654	.117	.106	.096
	techsex	-4.732	1.614	-.075	-.050	-.045

a. Dependent Variable: fnlexam

Coefficients[a]

Model		Collinearity Statistics	
		Tolerance	VIF
1	(Constant)		
	pretest	.945	1.058
	act	.962	1.040
	ascgr	.988	1.013
	gender	.969	1.032
	mozartuse	.954	1.049
	techsex	.948	1.055

a. Dependent Variable: fnlexam

Tolerance > 0.2 and VIF < 5 indicate that multicollinearity is not a problem.

Coefficient Correlations[a]

Model			techsex	act	ascgr	gender
1	Correlations	techsex	1.000	-.012	.011	.078
		act	-.012	1.000	-.032	-.011
		ascgr	.011	-.032	1.000	.102
		gender	.078	-.011	.102	1.000
		mozartuse	.210	.021	-.018	.047
		pretest	.066	-.191	-.004	.121
	Covariances	techsex	2.604	-.011	.035	.177
		act	-.011	.359	-.038	-.010
		ascgr	.035	-.038	4.010	.289
		gender	.177	-.010	.289	2.001
		mozartuse	.728	.027	-.077	.144
		pretest	.005	-.006	.000	.008

a. Dependent Variable: fnlexam

Coefficient Correlations[a]

Model			mozartuse	pretest
1	Correlations	techsex	.210	.066
		act	.021	-.191
		ascgr	-.018	-.004
		gender	.047	.121
		mozartuse	1.000	-.002
		pretest	-.002	1.000
	Covariances	techsex	.728	.005
		act	.027	-.006
		ascgr	-.077	.000
		gender	.144	.008
		mozartuse	4.623	.000
		pretest	.000	.002

a. Dependent Variable: fnlexam

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions			
				(Constant)	pretest	act	ascgr
1	1	4.653	1.000	.00	.00	.00	.01
	2	1.000	2.157	.00	.00	.00	.00
	3	.678	2.620	.00	.00	.00	.00
	4	.507	3.031	.00	.01	.00	.02
	5	.113	6.425	.00	.21	.00	.78
	6	.047	9.919	.02	.77	.02	.20
	7	.002	45.086	.98	.01	.98	.00

a. Dependent Variable: fnlexam

Collinearity Diagnostics[a]

Model	Dimension	Variance Proportions		
		gender	mozartuse	techsex
1	1	.01	.01	.01
	2	.00	.56	.24
	3	.44	.20	.36
	4	.47	.22	.37
	5	.01	.00	.00
	6	.07	.00	.02
	7	.00	.00	.00

a. Dependent Variable: fnlexam

Casewise Diagnostics[a]

Case Number	Std. Residual	fnlexam	Predicted Value	Residual
192	3.043	100	59.74	40.263
582	-3.065	35	75.56	-40.561

a. Dependent Variable: fnlexam

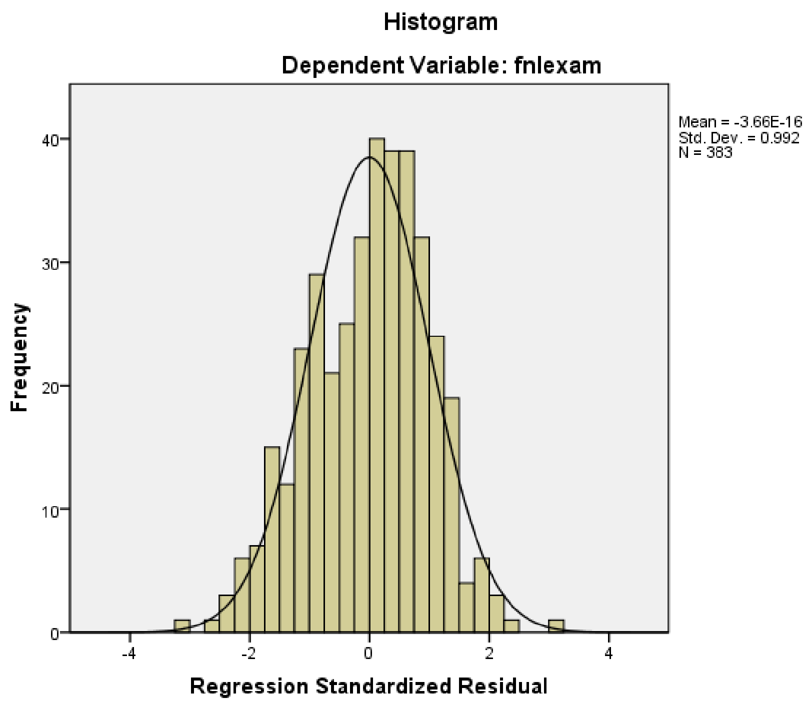
Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	49.23	85.60	68.99	6.177	383
Std. Predicted Value	-3.199	2.688	.000	1.000	383
Standard Error of Predicted Value	1.046	3.469	1.727	.467	383
Adjusted Predicted Value	49.17	85.45	68.99	6.172	383
Residual	-40.561	40.263	.000	13.127	383
Std. Residual	-3.065	3.043	.000	.992	383
Stud. Residual	-3.079	3.100	.000	1.002	383
Deleted Residual	-40.920	41.792	.002	13.379	383
Stud. Deleted Residual	-3.114	3.136	.000	1.004	383
Mahal. Distance	1.390	25.254	5.984	3.947	383
Cook's Distance	.000	.055	.003	.005	383
Centered Leverage Value	.004	.066	.016	.010	383

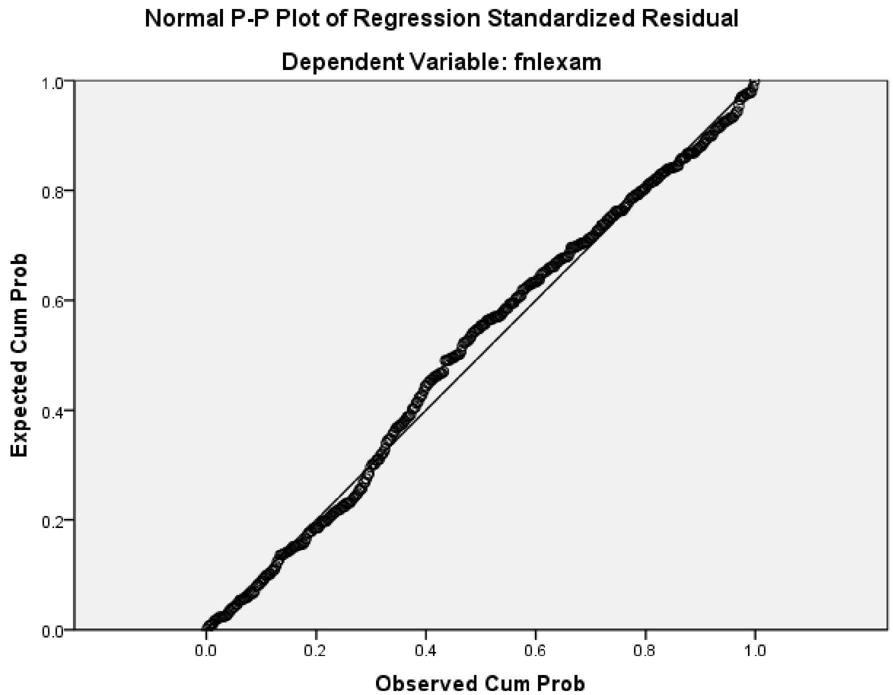
a. Dependent Variable: fnlexam

A maximum Mahalanobis distance of 25.254 greater than the critical chi-square value of 22.458 for df = 6 at α = .001 indicates the presence of one or more multivariate outliers, but the maximum Cook's distance of .055 (which is less than one) means outliers should not be a concern.

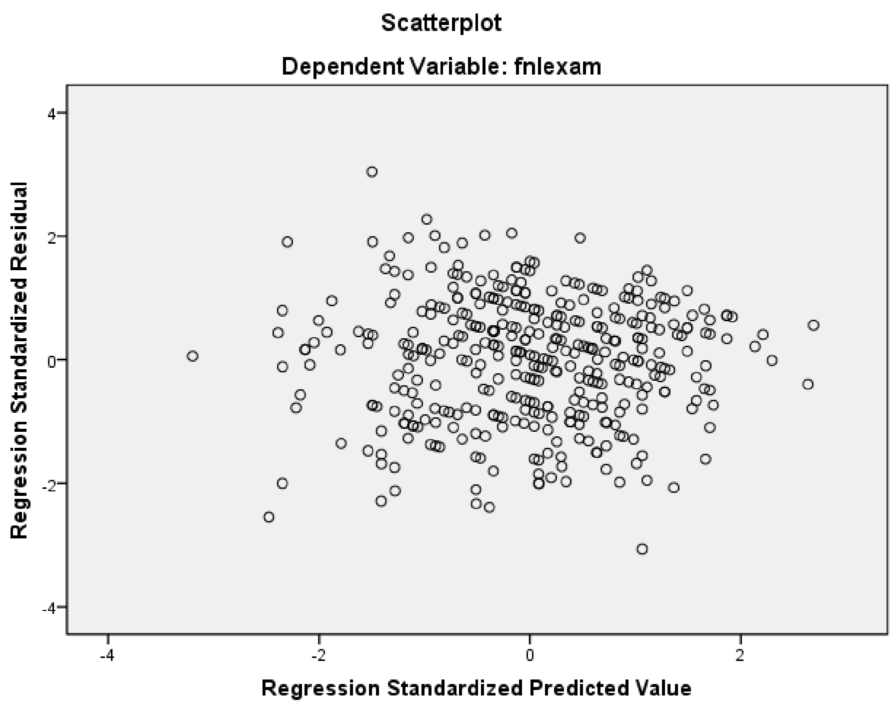
Charts



The points clustered fairly close to the line indicate that the residuals are normally distributed.



The absence of a pattern in the scatterplot indicates normality, linearity, and homoscedasticity of residuals.



```
REGRESSION
  /DESCRIPTIVES MEAN STDDEV CORR SIG N
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS CI(95) BCOV R ANOVA COLLIN TOL CHANGE
ZPP
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT fnlexam
  /METHOD=ENTER pretest act ascgr gender mozartuse comcol
  /SCATTERPLOT=(*ZRESID ,*ZPRED)
  /RESIDUALS DURBIN HISTOGRAM(ZRESID) NORMPROB(ZRESID)
  /CASEWISE PLOT(ZRESID) OUTLIERS(3)
  /SAVE MAHAL COOK.
```

Regression

Notes

Output Created		20-Oct-2011 14:59:02
Comments		
Input	Data	C:\Users\Lin\Documents\math 097 fall 2001 with classrooms no names.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	675
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.

Syntax		REGRESSION /DESCRIPTIVES MEAN STDDEV CORR SIG N /MISSING LISTWISE /STATISTICS COEFF OUTS CI(95) BCOV R ANOVA COLLIN TOL CHANGE ZPP /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT fnlexam /METHOD=ENTER pretest act ascgr gender mozartuse comcol /SCATTERPLOT=(*ZRESID ,*ZPRED) /RESIDUALS DURBIN HISTOGRAM(ZRESID) NORMPROB(ZRESID) /CASEWISE PLOT(ZRESID) OUTLIERS(3) /SAVE MAHAL COOK.
Resources	Processor Time	00:00:01.700
	Elapsed Time	00:00:01.809
	Memory Required	4140 bytes
	Additional Memory Required for Residual Plots	872 bytes
Variables Created or Modified	MAH_7	Mahalanobis Distance
	COO_7	Cook's Distance

[DataSet1] C:\Users\Lin\Documents\math 097 fall 2001 with classrooms no names.sav

Descriptive Statistics

	Mean	Std. Deviation	N
fnlexam	68.99	14.508	383
pretest	47.02	14.486	383
Act	16.86	1.152	383
ascgr	.87	.340	383
gender	.38	.486	383
mozartuse	.12	.322	383
comcol	.19	.389	383

N = 383 with k = 6 predictors
N > 50 + 8k
Therefore, the sample size is appropriate.

Correlations

		fnlexam	pretest	act	ascgr	gender
Pearson Correlation	fnlexam	1.000	.318	.222	.169	-.173
	pretest	.318	1.000	.191	.023	-.119
	act	.222	.191	1.000	.034	-.015
	ascgr	.169	.023	.034	1.000	-.104
	gender	-.173	-.119	-.015	-.104	1.000
	mozartuse	.117	.016	-.020	.024	-.036
	comcol	-.104	-.083	-.265	.029	.096
Sig. (1-tailed)	fnlexam	.	.000	.000	.000	.000
	pretest	.000	.	.000	.327	.010
	act	.000	.000	.	.254	.386
	ascgr	.000	.327	.254	.	.021
	gender	.000	.010	.386	.021	.
	mozartuse	.011	.376	.346	.322	.241
	comcol	.021	.052	.000	.287	.030
N	fnlexam	383	383	383	383	383
	pretest	383	383	383	383	383
	act	383	383	383	383	383
	ascgr	383	383	383	383	383
	gender	383	383	383	383	383
	mozartuse	383	383	383	383	383
	comcol	383	383	383	383	383

Correlations

		mozartuse	comcol
Pearson Correlation	fnlexam	.117	-.104
	pretest	.016	-.083
	act	-.020	-.265
	ascgr	.024	.029
	gender	-.036	.096
	mozartuse	1.000	.014
	comcol	.014	1.000
Sig. (1-tailed)	fnlexam	.011	.021
	pretest	.376	.052
	act	.346	.000
	ascgr	.322	.287
	gender	.241	.030
	mozartuse	.	.394
	comcol	.394	.
N	fnlexam	383	383
	pretest	383	383
	act	383	383
	ascgr	383	383
	gender	383	383
	mozartuse	383	383
	comcol	383	383

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	comcol, mozartuse, ascgr, pretest, gender, act[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: fnlexam

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics		
					R Square Change	F Change	df1
1	.425[a]	.180	.167	13.240	.180	13.787	6

a. Predictors: (Constant), comcol, mozartuse, ascgr, pretest, gender, act

b. Dependent Variable: fnlexam

Model Summary[b]

Model	Change Statistics		Durbin-Watson
	df2	Sig. F Change	
1	376	.000	1.730

b. Dependent Variable: fnlexam

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	14499.826	6	2416.638	13.787	.000[a]
	Residual	65908.132	376	175.288		
	Total	80407.958	382			

a. Predictors: (Constant), comcol, mozartuse, ascgr, pretest, gender, act

b. Dependent Variable: fnlexam

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	18.577	10.508		1.768	.078
	pretest	.266	.048	.266	5.551	.000
	act	1.990	.621	.158	3.207	.001
	ascgr	6.131	2.006	.144	3.056	.002
	gender	-3.478	1.418	-.117	-2.453	.015
	mozartuse	4.879	2.104	.108	2.319	.021
	comcol	-1.269	1.816	-.034	-.699	.485

a. Dependent Variable: fnlexam

Coefficients[a]

Model		95.0% Confidence Interval for B		Correlations		
		Lower Bound	Upper Bound	Zero-order	Partial	Part
1	(Constant)	-2.084	39.239			
	pretest	.172	.361	.318	.275	.259
	act	.770	3.210	.222	.163	.150
	ascgr	2.187	10.075	.169	.156	.143
	gender	-6.266	-.691	-.173	-.126	-.115
	mozartuse	.743	9.016	.117	.119	.108
	comcol	-4.841	2.303	-.104	-.036	-.033

a. Dependent Variable: fnlexam

Coefficients[a]

Model		Collinearity Statistics	
		Tolerance	VIF
1	(Constant)		
	pretest	.949	1.054
	act	.898	1.114
	ascgr	.985	1.015
	gender	.965	1.036
	mozartuse	.997	1.003
	comcol	.918	1.089

a. Dependent Variable: fnlexam

Tolerance > 0.2 and VIF < 5 indicate that multicollinearity is not a problem.

