Food, Fiber and Natural
Resource Economics

CONCEPT APPLICATION

Ag. Ec. 100

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Preface

Learning is easier and more enjoyable when the student has an opportunity to apply the new knowledge during the learning period. During the past several years a series of "Homework Problems" have been developed for and utilized in the introductory course in Agricultural Economics at The Ohio State University. Through a variety of problematic settings, these have attempted to illustrate the use of economic principles. The examples are not always from the "real world;" however, they approximate them as nearly as possible.

During Winter Quarter 1975, an experimental audio-visual cassette was prepared for one of the homework problems. A part of the same problem was reviewed using slides and an audio cassette. These cassettes permitted students the opportunity of reviewing their work at a time which was most convenient for each. The technique was well received by students.

Subsequently, a grant was received from the OSU Task Force on Learning to prepare several audio-visual instructional supplements (AVIS). The AVIS material is designed so the student can proceed at any pace. It is suggested that you work through each of the CONCEPT APPLICATIONS on your own (or with the help of another student) then check your work by listening to the video cassettes which are on file in the Learning Resources Center on West Campus.

Each video cassette requires approximately 40-45 minutes for viewing. However, you may wish to repeat concepts which you do not understand thoroughly. Only part of a cassette may be viewed if you wish. All cassettes are in color and are best if seen on one of the color sets. Concept applications should be requested by topic as indicated in the table of contents.

For the students who only wish to check their answers, a set of completed problems is on reserve in the Learning Resources Center and the Agricultural Library.

Many people have assisted in preparing the AVIS material at OSU. Dr. Glenn Himes, Dr. Don Larson, Dr. William Wayt, Mrs. Judy Wessel, and Mrs. Pierrette Woodford have assisted in preparing the material and tapes. Mr. Bruce Mathews and Mr. Richard Yepsen directed the television sessions. Mrs. Nancy Schwart typed the script. Any of these would appreciate receiving comments from you concerning the AVIS material.

Availability

	Learning Resources Center			Agricultural Library
	Audio Cassette	Slide-Tape	Answer File	Answer File
Index Numbers	X		X	X
Circular Flow of Economic Activity	X		X	X
Monetary and Fiscal Policy	X		X	X
Loans and Interest			X	X
Stocks and Bonds			X	X
Specialization and Comparative Advantage			X	X
Physical Production Relationships	X		X	X
Costs, Revenue and Profit			X	X
Changing Equilibrium	X	X	X	X
Model for Imperfect Competition			X	X
Trading in Futures	X		X	X

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Food, Fiber and Natural Resource Economics

CONCEPT APPLICATION

Index Numbers

1. Simple index numbers are used to compare different values with a
   base period value. The most frequent use of index numbers is to
   compare prices, sales, production, acres, etc. for different years.
   The Consumer Price Index (CPI) is a measure of the average changes
   in prices of about 400 items purchased by U.S. consumers. Data are
   collected from about 18,000 business establishments in 56 cities
   every 3-5 months. The CPI, called the cost of living index, is fre-
   quently used as a standard of comparison for other factors such as
   wages.
        Complete Table 1 and respond to the statements following.
   [Note: an index number is calculated by dividing each number in
   the series by the base value then multiplying this quotient by 100.
   For example, (3,550 ÷ 3,260) x 100 = 108.89, which rounds to 109].

Table 1. Per-Capita Personal Income, State of Ohio,
and Consumer Price Index (CPI), 1967-1974

Year	Per-capita Income		CPI
	Dollars	Index	
		(1967 = 100)	(1967 = 100)
1967	3,260	100	100
68	3,550	109	104
69	3,850	___	110
70	4,010	___	116
71	4,230	___	122
72	4,570	___	125
73	5,080	___	132
74	5,740*	___	148

SOURCE: U.S. Department of Commerce, Bureau of Economic
         Analysis, "Survey of Current Business," August,
         1974 (Table I).

*Estimated

a. How much did per capita income increase from 1967 to:

       1970 $ 750   23%

       1972 $_____   ___%

       1974 $_____   ___%

b. How much did the CPI increase from 1967 to:

       1970   16%

       1972   ___%

       1974   ___%

c. Because per capita income increased more than the CPI, Ohio residents were how much better off in 1974 than in 1967?