Coefficient Correlations[a]

Model			comcol	mozartuse	ascgr	pretest
1	Correlations	comcol	1.000	-.012	-.049	.024
		mozartuse	-.012	1.000	-.020	-.017
		ascgr	-.049	-.020	1.000	-.005
		pretest	.024	-.017	-.005	1.000
		gender	-.097	.033	.106	.114
		act	.258	.020	-.043	-.179
	Covariances	comcol	3.300	-.044	-.180	.002
		mozartuse	-.044	4.425	-.085	-.002
		ascgr	-.180	-.085	4.024	-.001
		pretest	.002	-.002	-.001	.002
		gender	-.250	.098	.300	.008
		act	.290	.027	-.054	-.005

a. Dependent Variable: fnlexam

Coefficient Correlations[a]

Model			gender	act
1	Correlations	comcol	-.097	.258
		mozartuse	.033	.020
		ascgr	.106	-.043
		pretest	.114	-.179
		gender	1.000	-.035
		act	-.035	1.000
	Covariances	comcol	-.250	.290
		mozartuse	.098	.027
		ascgr	.300	-.054
		pretest	.008	-.005
		gender	2.010	-.031
		act	-.031	.385

a. Dependent Variable: fnlexam

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions			
				(Constant)	pretest	act	ascgr
1	1	4.620	1.000	.00	.00	.00	.01
	2	.875	2.297	.00	.00	.00	.00
	3	.774	2.443	.00	.00	.00	.00
	4	.568	2.853	.00	.01	.00	.01
	5	.112	6.415	.00	.21	.00	.79
	6	.048	9.790	.02	.78	.02	.19
	7	.002	46.676	.98	.00	.98	.00

a. Dependent Variable: fnlexam

Collinearity Diagnostics[a]

Model	Dimension	Variance Proportions		
		gender	mozartuse	comcol
1	1	.01	.01	.01
	2	.04	.88	.06
	3	.00	.07	.82
	4	.88	.04	.03
	5	.01	.00	.00
	6	.06	.00	.00
	7	.00	.00	.07

a. Dependent Variable: fnlexam

Casewise Diagnostics[a]

Case Number	Std. Residual	fnlexam	Predicted Value	Residual
192	3.125	100	58.63	41.368
582	-3.035	35	75.18	-40.179

a. Dependent Variable: fnlexam

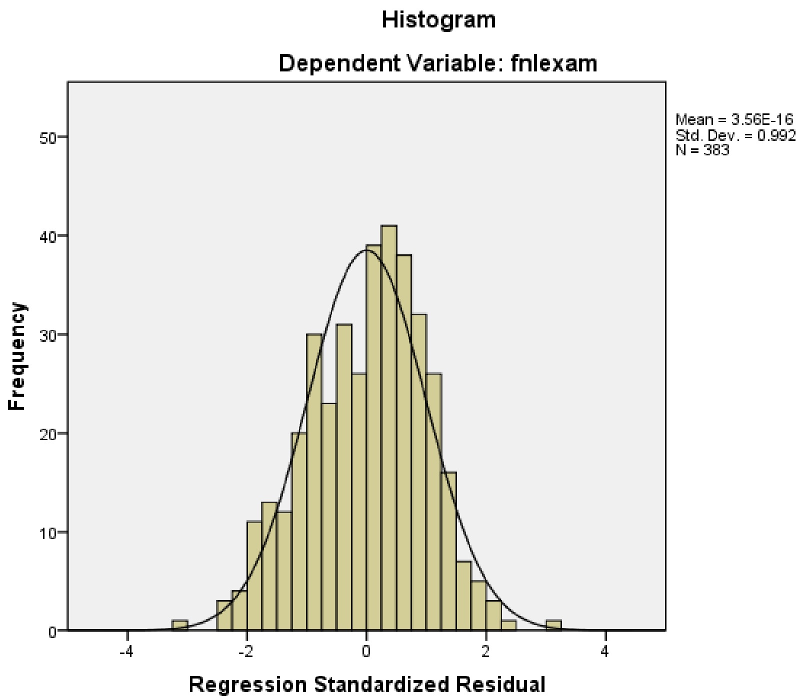
Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	48.37	85.39	68.99	6.161	383
Std. Predicted Value	-3.348	2.662	.000	1.000	383
Standard Error of Predicted Value	.969	4.029	1.710	.530	383
Adjusted Predicted Value	48.24	85.57	68.99	6.156	383
Residual	-40.179	41.368	.000	13.135	383
Std. Residual	-3.035	3.125	.000	.992	383
Stud. Residual	-3.046	3.188	.000	1.002	383
Deleted Residual	-40.485	43.077	.003	13.397	383
Stud. Deleted Residual	-3.080	3.228	.000	1.004	383
Mahal. Distance	1.047	34.376	5.984	4.499	383
Cook's Distance	.000	.060	.003	.006	383
Centered Leverage Value	.003	.090	.016	.012	383

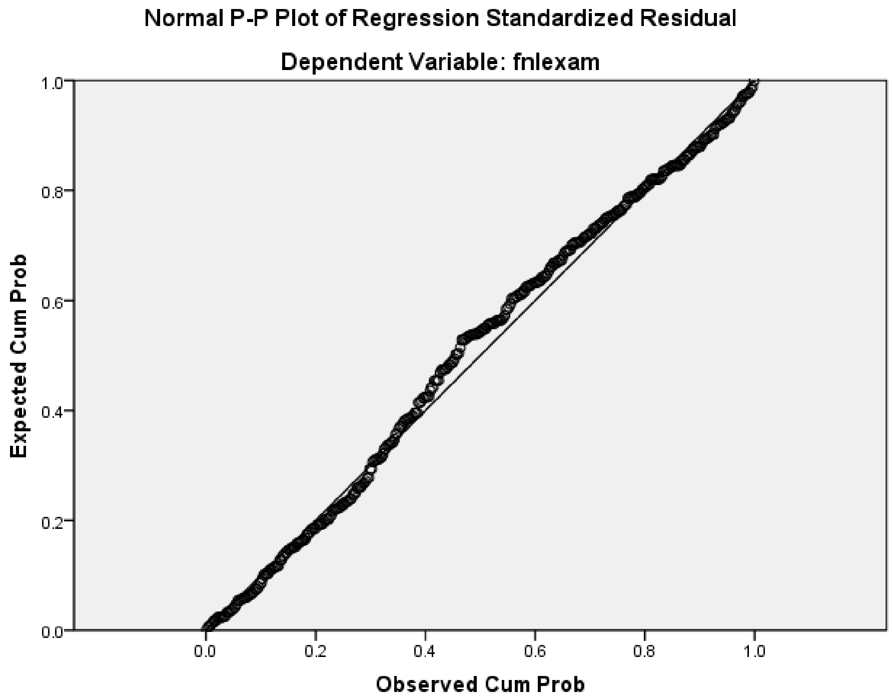
a. Dependent Variable: fnlexam

A maximum Mahalanobis distance of 34.376 greater than the critical chi-square value of 22.458 for df = 6 at α = .001 indicates the presence of one or more multivariate outliers, but the maximum Cook's distance of .060 (which is less than one) means outliers should not be a concern.

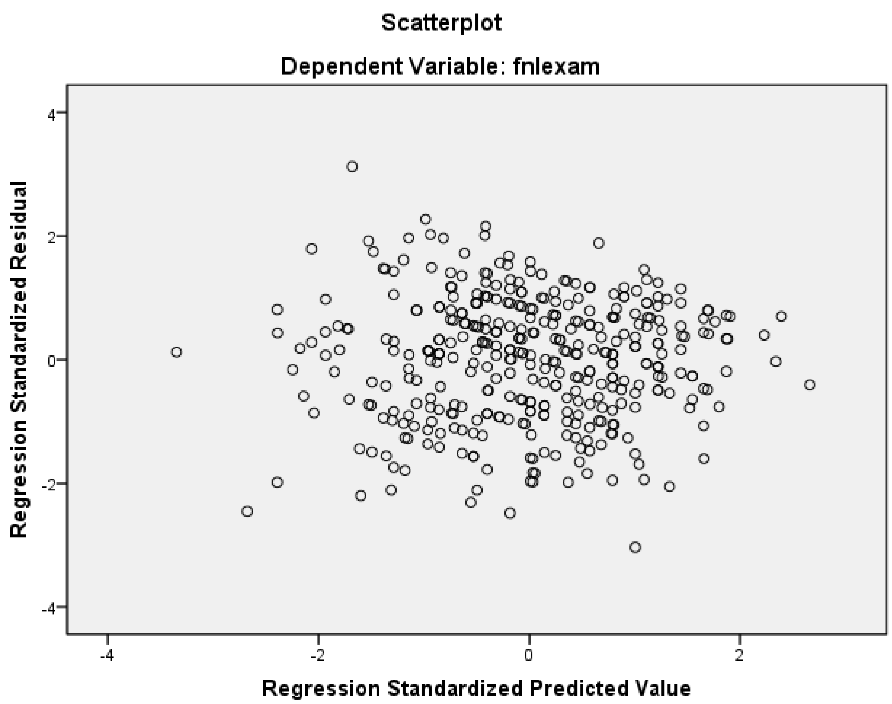
Charts



The points clustered fairly close to the line indicate that the residuals are normally distributed.



The absence of a pattern in the scatterplot indicates normality, linearity, and homoscedasticity of residuals.



Appendix W: SPSS Multiple Binary Logistic Regression Output for Elementary Algebra

```
GET
  FILE='C:\Users\Lin\Documents\math 096 fall 2001 with classrooms.sav'.
DATASET NAME DataSet1 WINDOW=FRONT.
LOGISTIC REGRESSION VARIABLES fnlgrd
  /METHOD=ENTER pretest ascgr
  /CONTRAST (ascgr)=Indicator(1)
  /SAVE=PRED PGROUP COOK LEVER DFBETA ZRESID
  /CLASSPLOT
  /CASEWISE OUTLIER(2)
  /PRINT=GOODFIT ITER(1) CI(95)
  /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).
```

Logistic Regression

Notes

Output Created		20-Oct-2011 18:10:15
Comments		
Input	Data	C:\Users\Lin\Documents\math 096 fall 2001 with classrooms.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	252
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing
Syntax		LOGISTIC REGRESSION VARIABLES fnlgrd /METHOD=ENTER pretest ascgr /CONTRAST (ascgr)=Indicator(1) /SAVE=PRED PGROUP COOK LEVER DFBETA ZRESID /CLASSPLOT /CASEWISE OUTLIER(2) /PRINT=GOODFIT ITER(1) CI(95) /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).
Resources	Processor Time	00:00:00.016
	Elapsed Time	00:00:00.051
Variables Created or Modified	PRE_1	Predicted probability
	PGR_1	Predicted group
	COO_1	Analog of Cook's influence statistics
	LEV_1	Leverage value
	ZRE_1	Normalized residual
	DFB0_1	DFBETA for constant
	DFB1_1	DFBETA for pretest
	DFB2_1	DFBETA for ascgr(1)

[DataSet1] C:\Users\Lin\Documents\math 096 fall 2001 with classrooms.sav

Case Processing Summary

Unweighted Cases[a]		N	Percent
Selected Cases	Included in Analysis	235	93.3
	Missing Cases	17	6.7
	Total	252	100.0
Unselected Cases		0	.0
Total		252	100.0

a. If weight is in effect, see classification table for the total number of cases.

Dependent Variable Encoding

Original Value	Internal Value
0	0
1	1

Categorical Variables Codings

		Frequency	Parameter coding (1)
ascgr	0	71	.000
	1	164	1.000

Block 0: Beginning Block

Iteration History[a,b,c]

Iteration		-2 Log likelihood	Coefficients Constant
Step 0	1	321.130	.281
	2	321.130	.283
	3	321.130	.283

a. Constant is included in the model.

b. Initial -2 Log Likelihood: 321.130

c. Estimation terminated at iteration number 3 because parameter estimates changed by less than .001.

Classification Table[a,b]

Observed			Predicted		
			fnlgrd		Percentage Correct
			0	1	
Step 0	fnlgrd	0	0	101	.0
		1	0	134	100.0
	Overall Percentage				57.0

a. Constant is included in the model.

b. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 0	Constant	.283	.132	4.603	1	.032	1.327

Variables not in the Equation

			Score	df	Sig.
Step 0	Variables	pretest	15.826	1	.000
		ascgr(1)	49.372	1	.000
	Overall Statistics		65.643	2	.000

Block 1: Method = Enter

Iteration History[a,b,c,d]

Iteration		-2 Log likelihood	Coefficients		
			Constant	pretest	ascgr(1)
Step 1	1	251.458	-2.448	.033	1.986
	2	248.607	-3.201	.046	2.382
	3	248.561	-3.312	.048	2.438
	4	248.561	-3.315	.048	2.439
	5	248.561	-3.315	.048	2.439

a. Method: Enter

b. Constant is included in the model.

c. Initial -2 Log Likelihood: 321.130

d. Estimation terminated at iteration number 5 because parameter estimates changed by less than .001.

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	72.569	2	.000
	Block	72.569	2	.000
	Model	72.569	2	.000

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	248.561[a]	.266	.357

a. Estimation terminated at iteration number 5 because parameter estimates changed by less than .001.

Hosmer and Lemeshow Test

Step	Chi-square	Df	Sig.
1	5.952	7	.545

Contingency Table for Hosmer and Lemeshow Test

		fnlgrd = 0		fnlgrd = 1		
		Observed	Expected	Observed	Expected	Total
Step 1	1	19	19.546	3	2.454	22
	2	21	21.154	5	4.846	26
	3	16	14.886	7	8.114	23
	4	13	10.784	9	11.216	22
	5	6	5.062	6	6.938	12
	6	5	9.493	21	16.507	26
	7	11	9.544	23	24.456	34
	8	5	6.525	28	26.475	33
	9	5	4.006	32	32.994	37

Classification Table[a]

Observed			Predicted		
			fnlgrd		Percentage Correct
			0	1	
Step 1	fnlgrd	0	58	43	57.4
		1	16	118	88.1
	Overall Percentage				74.9

a. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	pretest	.048	.011	18.690	1	.000	1.049
	ascgr(1)	2.439	.366	44.339	1	.000	11.464
	Constant	-3.315	.586	32.016	1	.000	.036

a. Variable(s) entered on step 1: pretest, ascgr.

Variables in the Equation

		95% C.I.for EXP(B)	
		Lower	Upper
Step 1[a]	pretest	1.026	1.072
	ascgr(1)	5.591	23.503
	Constant		

a. Variable(s) entered on step 1: pretest, ascgr.

Step number: 1

Observed Groups and Predicted Probabilities

```
     32 +                                                                        +
        I                                                                      I
        I                                                                      I
F       I                                        1                              I
R     24 +                                          1                              +
E       I                                        1       1                        I
Q       I                                        1       1      1                 I
U       I                              1         1       1      1                 I
E     16 +                               1         1       1      1                 +
N       I                              1         1       1   1  1                   I
C       I          1                    1     1     1    1    1   1 1               I
Y       I        0  0  1                 0     1     1    1    1   1  1  1 1        I
      8 +     1    0  0  0                 0     1     1    1    1   1  1  1 1  1      +
        I     0 1  0  0  0      0    0    1        0     0     0    0    0    1  1  1 1  1     I
        I     0 0  0  0  0   0    0    0    0    11    0     0     0    0    0    0  1   1 1  1 1 1
I
        I     0 0  0  0  0   0    0    01   0 0  00    00    0     0    0   10    0  0   0 0  0
11011   I
Predicted ---------+---------+---------+---------+---------+---------+---------+---------+--------
-+----------
  Prob:   0       .1        .2        .3        .4        .5        .6        .7        .8        .9        1
  Group:
000000000000000000000000000000000000000000000000011111111111111
1111111111111111111111111111111111
```

Predicted Probability is of Membership for 1
The Cut Value is .50
Symbols: 0 - 0
1 - 1
Each Symbol Represents 2 Cases.

Casewise List[b]

Case	Selected Status[a]	Observed Fnlgrd	Predicted	Predicted Group	Temporary Variable Resid	Temporary Variable ZResid
51	S	0**	.879	1	-.879	-2.694
67	S	1**	.086	0	.914	3.258
77	S	1**	.107	0	.893	2.892
145	S	0**	.950	1	-.950	-4.337
168	S	0**	.902	1	-.902	-3.035
177	S	1**	.132	0	.868	2.568

a. S = Selected, U = Unselected cases, and ** = Misclassified cases.

b. Cases with studentized residuals greater than 2.000 are listed.

```
LOGISTIC REGRESSION VARIABLES fnlgrd
  /METHOD=ENTER pretest ascgr adj096
  /CONTRAST (ascgr)=Indicator(1)
  /CONTRAST (adj096)=Indicator(1)
  /SAVE=PRED PGROUP COOK LEVER DFBETA ZRESID
  /CLASSPLOT
  /CASEWISE OUTLIER(2)
  /PRINT=GOODFIT ITER(1) CI(95)
  /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).
```

Logistic Regression

Notes

Output Created		20-Oct-2011 18:12:24
Comments		
Input	Data	C:\Users\Lin\Documents\math 096 fall 2001 with classrooms.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	252
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing
Syntax		LOGISTIC REGRESSION VARIABLES fnlgrd /METHOD=ENTER pretest ascgr adj096 /CONTRAST (ascgr)=Indicator(1) /CONTRAST (adj096)=Indicator(1) /SAVE=PRED PGROUP COOK LEVER DFBETA ZRESID /CLASSPLOT /CASEWISE OUTLIER(2) /PRINT=GOODFIT ITER(1) CI(95) /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).
Resources	Processor Time	00:00:00.032
	Elapsed Time	00:00:00.059
Variables Created or Modified	PRE_2	Predicted probability
	PGR_2	Predicted group
	COO_2	Analog of Cook's influence statistics
	LEV_2	Leverage value
	ZRE_2	Normalized residual
	DFB0_2	DFBETA for constant
	DFB1_2	DFBETA for pretest
	DFB2_2	DFBETA for ascgr(1)
	DFB3_2	DFBETA for adj096(1)

[DataSet1] C:\Users\Lin\Documents\math 096 fall 2001 with classrooms.sav

Case Processing Summary

Unweighted Cases[a]		N	Percent
Selected Cases	Included in Analysis	235	93.3
	Missing Cases	17	6.7
	Total	252	100.0
Unselected Cases		0	.0
Total		252	100.0

a. If weight is in effect, see classification table for the total number of cases.

Dependent Variable Encoding

Original Value	Internal Value
0	0
1	1

Categorical Variables Codings

		Frequency	Parameter coding (1)
adj096	0	128	.000
	1	107	1.000
ascgr	0	71	.000
	1	164	1.000

Block 0: Beginning Block

Iteration History[a,b,c]

Iteration		-2 Log likelihood	Coefficients Constant
Step 0	1	321.130	.281
	2	321.130	.283
	3	321.130	.283

a. Constant is included in the model.

b. Initial -2 Log Likelihood: 321.130

Iteration History[a,b,c]

Iteration		-2 Log likelihood	Coefficients
			Constant
Step 0	1	321.130	.281
	2	321.130	.283
	3	321.130	.283

a. Constant is included in the model.

b. Initial -2 Log Likelihood: 321.130

c. Estimation terminated at iteration number 3 because parameter estimates changed by less than .001.

Classification Table[a,b]

Observed			Predicted		
			fnlgrd		Percentage Correct
			0	1	
Step 0	fnlgrd	0	0	101	.0
		1	0	134	100.0
	Overall Percentage				57.0

a. Constant is included in the model.

b. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 0	Constant	.283	.132	4.603	1	.032	1.327

Variables not in the Equation

			Score	df	Sig.
Step 0	Variables	Pretest	15.826	1	.000
		ascgr(1)	49.372	1	.000
		adj096(1)	11.809	1	.001
	Overall Statistics		80.498	3	.000

Block 1: Method = Enter

Iteration History[a,b,c,d]

Iteration		-2 Log likelihood	Coefficients			
			Constant	pretest	ascgr(1)	adj096(1)
Step 1	1	233.558	-2.838	.029	2.121	1.016
	2	226.843	-3.977	.042	2.791	1.504
	3	226.527	-4.279	.045	2.981	1.649
	4	226.526	-4.298	.045	2.993	1.659
	5	226.526	-4.298	.045	2.993	1.659

a. Method: Enter

b. Constant is included in the model.

c. Initial -2 Log Likelihood: 321.130

d. Estimation terminated at iteration number 5 because parameter estimates changed by less than .001.

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	94.604	3	.000
	Block	94.604	3	.000
	Model	94.604	3	.000

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	226.526[a]	.331	.445

a. Estimation terminated at iteration number 5 because parameter estimates changed by less than .001.

Hosmer and Lemeshow Test

Step	Chi-square	Df	Sig.
1	5.120	7	.645

Contingency Table for Hosmer and Lemeshow Test

		fnlgrd = 0		fnlgrd = 1		
		Observed	Expected	Observed	Expected	Total
Step 1	1	22	21.626	1	1.374	23
	2	19	21.294	7	4.706	26
	3	19	15.972	6	9.028	25
	4	13	14.975	16	14.025	29
	5	12	10.569	14	15.431	26
	6	6	7.771	21	19.229	27
	7	6	5.318	24	24.682	30
	8	3	2.111	18	18.889	21
	9	1	1.364	27	26.636	28

Classification Table[a]

Observed			Predicted		
			fnlgrd		Percentage Correct
			0	1	
Step 1	fnlgrd	0	69	32	68.3
		1	20	114	85.1
	Overall Percentage				77.9

a. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	pretest	.045	.011	15.496	1	.000	1.046
	ascgr(1)	2.993	.436	47.066	1	.000	19.952
	adj096(1)	1.659	.389	18.229	1	.000	5.255
	Constant	-4.298	.679	40.068	1	.000	.014

a. Variable(s) entered on step 1: pretest, ascgr, adj096.

Variables in the Equation

		95% C.I.for EXP(B)	
		Lower	Upper
Step 1[a]	pretest	1.023	1.070
	ascgr(1)	8.484	46.922
	adj096(1)	2.454	11.256
	Constant		

a. Variable(s) entered on step 1: pretest, ascgr, adj096.

Step number: 1

Observed Groups and Predicted Probabilities

```
     16 +                                                                   +
        I                              1       1                          I
        I                              1       1                          I
F       I                        1       1       1                          I
R    12 +                          1       1       1              1          +
E       I                        1       1       1              1          I
Q       I                        1   1    1       1      1        1          I
U       I                        0   1    1   1    1      1        1      1    I
E     8 +      0                   0   1    1   1    1      1        1    1 1 1     +
N       I     0                    0   1    1   1    1      1  1      1    1 1 1 1   I
C       I   0 0              1       0   1    1   1    0   1   1   11     11    1 1 1 1
I
Y       I   0 0          1      1       0   01    0    0    0   1   1   11     11    1 1 1 1
I
      4 +    0 01   0  1 1 1  0   1    0        0    00    0    0    0    1    1   11  1  11    1 1
111    +
        I   00 00   0  0 1 0  0   1    0        0    00    0    01    0    1    1   11  1  11  1 1
1 111 11 I
        I   00 00 0 0  0 0 0  0   0   00   00    0    00    0    01    0    0    1   00  11 11  1
1 1 111111 I
        I   00 00 0 0 00 0 0  0   0   00   00    0    00    0    00    0 1  0    01  00  00 00
11 000 011111 I
Predicted ---------+---------+---------+---------+---------+---------+---------+---------+--------
-+----------
  Prob:   0       .1        .2        .3        .4        .5        .6        .7        .8        .9        1
  Group:
000000000000000000000000000000000000000000000000011111111111111
1111111111111111111111111111111111
```

Predicted Probability is of Membership for 1
The Cut Value is .50
Symbols: 0 - 0
1 - 1
Each Symbol Represents 1 Case.

Casewise List[b]

Case	Selected Status[a]	Observed fnlgrd	Predicted	Predicted Group	Temporary Variable Resid	Temporary Variable ZResid
15	S	1**	.076	0	.924	3.481
69	S	0**	.916	1	-.916	-3.292
145	S	0**	.909	1	-.909	-3.160
238	S	0**	.931	1	-.931	-3.685
251	S	0**	.896	1	-.896	-2.941

a. S = Selected, U = Unselected cases, and ** = Misclassified cases.

b. Cases with studentized residuals greater than 2.000 are listed.

```
LOGISTIC REGRESSION VARIABLES fnlgrd
  /METHOD=ENTER pretest ascgr adj096 numbmeet
  /CONTRAST (ascgr)=Indicator(1)
  /CONTRAST (adj096)=Indicator(1)
  /SAVE=PRED PGROUP COOK LEVER DFBETA ZRESID
  /CLASSPLOT
  /CASEWISE OUTLIER(2)
  /PRINT=GOODFIT ITER(1) CI(95)
  /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).
```

Logistic Regression

Notes

Output Created		20-Oct-2011 18:13:31
Comments		
Input	Data	C:\Users\Lin\Documents\math 096 fall 2001 with classrooms.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	252

Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing
Syntax		LOGISTIC REGRESSION VARIABLES fnlgrd /METHOD=ENTER pretest ascgr adj096 numbmeet /CONTRAST (ascgr)=Indicator(1) /CONTRAST (adj096)=Indicator(1) /SAVE=PRED PGROUP COOK LEVER DFBETA ZRESID /CLASSPLOT /CASEWISE OUTLIER(2) /PRINT=GOODFIT ITER(1) CI(95) /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).
Resources	Processor Time	00:00:00.047
	Elapsed Time	00:00:00.050
Variables Created or Modified	PRE_3	Predicted probability
	PGR_3	Predicted group
	COO_3	Analog of Cook's influence statistics
	LEV_3	Leverage value
	ZRE_3	Normalized residual
	DFB0_3	DFBETA for constant
	DFB1_3	DFBETA for pretest
	DFB2_3	DFBETA for ascgr(1)
	DFB3_3	DFBETA for adj096(1)
	DFB4_3	DFBETA for numbmeet

[DataSet1] C:\Users\Lin\Documents\math 096 fall 2001 with classrooms.sav

Case Processing Summary

Unweighted Cases[a]		N	Percent
Selected Cases	Included in Analysis	226	89.7
	Missing Cases	26	10.3
	Total	252	100.0
Unselected Cases		0	.0
Total		252	100.0

Case Processing Summary

Unweighted Cases[a]		N	Percent
Selected Cases	Included in Analysis	226	89.7
	Missing Cases	26	10.3
	Total	252	100.0
Unselected Cases		0	.0
Total		252	100.0

a. If weight is in effect, see classification table for the total number of cases.

Dependent Variable Encoding

Original Value	Internal Value
0	0
1	1

Categorical Variables Codings

			Parameter coding
		Frequency	(1)
adj096	0	119	.000
	1	107	1.000
ascgr	0	65	.000
	1	161	1.000

Block 0: Beginning Block

Iteration History[a,b,c]

Iteration			Coefficients
		-2 Log likelihood	Constant
Step 0	1	305.453	.372
	2	305.452	.376
	3	305.452	.376

a. Constant is included in the model.

b. Initial -2 Log Likelihood: 305.452

Iteration History[a,b,c]

Iteration		-2 Log likelihood	Coefficients
			Constant
Step 0	1	305.453	.372
	2	305.452	.376
	3	305.452	.376

a. Constant is included in the model.

b. Initial -2 Log Likelihood: 305.452

c. Estimation terminated at iteration number 3 because parameter estimates changed by less than .001.

Classification Table[a,b]

Observed			Predicted		
			fnlgrd		Percentage Correct
			0	1	
Step 0	fnlgrd	0	0	92	.0
		1	0	134	100.0
	Overall Percentage				59.3

a. Constant is included in the model.

b. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 0	Constant	.376	.135	7.714	1	.005	1.457

Variables not in the Equation

			Score	df	Sig.
Step 0	Variables	pretest	15.997	1	.000
		ascgr(1)	45.456	1	.000
		adj096(1)	8.196	1	.004
		numbmeet	9.660	1	.002

Variables not in the Equation

			Score	df	Sig.
Step 0	Variables	pretest	15.997	1	.000
		ascgr(1)	45.456	1	.000
		adj096(1)	8.196	1	.004
		numbmeet	9.660	1	.002
	Overall Statistics		78.216	4	.000

Block 1: Method = Enter

Iteration History[a,b,c,d]

Iteration		-2 Log likelihood	Coefficients				
			Constant	pretest	ascgr(1)	adj096(1)	numbmeet
Step 1	1	220.828	-1.729	.030	2.116	.588	-.251
	2	213.026	-2.375	.044	2.827	.899	-.385
	3	212.562	-2.562	.049	3.059	1.006	-.429
	4	212.559	-2.577	.049	3.079	1.015	-.433
	5	212.559	-2.577	.049	3.079	1.015	-.433

a. Method: Enter

b. Constant is included in the model.

c. Initial -2 Log Likelihood: 305.452

d. Estimation terminated at iteration number 5 because parameter estimates changed by less than .001.

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	92.893	4	.000
	Block	92.893	4	.000
	Model	92.893	4	.000

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	212.559[a]	.337	.455

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	212.559[a]	.337	.455

a. Estimation terminated at iteration number 5 because parameter estimates changed by less than .001.