    _____% Why?

2. Two series of index numbers can be compared by just looking at the numbers. However, the comparison of two or more series of index numbers is much easier when they are plotted in a graph. In Graph 1, the CPI values from Table 1 have been plotted. Plot the income index values on the same graph and respond to the statements following.

a. During what year did the per-capita income make the greatest gain over the CPI?

b. In what year were consumers in Ohio "better off"? _____ Why?

Graph 1. Comparison of Per-Capita Personal Income Index (PII), State of Ohio and Consumer Price Index (CPI), 1967-1974.
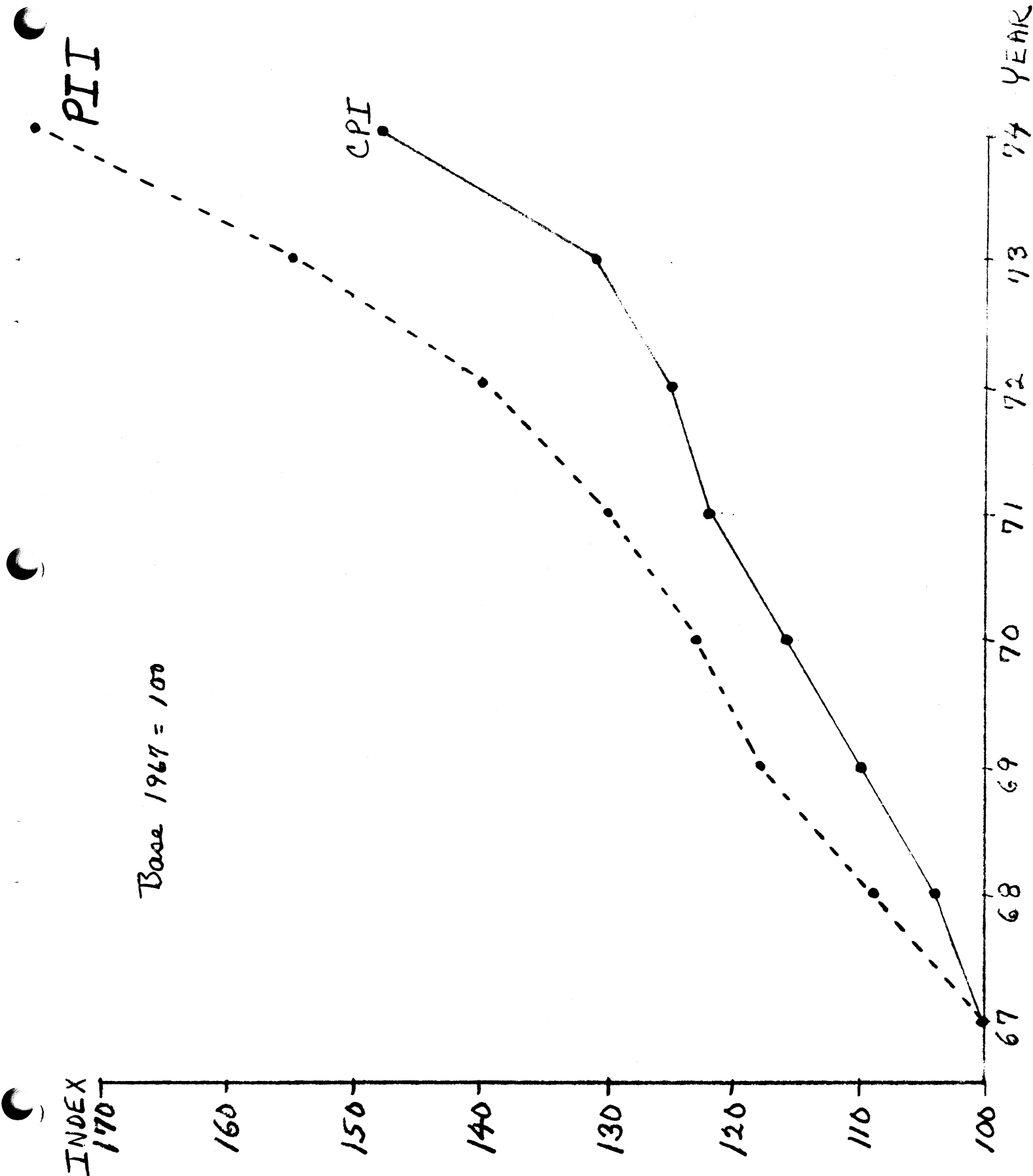
3. A major supermarket in Columbus quoted the following average price for selected meat, poultry and fish products during 1973 and 1974. Respond to the following statements.