Hosmer and Lemeshow Test

Step	Chi-square	Df	Sig.
1	6.372	8	.606

Contingency Table for Hosmer and Lemeshow Test

		fnlgrd = 0		fnlgrd = 1		
		Observed	Expected	Observed	Expected	Total
Step 1	1	23	22.300	1	1.700	24
	2	18	18.209	5	4.791	23
	3	15	14.256	8	8.744	23
	4	9	11.548	14	11.452	23
	5	12	8.762	10	13.238	22
	6	6	6.973	17	16.027	23
	7	2	4.529	20	17.471	22
	8	4	2.645	15	16.355	19
	9	2	1.974	21	21.026	23
	10	1	.804	23	23.196	24

Classification Table[a]

Observed			Predicted		
			fnlgrd		Percentage Correct
			0	1	
Step 1	fnlgrd	0	62	30	67.4
		1	20	114	85.1
	Overall Percentage				77.9

a. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	pretest	.049	.012	16.454	1	.000	1.050
	ascgr(1)	3.079	.464	44.021	1	.000	21.747
	adj096(1)	1.015	.431	5.554	1	.018	2.760
	numbmeet	-.433	.160	7.284	1	.007	.649
	Constant	-2.577	.864	8.891	1	.003	.076

a. Variable(s) entered on step 1: pretest, ascgr, adj096, numbmeet.

Variables in the Equation

		95% C.I.for EXP(B)	
		Lower	Upper
Step 1[a]	pretest	1.026	1.075
	ascgr(1)	8.756	54.009
	adj096(1)	1.186	6.423
	numbmeet	.474	.888
	Constant		

a. Variable(s) entered on step 1: pretest, ascgr, adj096, numbmeet.

Step number: 1

Observed Groups and Predicted Probabilities

```
     16 +                                                                            +
        I                                                                            I
        I                                                                            I
F       I                                                                            I
R    12 +                                                                            +
E       I                                                                            I
Q       I                                                                            I
U       I                                                 1             1            I
E     8 +                                                 1             1   1        +
N       I                              1        1         1             1   1 1 1  I
C       I                              1        11        1         1    1   1 1 1  I
Y       I          1           1        1   1     11   1    11    1    1   11 1 1 1   111
11 I
      4 +    01       0     1          11         1 1   1 1    11    1     11    1    11    11 1 1 1
111 11 +
        I  000       01    01   1        00     11    0 0    011     10    0 11   11     1 1 11   111 1
1 1 1 111 11 I
        I  000000     000    00  0    00    00      11    000    010     00    0 10  0111   0 1 10
111 11111 1 111 11 I
        I  000000 0000000    00   0   000   000 0   00   0000     000 1   000   0 00   0010   0
1 10 1110 010000111011111 I
Predicted ---------+---------+---------+---------+---------+---------+---------+---------+--------
-+----------
  Prob:   0       .1        .2        .3        .4        .5        .6        .7        .8        .9        1
  Group:
000000000000000000000000000000000000000000000000011111111111111
1111111111111111111111111111111111
```

Predicted Probability is of Membership for 1
The Cut Value is .50
Symbols: 0 - 0
1 - 1
Each Symbol Represents 1 Case.

Casewise List[b]

Case	Selected Status[a]	Observed fnlgrd	Predicted	Predicted Group	Temporary Variable Resid	Temporary Variable ZResid
15	S	1**	.058	0	.942	4.015
44	S	0**	.890	1	-.890	-2.840
69	S	0**	.946	1	-.946	-4.174
80	S	0**	.893	1	-.893	-2.890
145	S	0**	.905	1	-.905	-3.095
147	S	1**	.142	0	.858	2.460
168	S	0**	.876	1	-.876	-2.661
177	S	1**	.139	0	.861	2.487
238	S	0**	.859	1	-.859	-2.465

a. S = Selected, U = Unselected cases, and ** = Misclassified cases.

b. Cases with studentized residuals greater than 2.000 are listed.

```
LOGISTIC REGRESSION VARIABLES fnlgrd
  /METHOD=ENTER pretest ascgr adj096 numbmeet mozartuse
  /CONTRAST (ascgr)=Indicator(1)
  /CONTRAST (adj096)=Indicator(1)
  /CONTRAST (mozartuse)=Indicator(1)
  /SAVE=PRED PGROUP COOK LEVER DFBETA ZRESID
  /CLASSPLOT
  /CASEWISE OUTLIER(2)
  /PRINT=GOODFIT ITER(1) CI(95)
  /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).
```

Logistic Regression

Notes

Output Created		20-Oct-2011 18:14:33
Comments		
Input	Data	C:\Users\Lin\Documents\math 096 fall 2001 with classrooms.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>

	Split File	<none>
	N of Rows in Working Data File	252
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing
Syntax		LOGISTIC REGRESSION VARIABLES fnlgrd /METHOD=ENTER pretest ascgr adj096 numbmeet mozartuse /CONTRAST (ascgr)=Indicator(1) /CONTRAST (adj096)=Indicator(1) /CONTRAST (mozartuse)=Indicator(1) /SAVE=PRED PGROUP COOK LEVER DFBETA ZRESID /CLASSPLOT /CASEWISE OUTLIER(2) /PRINT=GOODFIT ITER(1) CI(95) /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).
Resources	Processor Time	00:00:00.062
	Elapsed Time	00:00:00.073
Variables Created or Modified	PRE_4	Predicted probability
	PGR_4	Predicted group
	COO_4	Analog of Cook's influence statistics
	LEV_4	Leverage value
	ZRE_4	Normalized residual
	DFB0_4	DFBETA for constant
	DFB1_4	DFBETA for pretest
	DFB2_4	DFBETA for ascgr(1)
	DFB3_4	DFBETA for adj096(1)
	DFB4_4	DFBETA for numbmeet
	DFB5_4	DFBETA for mozartuse(1)

[DataSet1] C:\Users\Lin\Documents\math 096 fall 2001 with classrooms.sav

Case Processing Summary

Unweighted Cases[a]		N	Percent
Selected Cases	Included in Analysis	226	89.7
	Missing Cases	26	10.3
	Total	252	100.0
Unselected Cases		0	.0
Total		252	100.0

a. If weight is in effect, see classification table for the total number of cases.

Dependent Variable Encoding

Original Value	Internal Value
0	0
1	1

Categorical Variables Codings

		Frequency	Parameter coding (1)
mozartuse	0	184	.000
	1	42	1.000
adj096	0	119	.000
	1	107	1.000
ascgr	0	65	.000
	1	161	1.000

Block 0: Beginning Block

Iteration History[a,b,c]

Iteration		-2 Log likelihood	Coefficients Constant
Step 0	1	305.453	.372
	2	305.452	.376
	3	305.452	.376

a. Constant is included in the model.

b. Initial -2 Log Likelihood: 305.452

Iteration History[a,b,c]

Iteration		-2 Log likelihood	Coefficients Constant
Step 0	1	305.453	.372
	2	305.452	.376
	3	305.452	.376

a. Constant is included in the model.

b. Initial -2 Log Likelihood: 305.452

c. Estimation terminated at iteration number 3 because parameter estimates changed by less than .001.

Classification Table[a,b]

Observed			Predicted: fnlgrd 0	Predicted: fnlgrd 1	Percentage Correct
Step 0	fnlgrd	0	0	92	.0
		1	0	134	100.0
	Overall Percentage				59.3

a. Constant is included in the model.

b. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 0	Constant	.376	.135	7.714	1	.005	1.457

Variables not in the Equation

			Score	df	Sig.
Step 0	Variables	Pretest	15.997	1	.000
		ascgr(1)	45.456	1	.000
		adj096(1)	8.196	1	.004
		Numbmeet	9.660	1	.002
		mozartuse(1)	11.881	1	.001
	Overall Statistics		79.920	5	.000

Block 1: Method = Enter

Iteration History[a,b,c,d]

Iteration			Coefficients			
		-2 Log likelihood	Constant	pretest	ascgr(1)	adj096(1)
Step 1	1	219.005	-1.757	.029	2.093	.481
	2	211.155	-2.457	.044	2.808	.767
	3	210.701	-2.660	.049	3.035	.870
	4	210.699	-2.675	.049	3.054	.879
	5	210.699	-2.676	.049	3.054	.879

a. Method: Enter

b. Constant is included in the model.

c. Initial -2 Log Likelihood: 305.452

d. Estimation terminated at iteration number 5 because parameter estimates changed by less than .001.

Iteration History[a,b,c,d]

Iteration		Coefficients	
		numbmeet	mozartuse(1)
Step 1	1	-.193	-.527
	2	-.306	-.658
	3	-.346	-.674
	4	-.349	-.674
	5	-.349	-.674

a. Method: Enter

b. Constant is included in the model.

c. Initial -2 Log Likelihood: 305.452

d. Estimation terminated at iteration number 5 because parameter estimates changed by less than .001.

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	94.753	5	.000
	Block	94.753	5	.000
	Model	94.753	5	.000

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	210.699[a]	.342	.462

a. Estimation terminated at iteration number 5 because parameter estimates changed by less than .001.

Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	2.966	8	.936

Contingency Table for Hosmer and Lemeshow Test

		fnlgrd = 0		fnlgrd = 1		Total
		Observed	Expected	Observed	Expected	
Step 1	1	21	21.414	2	1.586	23
	2	19	18.495	4	4.505	23
	3	16	14.927	7	8.073	23
	4	9	11.073	13	10.927	22
	5	9	9.391	14	13.609	23
	6	8	6.881	15	16.119	23
	7	4	4.405	19	18.595	23
	8	3	2.940	20	20.060	23
	9	3	1.842	20	21.158	23
	10	0	.632	20	19.368	20

Classification Table[a]

Observed			Predicted		
			fnlgrd		Percentage Correct
			0	1	
Step 1	fnlgrd	0	64	28	69.6
		1	20	114	85.1
	Overall Percentage				78.8

a. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	pretest	.049	.012	16.171	1	.000	1.050
	ascgr(1)	3.054	.460	44.058	1	.000	21.199
	adj096(1)	.879	.444	3.910	1	.048	2.408
	numbmeet	-.349	.171	4.143	1	.042	.705
	mozartuse(1)	-.674	.497	1.840	1	.175	.510
	Constant	-2.676	.876	9.323	1	.002	.069

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	pretest	.049	.012	16.171	1	.000	1.050
	ascgr(1)	3.054	.460	44.058	1	.000	21.199
	adj096(1)	.879	.444	3.910	1	.048	2.408
	numbmeet	-.349	.171	4.143	1	.042	.705
	mozartuse(1)	-.674	.497	1.840	1	.175	.510
	Constant	-2.676	.876	9.323	1	.002	.069

a. Variable(s) entered on step 1: pretest, ascgr, adj096, numbmeet, mozartuse.

Variables in the Equation

		95% C.I.for EXP(B)	
		Lower	Upper
Step 1[a]	pretest	1.025	1.075
	ascgr(1)	8.604	52.234
	adj096(1)	1.008	5.754
	numbmeet	.504	.987
	mozartuse(1)	.193	1.350
	Constant		

a. Variable(s) entered on step 1: pretest, ascgr, adj096, numbmeet, mozartuse.

Step number: 1

Observed Groups and Predicted Probabilities

```
     16 +                                                                            +
        I                                                                           I
        I                                                                           I
F       I                                                                           I
R    12 +                                                                            +
E       I                                                                 1          I
Q       I                                                                 1          I
U       I                                                                 1          I
E     8 +                                  1                1            1     1          +
N       I                                 1                1    1       1     1     1  1  I
C       I                      1          1       1        1    1       1     1   1 11 1  I
Y       I              1       1          1    1  1        1    1       1 1   1   1 11 11 I
      4 +             100   1      1    0         0 1  1  1   1     10    1        1 1 1111  1
11 11 +
        I 0     0      000   0   0     1    0        0 0  1 10   1 1   10    0  11  1 1 1 1
11111 1 11 11 I
        I 0000 0 0 1 0  000   00  00   10    00   10    010  1100  11 1   00    01 11  1
110 111110111 11111 I
        I 0000001000000 000   00 100  000   000  100   1000  1000  01 10  000
1101 11  011001110000111 01111 I
Predicted ---------+---------+---------+---------+---------+---------+---------+---------+--------
-+----------
  Prob:   0       .1        .2        .3        .4        .5        .6        .7        .8        .9        1
  Group:
000000000000000000000000000000000000000000000000011111111111111
11111111111111111111111111111111111
```

Predicted Probability is of Membership for 1
The Cut Value is .50
Symbols: 0 - 0
1 - 1
Each Symbol Represents 1 Case.

Casewise List[b]

Case	Selected Status[a]	Observed fnlgrd	Predicted	Predicted Group	Temporary Variable Resid	Temporary Variable ZResid
15	S	1**	.078	0	.922	3.430
44	S	0**	.893	1	-.893	-2.894
69	S	0**	.940	1	-.940	-3.974
80	S	0**	.884	1	-.884	-2.754
145	S	0**	.867	1	-.867	-2.549
147	S	1**	.103	0	.897	2.946
168	S	0**	.897	1	-.897	-2.945
238	S	0**	.876	1	-.876	-2.660

a. S = Selected, U = Unselected cases, and ** = Misclassified cases.

b. Cases with studentized residuals greater than 2.000 are listed.

```
LOGISTIC REGRESSION VARIABLES fnlgrd
  /METHOD=ENTER pretest ascgr adj096 numbmeet techsex
  /CONTRAST (ascgr)=Indicator(1)
  /CONTRAST (adj096)=Indicator(1)
  /CONTRAST (techsex)=Indicator(1)
  /SAVE=PRED PGROUP COOK LEVER DFBETA ZRESID
  /CLASSPLOT
  /CASEWISE OUTLIER(2)
  /PRINT=GOODFIT ITER(1) CI(95)
  /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).
```

Logistic Regression

Notes

Output Created		20-Oct-2011 18:17:31
Comments		
Input	Data	C:\Users\Lin\Documents\math 096 fall 2001 with classrooms.sav
	Active Dataset	DataSet1
	Filter	<none>

	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	252
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing
Syntax		LOGISTIC REGRESSION VARIABLES fnlgrd /METHOD=ENTER pretest ascgr adj096 numbmeet techsex /CONTRAST (ascgr)=Indicator(1) /CONTRAST (adj096)=Indicator(1) /CONTRAST (techsex)=Indicator(1) /SAVE=PRED PGROUP COOK LEVER DFBETA ZRESID /CLASSPLOT /CASEWISE OUTLIER(2) /PRINT=GOODFIT ITER(1) CI(95) /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).
Resources	Processor Time	00:00:00.032
	Elapsed Time	00:00:00.056
Variables Created or Modified	PRE_5	Predicted probability
	PGR_5	Predicted group
	COO_5	Analog of Cook's influence statistics
	LEV_5	Leverage value
	ZRE_5	Normalized residual
	DFB0_5	DFBETA for constant
	DFB1_5	DFBETA for pretest
	DFB2_5	DFBETA for ascgr(1)
	DFB3_5	DFBETA for adj096(1)
	DFB4_5	DFBETA for numbmeet
	DFB5_5	DFBETA for techsex(1)

[DataSet1] C:\Users\Lin\Documents\math 096 fall 2001 with classrooms.sav

Case Processing Summary

Unweighted Cases[a]		N	Percent
Selected Cases	Included in Analysis	226	89.7
	Missing Cases	26	10.3
	Total	252	100.0
Unselected Cases		0	.0
Total		252	100.0

a. If weight is in effect, see classification table for the total number of cases.

Dependent Variable Encoding

Original Value	Internal Value
0	0
1	1

Categorical Variables Codings

		Frequency	Parameter coding
			(1)
techsex	0	149	.000
	1	77	1.000
adj096	0	119	.000
	1	107	1.000
ascgr	0	65	.000
	1	161	1.000

Block 0: Beginning Block

Iteration History[a,b,c]

Iteration		-2 Log likelihood	Coefficients
			Constant
Step 0	1	305.453	.372
	2	305.452	.376
	3	305.452	.376

a. Constant is included in the model.

b. Initial -2 Log Likelihood: 305.452

Iteration History[a,b,c]

Iteration		-2 Log likelihood	Coefficients Constant
Step 0	1	305.453	.372
	2	305.452	.376
	3	305.452	.376

a. Constant is included in the model.

b. Initial -2 Log Likelihood: 305.452

c. Estimation terminated at iteration number 3 because parameter estimates changed by less than .001.

Classification Table[a,b]

Observed			Predicted fnlgrd 0	Predicted fnlgrd 1	Predicted Percentage Correct
Step 0	fnlgrd	0	0	92	.0
		1	0	134	100.0
	Overall Percentage				59.3

a. Constant is included in the model.

b. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 0	Constant	.376	.135	7.714	1	.005	1.457

Variables not in the Equation

			Score	df	Sig.
Step 0	Variables	Pretest	15.997	1	.000
		ascgr(1)	45.456	1	.000
		adj096(1)	8.196	1	.004
		Numbmeet	9.660	1	.002
		techsex(1)	12.438	1	.000
	Overall Statistics		81.407	5	.000

Block 1: Method = Enter

Iteration History[a,b,c,d]

Iteration		-2 Log likelihood	Coefficients			
			Constant	pretest	ascgr(1)	adj096(1)
Step 1	1	216.964	-2.287	.028	2.069	.707
	2	207.925	-3.207	.043	2.799	1.072
	3	207.288	-3.503	.048	3.062	1.200
	4	207.283	-3.530	.048	3.090	1.213
	5	207.283	-3.530	.048	3.090	1.213

a. Method: Enter

b. Constant is included in the model.

c. Initial -2 Log Likelihood: 305.452

d. Estimation terminated at iteration number 5 because parameter estimates changed by less than .001.

Iteration History[a,b,c,d]

Iteration		Coefficients	
		numbmeet	techsex(1)
Step 1	1	-.139	.563
	2	-.231	.846
	3	-.267	.941
	4	-.271	.949
	5	-.271	.949

a. Method: Enter

b. Constant is included in the model.

c. Initial -2 Log Likelihood: 305.452

d. Estimation terminated at iteration number 5 because parameter estimates changed by less than .001.

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	98.168	5	.000
	Block	98.168	5	.000
	Model	98.168	5	.000

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	207.283[a]	.352	.475

a. Estimation terminated at iteration number 5 because parameter estimates changed by less than .001.

Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	7.905	8	.443

Contingency Table for Hosmer and Lemeshow Test

		fnlgrd = 0		fnlgrd = 1		
		Observed	Expected	Observed	Expected	Total
Step 1	1	22	22.399	2	1.601	24
	2	18	18.504	5	4.496	23
	3	18	14.416	5	8.584	23
	4	9	11.674	14	11.326	23
	5	9	9.042	13	12.958	22
	6	5	6.903	18	16.097	23
	7	5	4.718	20	20.282	25
	8	5	2.512	17	19.488	22
	9	1	1.443	22	21.557	23
	10	0	.390	18	17.610	18

Classification Table[a]

Observed			Predicted		
			fnlgrd		Percentage Correct
			0	1	
Step 1	fnlgrd	0	63	29	68.5
		1	20	114	85.1
	Overall Percentage				78.3

a. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	pretest	.048	.012	15.304	1	.000	1.050
	ascgr(1)	3.090	.471	43.015	1	.000	21.974
	adj096(1)	1.213	.445	7.442	1	.006	3.365
	numbmeet	-.271	.178	2.336	1	.126	.762
	techsex(1)	.949	.423	5.049	1	.025	2.584
	Constant	-3.530	.990	12.714	1	.000	.029

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	pretest	.048	.012	15.304	1	.000	1.050
	ascgr(1)	3.090	.471	43.015	1	.000	21.974
	adj096(1)	1.213	.445	7.442	1	.006	3.365
	numbmeet	-.271	.178	2.336	1	.126	.762
	techsex(1)	.949	.423	5.049	1	.025	2.584
	Constant	-3.530	.990	12.714	1	.000	.029

a. Variable(s) entered on step 1: pretest, ascgr, adj096, numbmeet, techsex.

Variables in the Equation

		95% C.I.for EXP(B)	
		Lower	Upper
Step 1[a]	pretest	1.024	1.075
	ascgr(1)	8.727	55.324
	adj096(1)	1.407	8.046
	numbmeet	.538	1.080
	techsex(1)	1.129	5.916
	Constant		

a. Variable(s) entered on step 1: pretest, ascgr, adj096, numbmeet, techsex.

Step number: 1

Observed Groups and Predicted Probabilities

```
     16 +                                                                  +
        I                                                                  I
        I                                                                  I
F        I                                                                  I
R     12 +                                                                  +
E        I                                                                  I
Q        I                                                                  I
U        I                                                            1     I
E      8 +                              1                               1 1  1 +
N        I                             1          1        1        1 1  1 I
C        I  0                      1         1          1        1    1   1 1 11 I
Y        I  0                      1         11    1   1   1         1    1 1 1 1 11 I
      4 +   0      0 1                  1     0 1   1    11     1   11    1    11  1   11 1 11 1 1
1 11 +
        I   00     0 1      0        1 0     0    00 1   1    00  1 11    11     11    11   11   11 1
11 111 1 11 I
        I 0 000   00 01011 00     00 0 0    10  1 00 0  11 1  00  1 00   11 1 111   10
11 11111101101111 11 I
        I 0 000 0000100000 00 0   00 0 0000 00 00 00 00 0110  00 00100   10 0
0001  10  01 1000010110111111111I
Predicted ---------+---------+---------+---------+---------+---------+---------+---------+--------
-+----------
  Prob:   0        .1        .2        .3        .4        .5        .6        .7        .8        .9        1
  Group:
000000000000000000000000000000000000000000000000000001111111111111
1111111111111111111111111111111111
```

Predicted Probability is of Membership for 1
The Cut Value is .50
Symbols: 0 - 0
1 - 1
Each Symbol Represents 1 Case.

Casewise List[b]

Case	Selected Status[a]	Observed fnlgrd	Predicted	Predicted Group	Temporary Variable Resid	Temporary Variable ZResid
15	S	1**	.119	0	.881	2.720
44	S	0**	.916	1	-.916	-3.300
51	S	0**	.887	1	-.887	-2.797
59	S	0**	.860	1	-.860	-2.478
67	S	1**	.131	0	.869	2.574
69	S	0**	.918	1	-.918	-3.336
145	S	0**	.889	1	-.889	-2.824
147	S	1**	.121	0	.879	2.694
177	S	1**	.125	0	.875	2.651
238	S	0**	.863	1	-.863	-2.506

a. S = Selected, U = Unselected cases, and ** = Misclassified cases.

b. Cases with studentized residuals greater than 2.000 are listed.

```
LOGISTIC REGRESSION VARIABLES fnlgrd
  /METHOD=ENTER pretest ascgr adj096 techsex amisone
  /CONTRAST (ascgr)=Indicator(1)
  /CONTRAST (adj096)=Indicator(1)
  /CONTRAST (techsex)=Indicator(1)
  /CONTRAST (amisone)=Indicator(1)
  /SAVE=PRED PGROUP COOK LEVER DFBETA ZRESID
  /CLASSPLOT
  /CASEWISE OUTLIER(2)
  /PRINT=GOODFIT ITER(1) CI(95)
  /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).
```

Logistic Regression

Notes

Output Created		20-Oct-2011 18:19:28
Comments		
Input	Data	C:\Users\Lin\Documents\math 096 fall 2001 with classrooms.sav
	Active Dataset	DataSet1

	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	252
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing
Syntax		LOGISTIC REGRESSION VARIABLES fnlgrd /METHOD=ENTER pretest ascgr adj096 techsex amisone /CONTRAST (ascgr)=Indicator(1) /CONTRAST (adj096)=Indicator(1) /CONTRAST (techsex)=Indicator(1) /CONTRAST (amisone)=Indicator(1) /SAVE=PRED PGROUP COOK LEVER DFBETA ZRESID /CLASSPLOT /CASEWISE OUTLIER(2) /PRINT=GOODFIT ITER(1) CI(95) /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).
Resources	Processor Time	00:00:00.032
	Elapsed Time	00:00:00.048
Variables Created or Modified	PRE_6	Predicted probability
	PGR_6	Predicted group
	COO_6	Analog of Cook's influence statistics
	LEV_6	Leverage value
	ZRE_6	Normalized residual
	DFB0_6	DFBETA for constant
	DFB1_6	DFBETA for pretest
	DFB2_6	DFBETA for ascgr(1)
	DFB3_6	DFBETA for adj096(1)
	DFB4_6	DFBETA for techsex(1)
	DFB5_6	DFBETA for amisone(1)

[DataSet1] C:\Users\Lin\Documents\math 096 fall 2001 with classrooms.sav

Case Processing Summary

Unweighted Cases[a]		N	Percent
Selected Cases	Included in Analysis	223	88.5
	Missing Cases	29	11.5
	Total	252	100.0
Unselected Cases		0	.0
Total		252	100.0

a. If weight is in effect, see classification table for the total number of cases.

Dependent Variable Encoding

Original Value	Internal Value
0	0
1	1

Categorical Variables Codings

		Frequency	Parameter coding (1)
amisone	0	140	.000
	1	83	1.000
adj096	0	119	.000
	1	104	1.000
techsex	0	148	.000
	1	75	1.000
ascgr	0	64	.000
	1	159	1.000

Block 0: Beginning Block

Iteration History[a,b,c]

Iteration		-2 Log likelihood	Coefficients
			Constant
Step 0	1	300.801	.386
	2	300.800	.391
	3	300.800	.391

a. Constant is included in the model.

b. Initial -2 Log Likelihood: 300.800

c. Estimation terminated at iteration number 3 because parameter estimates changed by less than .001.

Classification Table[a,b]

Observed			Predicted		
			fnlgrd		Percentage Correct
			0	1	
Step 0	fnlgrd	0	0	90	.0
		1	0	133	100.0
	Overall Percentage				59.6

a. Constant is included in the model.

b. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 0	Constant	.391	.136	8.187	1	.004	1.478

Variables not in the Equation

			Score	df	Sig.
Step 0	Variables	pretest	16.870	1	.000
		ascgr(1)	44.750	1	.000
		adj096(1)	9.014	1	.003
		techsex(1)	12.564	1	.000
		amisone(1)	5.763	1	.016
	Overall Statistics		83.477	5	.000

Block 1: Method = Enter

Iteration History[a,b,c,d]

Iteration			Coefficients			
		-2 Log likelihood	Constant	pretest	ascgr(1)	adj096(1)
Step 1	1	209.635	-2.696	.029	2.062	.788
	2	198.718	-4.015	.046	2.848	1.250
	3	197.729	-4.552	.052	3.178	1.445
	4	197.716	-4.622	.053	3.222	1.470
	5	197.716	-4.623	.053	3.223	1.471
	6	197.716	-4.623	.053	3.223	1.471

a. Method: Enter

b. Constant is included in the model.

c. Initial -2 Log Likelihood: 300.800

d. Estimation terminated at iteration number 6 because parameter estimates changed by less than .001.

Iteration History[a,b,c,d]

Iteration		Coefficients	
		techsex(1)	amisone(1)
Step 1	1	.665	-.452
	2	1.051	-.736
	3	1.209	-.856
	4	1.229	-.871
	5	1.229	-.871
	6	1.229	-.871

a. Method: Enter

b. Constant is included in the model.

c. Initial -2 Log Likelihood: 300.800

d. Estimation terminated at iteration number 6 because parameter estimates changed by less than .001.

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	103.084	5	.000
	Block	103.084	5	.000
	Model	103.084	5	.000

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	197.716[a]	.370	.500

a. Estimation terminated at iteration number 6 because parameter estimates changed by less than .001.

Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	8.734	8	.365

Contingency Table for Hosmer and Lemeshow Test

		fnlgrd = 0		fnlgrd = 1		
		Observed	Expected	Observed	Expected	Total
Step 1	1	19	20.760	3	1.240	22
	2	19	18.261	3	3.739	22
	3	17	14.460	5	7.540	22
	4	12	11.494	10	10.506	22
	5	8	9.082	14	12.918	22
	6	6	7.262	17	15.738	23
	7	3	4.517	21	19.483	24
	8	5	2.461	17	19.539	22
	9	1	1.366	23	22.634	24
	10	0	.336	20	19.664	20

Classification Table[a]

Observed			Predicted		
			fnlgrd		Percentage Correct
			0	1	
Step 1	fnlgrd	0	66	24	73.3
		1	19	114	85.7
	Overall Percentage				80.7

a. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	pretest	.053	.013	16.667	1	.000	1.055
	ascgr(1)	3.223	.493	42.791	1	.000	25.095
	adj096(1)	1.471	.427	11.857	1	.001	4.352
	techsex(1)	1.229	.405	9.211	1	.002	3.417
	amisone(1)	-.871	.389	5.030	1	.025	.418
	Constant	-4.623	.780	35.121	1	.000	.010

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	pretest	.053	.013	16.667	1	.000	1.055
	ascgr(1)	3.223	.493	42.791	1	.000	25.095
	adj096(1)	1.471	.427	11.857	1	.001	4.352
	techsex(1)	1.229	.405	9.211	1	.002	3.417
	amisone(1)	-.871	.389	5.030	1	.025	.418
	Constant	-4.623	.780	35.121	1	.000	.010

a. Variable(s) entered on step 1: pretest, ascgr, adj096, techsex, amisone.

Variables in the Equation

		95% C.I.for EXP(B)	
		Lower	Upper
Step 1[a]	pretest	1.028	1.082
	ascgr(1)	9.555	65.905
	adj096(1)	1.884	10.052
	techsex(1)	1.545	7.556
	amisone(1)	.195	.896
	Constant		

a. Variable(s) entered on step 1: pretest, ascgr, adj096, techsex, amisone.

Step number: 1

Observed Groups and Predicted Probabilities

```
     16 +                                                                            +
        I                                                                           I
        I                                                                           I
F       I                                                                           I
R    12 +                                                                            +
E       I                                                                           I
Q       I                                                                           I
U       I                                    1                                1 1 I
E     8 +                                     1                                1 1 +
N       I                                  1 1                               1 1 1 I
C       I                                  1 1          1                     1 1 11I
Y       I 0         1   1                1    1 0          1     1           11 1    11 1 1 11I
      4 + 0          0   0                0     1 0       1 1 0 1   1          1  11 1 1 1111 1
1 11+
        I 0 0     1  00   0     0  1  0   0      0    0 0     1  1 1 0 1    1  1       111  11
1111111 111 11I
        I 000 0  00 1000  00     0  0 10   0     1 10  0 0 0     111 1 1 0 1 1 0111     11
111 111 01011111111 11I
        I 000000 0010000  001   0 00 000 00    0 000 0 0 0 1  0100011 00110
01001 1 00 101 110 01001101111111I
Predicted ---------+---------+---------+---------+---------+---------+---------+---------+--------
-+----------
  Prob:   0       .1        .2        .3        .4        .5        .6        .7        .8        .9        1
  Group:
000000000000000000000000000000000000000000000000001111111111111
1111111111111111111111111111111111
```

Predicted Probability is of Membership for 1
The Cut Value is .50
Symbols: 0 - 0
1 - 1
Each Symbol Represents 1 Case.

Casewise List[b]

Case	Selected Status[a]	Observed fnlgrd	Predicted	Predicted Group	Temporary Variable Resid	Temporary Variable ZResid
15	S	1**	.106	0	.894	2.904
44	S	0**	.924	1	-.924	-3.481
51	S	0**	.896	1	-.896	-2.940
59	S	0**	.869	1	-.869	-2.573
67	S	1**	.110	0	.890	2.837
77	S	1**	.140	0	.860	2.483
145	S	0**	.880	1	-.880	-2.711
147	S	1**	.092	0	.908	3.150
168	S	0**	.888	1	-.888	-2.809
238	S	0**	.866	1	-.866	-2.541

a. S = Selected, U = Unselected cases, and ** = Misclassified cases.

b. Cases with studentized residuals greater than 2.000 are listed.

```
LOGISTIC REGRESSION VARIABLES fnlgrd
  /METHOD=ENTER pretest ascgr adj096 techsex amisone act
  /CONTRAST (ascgr)=Indicator(1)
  /CONTRAST (adj096)=Indicator(1)
  /CONTRAST (techsex)=Indicator(1)
  /CONTRAST (amisone)=Indicator(1)
  /SAVE=PRED PGROUP COOK LEVER DFBETA ZRESID
  /CLASSPLOT
  /CASEWISE OUTLIER(2)
  /PRINT=GOODFIT ITER(1) CI(95)
  /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).
```

Logistic Regression

Notes

Output Created		20-Oct-2011 18:20:21
Comments		
Input	Data	C:\Users\Lin\Documents\math 096 fall 2001 with classrooms.sav
	Active Dataset	DataSet1

	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	252
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing
Syntax		LOGISTIC REGRESSION VARIABLES fnlgrd /METHOD=ENTER pretest ascgr adj096 techsex amisone act /CONTRAST (ascgr)=Indicator(1) /CONTRAST (adj096)=Indicator(1) /CONTRAST (techsex)=Indicator(1) /CONTRAST (amisone)=Indicator(1) /SAVE=PRED PGROUP COOK LEVER DFBETA ZRESID /CLASSPLOT /CASEWISE OUTLIER(2) /PRINT=GOODFIT ITER(1) CI(95) /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).
Resources	Processor Time	00:00:00.046
	Elapsed Time	00:00:00.081
Variables Created or Modified	PRE_7	Predicted probability
	PGR_7	Predicted group
	COO_7	Analog of Cook's influence statistics
	LEV_7	Leverage value
	ZRE_7	Normalized residual
	DFB0_7	DFBETA for constant
	DFB1_7	DFBETA for pretest
	DFB2_7	DFBETA for ascgr(1)
	DFB3_7	DFBETA for adj096(1)
	DFB4_7	DFBETA for techsex(1)
	DFB5_7	DFBETA for amisone(1)
	DFB6_7	DFBETA for act

[DataSet1] C:\Users\Lin\Documents\math 096 fall 2001 with classrooms.sav

Case Processing Summary

Unweighted Cases[a]		N	Percent
Selected Cases	Included in Analysis	168	66.7
	Missing Cases	84	33.3
	Total	252	100.0
Unselected Cases		0	.0
Total		252	100.0

a. If weight is in effect, see classification table for the total number of cases.

Dependent Variable Encoding

Original Value	Internal Value
0	0
1	1

Categorical Variables Codings

		Frequency	Parameter coding (1)
amisone	0	99	.000
	1	69	1.000
adj096	0	97	.000
	1	71	1.000
techsex	0	109	.000
	1	59	1.000
ascgr	0	47	.000
	1	121	1.000

Block 0: Beginning Block

Iteration History[a,b,c]

Iteration		-2 Log likelihood	Coefficients
			Constant
Step 0	1	230.008	.262
	2	230.008	.263
	3	230.008	.263

a. Constant is included in the model.

b. Initial -2 Log Likelihood: 230.008

c. Estimation terminated at iteration number 3 because parameter estimates changed by less than .001.

Classification Table[a,b]

Observed			Predicted		
			fnlgrd		Percentage Correct
			0	1	
Step 0	fnlgrd	0	0	73	.0
		1	0	95	100.0
	Overall Percentage				56.5

a. Constant is included in the model.

b. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 0	Constant	.263	.156	2.864	1	.091	1.301

Variables not in the Equation

			Score	df	Sig.
Step 0	Variables	Pretest	10.388	1	.001
		ascgr(1)	29.173	1	.000
		adj096(1)	7.778	1	.005
		techsex(1)	14.397	1	.000
		amisone(1)	4.930	1	.026
		Act	4.981	1	.026
	Overall Statistics		61.968	6	.000

Block 1: Method = Enter

Iteration History[a,b,c,d]

Iteration		-2 Log likelihood	Coefficients				
			Constant	pretest	ascgr(1)	adj096(1)	techsex(1)
Step 1	1	161.240	-5.689	.019	1.935	.946	.796
	2	153.535	-8.402	.030	2.694	1.455	1.165
	3	152.883	-9.455	.034	3.001	1.668	1.296
	4	152.876	-9.579	.035	3.039	1.696	1.310
	5	152.876	-9.580	.035	3.040	1.696	1.311
	6	152.876	-9.580	.035	3.040	1.696	1.311

a. Method: Enter

b. Constant is included in the model.

c. Initial -2 Log Likelihood: 230.008

d. Estimation terminated at iteration number 6 because parameter estimates changed by less than .001.

Iteration History[a,b,c,d]

Iteration		Coefficients	
		amisone(1)	act
Step 1	1	-.468	.227
	2	-.761	.341
	3	-.883	.385
	4	-.898	.391
	5	-.898	.391
	6	-.898	.391

a. Method: Enter

b. Constant is included in the model.

c. Initial -2 Log Likelihood: 230.008

d. Estimation terminated at iteration number 6 because parameter estimates changed by less than .001.

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	77.132	6	.000
	Block	77.132	6	.000
	Model	77.132	6	.000

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	152.876[a]	.368	.494

a. Estimation terminated at iteration number 6 because parameter estimates changed by less than .001.

Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	3.044	8	.932

Contingency Table for Hosmer and Lemeshow Test

		fnlgrd = 0		fnlgrd = 1		Total
		Observed	Expected	Observed	Expected	
Step 1	1	16	15.939	1	1.061	17
	2	14	14.234	3	2.766	17
	3	13	11.940	4	5.060	17
	4	10	9.745	7	7.255	17
	5	5	7.690	12	9.310	17
	6	7	6.464	11	11.536	18
	7	5	3.645	12	13.355	17
	8	2	2.212	15	14.788	17
	9	1	.911	16	16.089	17
	10	0	.220	14	13.780	14

Classification Table[a]

Observed			Predicted		
			fnlgrd		Percentage Correct
			0	1	
Step 1	fnlgrd	0	54	19	74.0
		1	17	78	82.1
	Overall Percentage				78.6

a. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	pretest	.035	.015	5.351	1	.021	1.035
	ascgr(1)	3.040	.571	28.334	1	.000	20.904
	adj096(1)	1.696	.516	10.786	1	.001	5.452
	techsex(1)	1.311	.450	8.493	1	.004	3.708
	amisone(1)	-.898	.441	4.146	1	.042	.407
	act	.391	.205	3.629	1	.057	1.478
	Constant	-9.580	2.996	10.224	1	.001	.000

a. Variable(s) entered on step 1: pretest, ascgr, adj096, techsex, amisone, act.

Variables in the Equation

		95% C.I.for EXP(B)	
		Lower	Upper
Step 1[a]	pretest	1.005	1.066
	ascgr(1)	6.825	64.024
	adj096(1)	1.981	15.002
	techsex(1)	1.536	8.953
	amisone(1)	.172	.967
	act	.989	2.209
	Constant		

a. Variable(s) entered on step 1: pretest, ascgr, adj096, techsex, amisone, act.

Step number: 1

Observed Groups and Predicted Probabilities

```
     16 +                                                                    +
        I                                                                    I
        I                                                                    I
F       I                                                                    I
R    12 +                                                                    +
E       I                                                                    I
Q       I                                                                    I
U       I                                                                  1 I
E     8 +                                                                  1 +
N       I                                                               1  1 I
C       I                                                       1       1  1 I
Y       I                               1                       1       1  1 I
      4 +       0 1           0           1           1         1    1        1 11 +
        I     1  0 0    1       1 0    0       1   1   1    1 1  1    1    1 1   1  111 1    1 1
11 I
        I  00 0 0  0 0 01 0      1 0 0  1 10    1  1 1   1   1   1111 101 1 1    1 0 1  1
111 1111 11 11111I
        I000000 0  00000000 00 00 000000 0 000 0 0 0000 0101010 1 00100000
011    10011  0 011 0011111101111I
Predicted ---------+---------+---------+---------+---------+---------+---------+---------+--------
-+----------
  Prob:   0       .1        .2        .3        .4        .5        .6        .7        .8        .9        1
  Group:
000000000000000000000000000000000000000000000000001111111111111
111111111111111111111111111111111111
```

Predicted Probability is of Membership for 1
The Cut Value is .50
Symbols: 0 - 0
1 - 1
Each Symbol Represents 1 Case.

Casewise List[b]

Case	Selected Status[a]	Observed fnlgrd	Predicted	Predicted Group	Temporary Variable Resid	Temporary Variable ZResid
15	S	1**	.128	0	.872	2.612
44	S	0**	.878	1	-.878	-2.683
51	S	0**	.952	1	-.952	-4.450
80	S	0**	.887	1	-.887	-2.796
147	S	1**	.073	0	.927	3.555

a. S = Selected, U = Unselected cases, and ** = Misclassified cases.

b. Cases with studentized residuals greater than 2.000 are listed.

Appendix X: SPSS Multiple Binary Logistic Regression Output for Intermediate Algebra

```
GET
  FILE='C:\Users\Lin\Documents\math 097 fall 2001 with classrooms no
names.sav'.
DATASET NAME DataSet1 WINDOW=FRONT.
LOGISTIC REGRESSION VARIABLES fnlgrd
  /METHOD=ENTER gender act comcol pretest ascgr
  /CONTRAST (gender)=Indicator(1)
  /CONTRAST (comcol)=Indicator(1)
  /CONTRAST (ascgr)=Indicator(1)
  /SAVE=PRED PGROUP COOK LEVER DFBETA ZRESID
  /CLASSPLOT
  /CASEWISE OUTLIER(2)
  /PRINT=GOODFIT ITER(1) CI(95)
  /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).
```

Logistic Regression

Notes

Output Created		20-Oct-2011 19:01:41
Comments		
Input	Data	C:\Users\Lin\Documents\math 097 fall 2001 with classrooms no names.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	675
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing

Syntax		LOGISTIC REGRESSION VARIABLES fnlgrd /METHOD=ENTER gender act comcol pretest ascgr /CONTRAST (gender)=Indicator(1) /CONTRAST (comcol)=Indicator(1) /CONTRAST (ascgr)=Indicator(1) /SAVE=PRED PGROUP COOK LEVER DFBETA ZRESID /CLASSPLOT /CASEWISE OUTLIER(2) /PRINT=GOODFIT ITER(1) CI(95) /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).
Resources	Processor Time	00:00:00.063
	Elapsed Time	00:00:00.053
Variables Created or Modified	PRE_1	Predicted probability
	PGR_1	Predicted group
	COO_1	Analog of Cook's influence statistics
	LEV_1	Leverage value
	ZRE_1	Normalized residual
	DFB0_1	DFBETA for constant
	DFB1_1	DFBETA for gender(1)
	DFB2_1	DFBETA for act
	DFB3_1	DFBETA for comcol(1)
	DFB4_1	DFBETA for pretest
	DFB5_1	DFBETA for ascgr(1)

[DataSet1] C:\Users\Lin\Documents\math 097 fall 2001 with classrooms no names.sav

Case Processing Summary

Unweighted Cases[a]		N	Percent
Selected Cases	Included in Analysis	474	70.2
	Missing Cases	201	29.8
	Total	675	100.0
Unselected Cases		0	.0

Total	675	100.0

a. If weight is in effect, see classification table for the total number of cases.

Dependent Variable Encoding

Original Value	Internal Value
0	0
1	1

Categorical Variables Codings

		Frequency	Parameter coding (1)
Ascgr	0	120	.000
	1	354	1.000
Comcol	0	374	.000
	1	100	1.000
Gender	0	279	.000
	1	195	1.000

Block 0: Beginning Block

Iteration History[a,b,c]

Iteration		-2 Log likelihood	Coefficients Constant
Step 0	1	591.845	.734
	2	591.712	.770
	3	591.712	.770

a. Constant is included in the model.

b. Initial -2 Log Likelihood: 591.712

c. Estimation terminated at iteration number 3 because parameter estimates changed by less than .001.

Classification Table[a,b]

Observed			Predicted fnlgrd 0	Predicted fnlgrd 1	Percentage Correct
Step 0	fnlgrd	0	0	150	.0
		1	0	324	100.0
	Overall Percentage				68.4

a. Constant is included in the model.

b. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 0	Constant	.770	.099	60.808	1	.000	2.160

Variables not in the Equation

			Score	df	Sig.
Step 0	Variables	gender(1)	10.690	1	.001
		Act	20.457	1	.000
		comcol(1)	10.449	1	.001
		Pretest	22.948	1	.000
		ascgr(1)	129.090	1	.000
	Overall Statistics		153.149	5	.000

Block 1: Method = Enter

Iteration History[a,b,c,d]

Iteration			Coefficients					
		-2 Log likelihood	Constant	gender(1)	act	comcol(1)	pretest	ascgr(1)
Step 1	1	444.500	-4.300	-.245	.177	-.403	.015	2.064
	2	434.615	-6.244	-.385	.269	-.572	.024	2.453
	3	434.338	-6.652	-.418	.288	-.603	.027	2.524
	4	434.338	-6.666	-.419	.288	-.604	.027	2.527
	5	434.338	-6.666	-.419	.288	-.604	.027	2.527

a. Method: Enter

b. Constant is included in the model.

c. Initial -2 Log Likelihood: 591.712

d. Estimation terminated at iteration number 5 because parameter estimates changed by less than .001.

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	157.374	5	.000
	Block	157.374	5	.000

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	157.374	5	.000
	Block	157.374	5	.000
	Model	157.374	5	.000

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	434.338[a]	.283	.396

a. Estimation terminated at iteration number 5 because parameter estimates changed by less than .001.

Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	10.358	8	.241

Contingency Table for Hosmer and Lemeshow Test

		fnlgrd = 0		fnlgrd = 1		
		Observed	Expected	Observed	Expected	Total
Step 1	1	37	40.664	11	7.336	48
	2	35	34.185	13	13.815	48
	3	21	23.310	26	23.690	47
	4	19	13.743	28	33.257	47
	5	12	10.363	35	36.637	47
	6	10	8.209	37	38.791	47
	7	5	6.721	42	40.279	47
	8	7	5.549	41	42.451	48
	9	4	4.397	45	44.603	49
	10	0	2.858	46	43.142	46

Classification Table[a]

Observed			Predicted fnlgrd 0	Predicted fnlgrd 1	Percentage Correct
Step 1	fnlgrd	0	87	63	58.0
		1	33	291	89.8
	Overall Percentage				79.7

a. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	gender(1)	-.419	.243	2.971	1	.085	.658
	act	.288	.112	6.682	1	.010	1.334
	comcol(1)	-.604	.291	4.313	1	.038	.547
	pretest	.027	.009	8.608	1	.003	1.027
	ascgr(1)	2.527	.263	92.191	1	.000	12.512
	Constant	-6.666	1.874	12.653	1	.000	.001

a. Variable(s) entered on step 1: gender, act, comcol, pretest, ascgr.

Variables in the Equation

		95% C.I.for EXP(B)	
		Lower	Upper
Step 1[a]	gender(1)	.409	1.059
	act	1.072	1.660
	comcol(1)	.309	.967
	pretest	1.009	1.045
	ascgr(1)	7.470	20.956
	Constant		

a. Variable(s) entered on step 1: gender, act, comcol, pretest, ascgr.

Step number: 1

Observed Groups and Predicted Probabilities

```
     32 +                                                                +
        I                                                              I
        I                                                              I
F       I                                                              I
R     24 +                                                               +
E       I                                                   1 11 11        I
Q       I                                                  1 1 11 111       I
U       I                                                 1 1 1 11 1111 1     I
E     16 +                                                 1 1 1 11 1111 1     +
N       I                                                 1 1 1 11 111111    I
C       I                         1                      1  1 1 1 1111 111111     I
Y       I                         0                      1  1 1 1 1111 111111     I
     8 +            1      1  1         0                    1 11  111 1 11111111111
+
       I          1   0  1 0 0  0          0                     1111 10 1111
1111111111111     I
       I         0 0  00 0010 00 0 1  1   1 10  01     1      1  11  1 11  011110011110
10010101111111    I
       I    0 00000000000000000000010000000 00 00  00 01 10 001 10
001110000 00000000000001000000000001111   I
Predicted ---------+---------+---------+---------+---------+---------+---------+---------+--------
-+----------
  Prob:   0       .1        .2        .3        .4        .5        .6        .7        .8        .9        1
  Group:
000000000000000000000000000000000000000000000000011111111111111
11111111111111111111111111111111111
```

Predicted Probability is of Membership for 1
The Cut Value is .50
Symbols: 0 - 0
    1 - 1
Each Symbol Represents 2 Cases.

Casewise List[b]

Case	Selected Status[a]	Observed fnlgrd	Predicted	Predicted Group	Temporary Variable Resid	Temporary Variable ZResid
32	S	0**	.877	1	-.877	-2.666
40	S	0**	.877	1	-.877	-2.666
204	S	0**	.903	1	-.903	-3.050
219	S	0**	.922	1	-.922	-3.441
232	S	1**	.130	0	.870	2.584
241	S	1**	.139	0	.861	2.493
292	S	0**	.914	1	-.914	-3.255
545	S	0**	.890	1	-.890	-2.850
595	S	0**	.905	1	-.905	-3.080
606	S	0**	.888	1	-.888	-2.822
614	S	0**	.890	1	-.890	-2.850
619	S	0**	.888	1	-.888	-2.822
635	S	0**	.886	1	-.886	-2.787

a. S = Selected, U = Unselected cases, and ** = Misclassified cases.

b. Cases with studentized residuals greater than 2.000 are listed.

```
LOGISTIC REGRESSION VARIABLES fnlgrd
  /METHOD=ENTER act comcol pretest ascgr
  /CONTRAST (comcol)=Indicator(1)
  /CONTRAST (ascgr)=Indicator(1)
  /SAVE=PRED PGROUP COOK LEVER DFBETA ZRESID
  /CLASSPLOT
  /CASEWISE OUTLIER(2)
  /PRINT=GOODFIT ITER(1) CI(95)
  /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).
```

Logistic Regression

Notes

Output Created		20-Oct-2011 19:02:47
Comments		
Input	Data	C:\Users\Lin\Documents\math 097 fall 2001 with classrooms no names.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	675
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing
Syntax		LOGISTIC REGRESSION VARIABLES fnlgrd /METHOD=ENTER act comcol pretest ascgr /CONTRAST (comcol)=Indicator(1) /CONTRAST (ascgr)=Indicator(1) /SAVE=PRED PGROUP COOK LEVER DFBETA ZRESID /CLASSPLOT /CASEWISE OUTLIER(2) /PRINT=GOODFIT ITER(1) CI(95) /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).
Resources	Processor Time	00:00:00.078
	Elapsed Time	00:00:00.051
Variables Created or Modified	PRE_2	Predicted probability
	PGR_2	Predicted group
	COO_2	Analog of Cook's influence statistics
	LEV_2	Leverage value
	ZRE_2	Normalized residual
	DFB0_2	DFBETA for constant
	DFB1_2	DFBETA for act
	DFB2_2	DFBETA for comcol(1)

DFB3_2	DFBETA for pretest
DFB4_2	DFBETA for ascgr(1)

[DataSet1] C:\Users\Lin\Documents\math 097 fall 2001 with classrooms no names.sav

Case Processing Summary

Unweighted Cases[a]		N	Percent
Selected Cases	Included in Analysis	485	71.9
	Missing Cases	190	28.1
	Total	675	100.0
Unselected Cases		0	.0
Total		675	100.0

a. If weight is in effect, see classification table for the total number of cases.

Dependent Variable Encoding

Original Value	Internal Value
0	0
1	1

Categorical Variables Codings

		Frequency	Parameter coding (1)
ascgr	0	124	.000
	1	361	1.000
comcol	0	383	.000
	1	102	1.000

Block 0: Beginning Block

Iteration History[a,b,c]

Iteration		-2 Log likelihood	Coefficients Constant
Step 0	1	604.841	.738
	2	604.701	.774
	3	604.701	.775

a. Constant is included in the model.

b. Initial -2 Log Likelihood: 604.701

Iteration History[a,b,c]

Iteration		-2 Log likelihood	Coefficients
			Constant
Step 0	1	604.841	.738
	2	604.701	.774
	3	604.701	.775

a. Constant is included in the model.

b. Initial -2 Log Likelihood: 604.701

c. Estimation terminated at iteration number 3 because parameter estimates changed by less than .001.

Classification Table[a,b]

Observed			Predicted		
			fnlgrd		Percentage Correct
			0	1	
Step 0	fnlgrd	0	0	153	.0
		1	0	332	100.0
	Overall Percentage				68.5

a. Constant is included in the model.

b. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 0	Constant	.775	.098	62.857	1	.000	2.170

Variables not in the Equation

			Score	df	Sig.
Step 0	Variables	Act	22.940	1	.000
		comcol(1)	12.631	1	.000
		Pretest	24.676	1	.000
		ascgr(1)	135.054	1	.000

Variables not in the Equation

			Score	df	Sig.
Step 0	Variables	Act	22.940	1	.000
		comcol(1)	12.631	1	.000
		Pretest	24.676	1	.000
		ascgr(1)	135.054	1	.000
	Overall Statistics		158.707	4	.000

Block 1: Method = Enter

Iteration History[a,b,c,d]

Iteration		-2 Log likelihood	Coefficients				
			Constant	act	comcol(1)	pretest	ascgr(1)
Step 1	1	452.505	-4.455	.179	-.458	.016	2.099
	2	442.516	-6.496	.272	-.647	.025	2.504
	3	442.251	-6.920	.291	-.680	.027	2.576
	4	442.251	-6.935	.292	-.681	.027	2.579
	5	442.251	-6.935	.292	-.681	.027	2.579

a. Method: Enter

b. Constant is included in the model.

c. Initial -2 Log Likelihood: 604.701

d. Estimation terminated at iteration number 5 because parameter estimates changed by less than .001.

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	162.450	4	.000
	Block	162.450	4	.000
	Model	162.450	4	.000

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	442.251[a]	.285	.399

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	442.251[a]	.285	.399

a. Estimation terminated at iteration number 5 because parameter estimates changed by less than .001.

Hosmer and Lemeshow Test

Step	Chi-square	Df	Sig.
1	8.302	8	.405

Contingency Table for Hosmer and Lemeshow Test

		fnlgrd = 0		fnlgrd = 1		
		Observed	Expected	Observed	Expected	Total
Step 1	1	41	40.661	7	7.339	48
	2	35	35.243	14	13.757	49
	3	21	24.993	28	24.007	49
	4	17	14.355	33	35.645	50
	5	15	9.754	32	37.246	47
	6	6	8.338	44	41.662	50
	7	5	5.989	38	37.011	43
	8	8	6.432	48	49.568	56
	9	4	4.384	45	44.616	49
	10	1	2.851	43	41.149	44

Classification Table[a]

Observed			Predicted		
			fnlgrd		Percentage Correct
			0	1	
Step 1	fnlgrd	0	91	62	59.5
		1	35	297	89.5
	Overall Percentage				80.0

a. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	act	.292	.111	6.899	1	.009	1.339
	comcol(1)	-.681	.288	5.610	1	.018	.506
	pretest	.027	.009	9.222	1	.002	1.028
	ascgr(1)	2.579	.259	98.981	1	.000	13.183
	Constant	-6.935	1.872	13.729	1	.000	.001

a. Variable(s) entered on step 1: act, comcol, pretest, ascgr.

Variables in the Equation

		95% C.I.for EXP(B)	
		Lower	Upper
Step 1[a]	act	1.077	1.664
	comcol(1)	.288	.889
	pretest	1.010	1.046
	ascgr(1)	7.932	21.911
	Constant		

a. Variable(s) entered on step 1: act, comcol, pretest, ascgr.

Step number: 1

Observed Groups and Predicted Probabilities

```
     40 +                                                                                    +
        I                                                                                    I
        I                                                                                    I
F       I                                                                          1          I
R     30 +                                                                          1  1          +
E       I                                                                      1 1  1   1       I
Q       I                                                                      1 1  1 1 1       I
U       I                                                                    1 1 1  1 111       I
E     20 +                                                                      1 1 1 11 111       +
N       I                                                                    1 1 1 11 1111      I
C       I              1                                                   1  1 1 1 11 11111     I
Y       I              1                                                   1  1 1 1 11 11111     I
     10 +               0                                                  1 11 1 1 1 11 111111
+
        I           1    0 1  1  1  1     1      1                  1    1  1 11 0 1 1
101111111    I
        I         0 00 0  0 0  0  0  0  0  0      0          1  1      1  1 11 1 00 0 1
01101111111    I
        I      0000 0100 00 0 01 0 00  0 10 00  11 10  11   1 111  0  10 10 10 00
0100 0 0101001010111    I
Predicted ---------+---------+---------+---------+---------+---------+---------+---------+--------
-+----------
  Prob:   0       .1        .2        .3        .4        .5        .6        .7        .8        .9        1
  Group:
000000000000000000000000000000000000000000000000001111111111111
11111111111111111111111111111111111
```

Predicted Probability is of Membership for 1
The Cut Value is .50
Symbols: 0 - 0
1 - 1
Each Symbol Represents 2.5 Cases.

Casewise List[b]

Case	Selected Status[a]	Observed fnlgrd	Predicted	Predicted Group	Temporary Variable Resid	Temporary Variable ZResid
20	S	0**	.875	1	-.875	-2.645
37	S	0**	.877	1	-.877	-2.670
204	S	0**	.926	1	-.926	-3.541
219	S	0**	.913	1	-.913	-3.246
292	S	0**	.904	1	-.904	-3.061
318	S	0**	.893	1	-.893	-2.886
493	S	0**	.877	1	-.877	-2.670
538	S	0**	.875	1	-.875	-2.645
545	S	0**	.877	1	-.877	-2.670
594	S	0**	.893	1	-.893	-2.886
595	S	0**	.893	1	-.893	-2.886
606	S	0**	.915	1	-.915	-3.277
614	S	0**	.877	1	-.877	-2.670
619	S	0**	.915	1	-.915	-3.277
635	S	0**	.873	1	-.873	-2.621
658	S	0**	.877	1	-.877	-2.670

a. S = Selected, U = Unselected cases, and ** = Misclassified cases.

b. Cases with studentized residuals greater than 2.000 are listed.

REFERENCES

Abney, D. H., Crowley, L. R., Mowers, K. R., & Calland, D. T. (1999). *Intermediate Algebra: An Introduction to Functions through Applications.* Reading: Addison-Wesley.

Abney, D. H., Mowers, K. R., Calland, D. T., & Crowley, L. R. (1999). *Elementary Algebra: A Prerequisite for Functions.* Reading: Addison-Wesley.

Allen, P., & Bennett, K. (2010). *PASW Statistics by SPSS: A Practical Guide Version 18.0.* South Melbourne: Cengage Learning.

Armington, T. C. (2002). (T. C. Armington, Ed.) Retrieved July 6, 2010, from http://www.etsu.edu/devstudy/spin/bp2a.pdf

Autrey, K. R. (1998). *Using mathematical modeling for the prediction of success in developmental math. Ph. D. dissertation. Louisiana State University, United States -- Louisiana.*

Barker, J. L. (1994). *Selected factors related to academic achievement of developmental introductory algebra students at the two-year college level (developmental mathematics). Ph.D. dissertation. The University of Oklahoma: United States -- Oklahoma .*

Baxter, J. L., & Smith, S. D. (1998). Subsequent-grades assessment of pedagogies in remedial mathematics. *Primus*, 276-288.

Bershinsky, D. M. (1993). *Predicting student outcomes in remedial math: a study of demographic, attitudinal, and achievement variables (remedial students). Ed.D, dissertation, University of Wyoming, United States -- Wyoming.*

Betshahbazadeh, Y. (2001). *The effects of Mozart and Tejano music on community college student math test performance. Ed. D. dissertation, Texas A&M University-Kingsville and Texas A&M-Corpus Christi, United States -- Texas.*

Boylan, H. R. (2002). *What works: Research-based best practices in developmental education.* Boone: Continuous Quality Improvement Network with the National Center for Developmental Education.

Burgess, L. A. (1992). *A comparison of success factors of community college developmental mathematics students taught by part-time versus full-time instructors. Ed. D. dissertation.* Northern Arizona University: United States -- Arizona.

Carter, M. B. (2004). *An analysis and comparison of the effects of computer-assisted instruction versus traditional lecture instruction on student attitudes and achievement in a college remedial mathematics course. Ed. D. dissertation. Temple University, United States -- PA.*

Casazza, M. E., & Silverman, S. L. (1996). *Learning assistance and developmental education: A guide for effective practice.* San Francisco, CA: Jossey-Bass Inc.

Clery, S., & Topper, A. (2008, July/August). *Lumina Foundation.* Retrieved July 7, 2010, from Student Access and Success News: http://www.achievingthedream.org/_pdfs/datanotes/DataNotes_JulyAugust_08.pdf

Donovan, W. J., & Wheland, E. R. (2008). Placement Tools for Developmental Mathematics and Intermediate Algebra. *Journal of Developmental Education* , 2-11.

Dorans, N. J. (1999). Correspondences between ACT and SAT I scores. New York, New York, United States.

Echenique, M. L. (2007). *Predicting success rate of first-time college students enrolled in developmental mathematics courses in an urban multi-campus community college based on reading level and order of courses taken. Ed.D. dissertation.* Florida Atlantic University, United States -- Florida.

Faro-Schroeder, J. D. (1995). *Developmental education: Factors that contribute to academic success (community colleges). Ph. D. dissertation.* Southern Illinois University at Carbondale: United States -- Illinois.

Fike, D. S. (2005). *The impact of class scheduling on the performance of developmental mathematics students in the community college. Ph. D. dissertation.* Touro University International: United States -- California.

Fike, D. S., & Fike, R. (2007). Does Faculty Employment Status Impact Developmental Mathematics Outcomes? *Journal of Developmental Education*, 2-11.

Fleming, S. C. (2003). *A comparison of artificial intelligence-based asynchronous Internet instruction and traditional instruction in community college developmental algebra. Ed. D. dissertation.* University of Virginia: United States -- Virginia.

Goolsby, C. B., Dwinell, P. L., Higbee, J. L., & Bretscher, A. S. (1988). Factors Affecting Mathematics Achievement in High Risk College Students. *Research and Teaching In Developmental Education*, 18-27.

Haehl, M. L. (2007). *Placement test scores and demographics predicting grades in basic math and introductory algebra at an urban/suburban community college. Ph.D. dissertation.* University of Missouri - Kansas City, United States -- Missouri.

Heath, J. P. (1995). *An Analysis of the Differences Between Successful and Unsuccessful High-Risk University Students. Ed. D. dissertation.* The University of Memphis, United States -- Tennessee.

Hewitt, D. L. (2001). *Developmental mathematics students' achievement and persistence and the full- or part-time employment status of their instructors. Ed. D. dissertation.* Texas A & M University-Commerce, United States -- Texas.

Howland, W. H. (1991). *Comparative effectiveness of selected remediation programs in postsecondary mathematics. Ed. D. dissertation.* Texas Tech University: United States -- Texas.

Hoyt, J. E., & Sorensen, C. T. (2001). High School Preparation, Placement Testing, and College Remediation. *Journal of Developmental Education*, 26-34.

Huber, P. B. (2006). *Examining retention and academic success among community college developmental Algebra I students. Ph. D. dissertation.* Old Dominion University: United States -- Virginia.

Hudson, J. B., McPhee, S. A., & Petrosko, J. J. (1993). The relationship between tests, course placement, and the academic performance of college freshmen. *NACADA, 13* (2), 5-14.

Hunt, L. D. (2000). Positive Changes: New Possibilities for a New Millennium. Unpublished manuscript, General Studies Division, Marshall University Community and Technical College, Huntington, WV.

Hutson, T. L. (1999). *An assessment of a mathematics program including the scheme for placing students into developmental courses. Ed. D. dissertation.* The University of Memphis: United States -- Tennessee.

Jaschik, S. (2008, November 12). *Inside Higher Ed.* Retrieved July 6, 2010, from Gates Foundation to Spend Big on Community Colleges: http://www.insidehighered.com/news/2008/11/12/gates

Kastberg, S. (1996a). *Cooperative learning for the college mathematics classroom elementary algebra with applications.* Dubuque: Times Mirror Higher Education Group, Inc.

Kastberg, S. (1996b). *Cooperative learning for the college mathematics classroom intermediate algebra with applications.* Dubuque: Times Mirror Higher Education Group, Inc.

Keleher, J. C. (2005). *An analysis of the performance of first-year students completing a developmental math course. Ed. D. dissertation.* Central Connecticut State University, United States -- Connecticut.

Kenison, J. H. (1986). *Development of a Prediction Model to Place Freshmen in Mathematics Courses. Ed. D. dissertation.* Peabody College for Teachers of Vanderbilt University: United States --Tennessee.

Kerlinger, F. N. (1986). *Foundations of behavioral research.* New York: Holt, Rinehart and Winston.

Knowlton, E. H. (2011). *An intervention strategy to reduce math remediation rates at community colleges. Ph. D. dissertation.* Northcentral University, United States -- Arizona.

Krzemien, G. L. (2003). *A community college basic arithmetic course: Predictive factors for success. Ph.D. dissertation.* Colorado State University: United States -- Colorado.

Lawrence, G. S. (1988). *An analysis of the algebraic competencies and other characteristics which affect success in developmental mathematics courses on the college level. Ph. D. dissertation.* North Carolina State University: United States -- North Carolina.

Little, S. C. (2002). *Factors influencing the success of students in introductory algebra at a community college. Ed. D. dissertation.* University of Houston: United States -- Texas.

Long, W. J. (2003). *Mathematics placement and mathematics achievement in the community college. Ph.D. dissertation. University of Missouri-St. Louis, United States -- Missouri.*

Marshall Community and Technical College. (2001, July 2). Retrieved October 9, 2010, from Marshall University 1999 - 2001 Undergraduate Catalog: http://marshall.edu/www/ugradcat/99-01/PDF/17.pdf

Martin-Gay, E. (1990a). Videotape series to accompany Nustad and Wesner, Principles of Elementary Algebra with Applications, 2nd ed., 1991.

Martin-Gay, E. (1990b). Videotape series to accompany Principles of Intermediate Algebra with Applications, 2nd. ed., 1991.

Marwick, J. D. (2002). *Charting a path to success: How alternate mehtods of mathematics placement impact the academic success of community college* *students. Ed. D. dissertation.* University of Illinois at Urbana-Champaign, United States -- Illinois.

Maxwell, M. (1997). *Improving Student Learning Skills: A New Edition.* Clearwater: H & H Publishing Company, Inc.

McCabe, R. H. (2000). *No One to Waste: A Report to Public Decision-Makers and Community College Leaders.* Washington, DC: Community College Press.

McFadden, M. S. (1986). *The prediction of college course grades in a developmental studies program using preenrollment academic and demographic variables. Ph.D. dissertation.* University of Georgia: United States -- Georgia.

Mitchell, K. E. (1999). *The effect of postorganizers on mathematics achievement following lectures. Ed. D. dissertation.* West Virginia University: United States -- West Virginia.

Mozart, W. A. (Composer). (1990). Mozart for your mind: Boost your brain power. New York, New York, USA.

Nustad, H. L., & Wesner, T. H. (1991a). *Principles of elementary algebra with applications.* Dubuque: Wm. C. Brown.

Nustad, H. L., & Wesner, T. H. (1991b). *Principles of intermediate algebra with applications.* Dubuque: Wm. C. Brown.

Nustad, H. L., & Wesner, T. H. (1987a). *Quiz Item File: Principles of Elementary Algebra with Applications.* Dubuque: Wm. C. Brown.

Nustad, H. L., & Wesner, T. H. (1987b). *Test Item File: Principles of Elementary Algebra with Applications.* Dubuque: Wm. C. Brown.

Obama, B. (2009, July 14). *The White House*. Retrieved July 6, 2010, from The Press Office: http://www.whitehouse.gov/the_press_office/Remarks-by-the-President-on-the-American-Graduation-Initiative-in-Warren-MI

Parsad, B., & Lewis, L. (2003, November). *Remedial Education at Degree-Granting Postsecondary Institutions in Fall 2000.* Retrieved July 7, 2010, from U. S. Department of Education National Center for Education Statistics: http://www.nces.ed.gov/pubs2004/2004010.pdf

PASW Statistics GradPack (Version 18) [Computer software]. (2009). United States: SPSS Inc.

Penny, M. D. (1996). *The relationship between faculty status, specific student variables and the performance of developmental mathematics students at four-year institutions. Ed. D. dissertation.* Grambling State University: United States -- Louisiana.

Penny, M. D., & White, W. J. (1998). Developmental Mathematics Students' Perfomance: Impact of Faculty and Student Characteristics. *Journal of Developmental Education*, 2-8.

Roueche, J. E., & Roueche, S. D. (1999). *High Stakes, High Performance.* Washington, DC: Community College Press.

Sandruck, B. A. (2003). *Effects of interactive computer-based instruction in elementary algebra on community college achievement in intermediate algebra, Ed.D. dissertation, University of Maryland, College Park: United States - Maryland.*

Saxon, D. P., & Boylan, H. R. (2001). The Cost of Remedial Education in Higher Education. *Journal of Developmental Education, 25*, 2-8.

Shalyefu, R. K. (2004). *Assessing selected predictors of performance in developmental mathematics. Ph.D. dissertation, The Pennsylvania State University, United States -- Pennsylvania.*

Shonkwiler, G. S. (2004). *An analysis of the remedial/developmental mathematics program at the University of Nevada, Reno, 1998 - 2003. Ph. D. dissertation. University of Nevada, Reno, United States -- Nevada.*

Smith, D., O'Hear, M., Baden, W., Hayden, D., Gorham, D., Ahuja, Y., et al. (1996). Factors Influencing Success in Developmental Math: An Observational Study. *Research and Teaching in Developmental Education* , 33-43.

Smith, H. M. (1987). *Test Item File and Quiz Item File: Principles of Intermediate Algebra with Applications.* Dubuque: Wm. C. Brown.

Spradlin, K., & Ackerman, B. (2010). The effectiveness of computer-assisted instruction in developmental mathematics. *Journal of Developmental Education , 34* (2), 12-18.

Stephens, D. L. (2005). *Predicting success of developmental and core mathematics students at East Tennessee State University. Ph.D. dissertation.* The University of Tennessee, Knoxville: United States -- Tennessee.

Stuart, J. (1949). *A Thread that Runs So True.* Ashland: Jesse Stuart Foundation.

Stuart, J. (1949). *The thread that runs so true.* New York: Touchstone.

Summerlin, J. A. (2003). *A comparison of the effectiveness of off-line Internet and tradtional classroom remediation of mathematics skills. Ed.D. dissertation.* Baylor University: United States -- Texas.

Sundeen, T. R. (2000). *Comparative performance standards and retention rates of students taking developmental mathematics courses. Ed. D. dissertation.* Tennessee State University: United States -- Tennessee.

Taylor, J. M. (2006). *The effects of a computerized-algebra program on mathematics achievement of college and university freshmen enrolled in a developmental mathematics course. Ph. D. dissertation.* Texas A & M University, United States -- Texas.

Tuckman, B. W. (1988). *Conducting educational research.* San Diego: Harcourt Brace Jovanovich.

Walker, W., & Plata, M. (2000). Race/gender/age differences in college mathematics students. *Journal of Developmental Education , 23* (3), 24-29.

Walters, B. P. (2003). *"The Mozart Effect": A listening experience with developmental mathematics students at a community college. Ph. D. dissertation.* University of Kentucky, United States -- Kentucky.

Waycaster, P. (2002). Factors impacting success in developmental and subsequent mathematics courses. (D. P. Saxon, Ed.) *Research in Developmental Education , 17* (1), 1-6.

Webster, P. S. (2005). *The effectiveness of interventions on the pass rate in developmental mathematics courses. Ed.D. dissertation.* Texas A&M University - Commerce: United States -- Texas.

What is ALEKS? (2010, July 7). Retrieved October 18, 2010, from ALEKS: http://www.aleks.com/about_aleks

Writing Team and Task Force of the Standards for Introductory College Mathematics Project. (1995). *Crossroads in Mathematics: Standards for Introductory College Mathematics Before Calculus.* (D. Cohen, Ed.) Memphis, TN, USA: American Mathematical Association of Two-Year Colleges.

Curriculum Vitae

Linda Darlene Hunt
e-mail: lindadhunt123@gmail.com

Education

Ed.D./ABD Curriculum and Instruction — In progress
Marshall University, Huntington, WV

Ed.S. Curriculum and Instruction — 2003
Marshall University, Huntington, WV

M.A. Secondary Education—Mathematics — 1993
Marshall University, Huntington, WV

B.S. Major: Math, Minor: Computer Science — 1985
Bethany College, Bethany, WV

Employment

Associate Professor - Math — 2006 - Present
Ashland Community and Technical College, Ashland, KY
Certificate awarded for Teaching Excellence 2007, 2008, 2009
Teach math, advise students, serve on committees

Co-Director Title III Program — 2003 - 2006
University of Rio Grande, Rio Grande, OH
- Assisted in overseeing 1.72 million dollar grant
- Managed the day-to-day grant activities
- Equipped and oversaw Learning Assistance Center

Adjunct Instructor - Applied Math — 2002 - 2006
Ashland Community and Technical College, Ashland, KY
- Certificate awarded for Teaching Excellence 2005

Assistant Professor — 2002 - 2003
Marshall University College of Education, Huntington, WV
- Taught Technology for Teachers
- Placed sophomores in clinical experiences

Associate Professor — 1993 – 2002
Marshall University Community & Technical College, Huntington, WV
- Wrote end of semester departmental exams
- Served as a mentor to adjunct faculty

Graduate Assistant — 1992 - 1993
Marshall University Math Department, Huntington, WV
- Taught Intermediate Algebra
- Math Tutor in Math Study Hall

Certificates Developmental Education Specialist, Kellogg Institute 2001

Publications

Hunt, L. D. (2003). Common characteristics of successful programs. In T. C. Armington (Ed.), *Best practices in developmental mathematics* (p. 8). *NADE Mathematics Special Professional Interest Network.*

Hunt, L. D., & Anderson, M. R. (2000, November). Survey of West Virginia Colleges and Universities. *West Virginia Mathematical Association of Two-Year Colleges Newsletter*, 14, 2.

Hunt, L. D., & Stringer, D. (2000, Fall). Formula for teaching application problems: Insure student success. *Math SPIN Newsletter of the National Association for Developmental Education.*

Hunt, L. D. (1997, Summer). Teaching tips: Using study sheets to help students read their math text. *National Association for Developmental Education Newsletter*, 20(4), 4.

Hunt, L. D. (1997, February). What's a math lab? *West Virginia Association of Developmental Educators Newsletter*, 10(1), 2.

Hunt, L. D. (1995, January). Math skills diagnosis and remediation. *West Virginia Association of Developmental Educators Newsletter*, 7(1), 2.

Hunt, L. D. (1994, Winter). Teaching tips and techniques: Interactive teaching. *National Association for Developmental Education Newsletter*, 18(3), 7.

Presentations

Alge-blocks Spring 2007
Kentucky Mathematical Association of Two-Year Colleges
Joint presentation with Jame McCumbee

Get Your Hands On Developmental Mathematics Fall 2006
Kentucky Association for Developmental Education
Joint presentation with Ralfred Hall

Move Over, Math Anxiety Spring 2003
West Virginia Council of Teachers of Mathematics conference
Joint presentation with Tom Klein

Math Anxiety: Definitions, Assessments, & Research 2002
Ashland Teaching and Learning Conference
Joint presentation with Mildred Battle and Kay Thompson

Professional Development

New Horizons Conference on Teaching and Learning
May 2007, May 2008, May 2010, May 2011

Annual Teaching/Learning Conference, Ashland, KY
1998, 2000, 2001, 2004, 2005, 2006, 2007, 2008, 2009, 2010

ACCLAIM Conferences
June 19-21, 2002, August 16-17, 2002, & September 17, 2004

Advanced Kellogg Institute, Appalachian State University
August 3-8, 2002

NADE National Conference 1997 - 2011

Memberships

Delta Kappa Gamma 2004 – present
Kentucky Association for Developmental Education 2006 -
Kentucky Math Association of Two-Year Colleges 2007 –