Table 2. Calculating Weighted Index Numbers for Different Products, 1973-1974

Product	Average Price/lb.		1974 Price Index	Product Sales	Weighted Sales	Weighted Price Relative
	1973 (1)	1974 (2)	(3)	(4)	(5)	(6)
	(dollars)		(1973 = 100)	(dollars)		
Hamburger	.49	.85	173	20,320	.19	32.87
Sausage	.44	.69	157	11,110	.10	15.70
Cube Steak	.89	1.09	_____	19,230	_____	_____
Sirloin Tip	1.18	1.68	_____	8,940	_____	_____
Rump Roast	1.29	1.59	_____	12,120	_____	_____
Pork Chops	.61	.89	_____	14,360	_____	_____
Flounder	.70	.79	_____	7,410	_____	_____
Chicken	.35	.49	_____	14,780	_____	_____
Total	5.95	8.07		108,270	1.00	

A common formula used for calculating the weighted index is:

$$W_I = \sum \frac{P_2}{P_1} (PQ);$$ where

P_1 = price during 1st period

P_2 = price during 2nd period

P = average price for the two periods

Q = average quantity sold for two periods

a. What is the simple index value of hamburger in 1974
    relative to 1973?   _____

b. Determine the 1974 simple index relative to 1973 for
    each of the other products and record in column 3.

c. Hamburger accounted for what percent of total meat
    sales (expressed as a decimal fraction)?   _____

d. Calculate the weighted sales for each of the other
    products and record in column 5 (note—all the
    responses should total to 1.00).

e. What is the weighted price relative for hamburger sales?_____

f. Calculate the weighted price relative for each of the
    other products.

g. What is the total of the weighted price relatives for
    all products (this is the weighted price index)?   _____

h. Which of the above products increased the most in
    absolute price from 1973 to 1974?   _____

i. Which of the above products had the greatest
    relative price increase from 1973 to 1974?   _____

j. If the value of sales for each of the products
    was approximately the same in 1973 and 1974, the
    average price of meat, poultry, and fish products
    increased by about how much from 1973 to 1974?   _____

k. The total of the 1974 price index (column 3) is

    _____, which when divided by the number of items

    (8) gives the average 1974 index value of _____.

    This means than on the average the eight products

    increase _____% in price from 1973 to 1974. Why

    is this method of figuring the average increase in

    price incorrect?

4. Index numbers can be used to compare changes in prices, production, cost of living, and many other comparable items. Fill in the blanks of the following table, using first 1964 and then 1969 as the base year, and then answer the questions following the table. Round all numbers to one place beyond the decimal.

Table 3. Simple Index Numbers for Automobiles
and a Change in Base Year, 1964-1974

Year	Average Price of Impalas	Index Number	
	(1)	(2)	(3)
1964	$2,500	100	_____
1965	2,750	_____	_____
1966	2,975	_____	_____
1967	3,130	_____	_____
1968	3,445	_____	_____
1969	3,875	_____	100
1970	4,355	_____	_____
1971	4,525	_____	_____
1972	4,895	_____	_____
1973	5,120	_____	_____
1974	5,365	_____	_____

a. To determine the index value (1964 = 100) for the years 1965 through 1974, the value of Impalas for each year is first divided by _____ then multiplied by 100.

b. Index numbers are pure numbers with no units of measure attached. However, the index numbers which were calculated in Table 3 represent a:

Price Index _____
Quantity Index _____

c. What is the index number for 1969 (1964 = 100)? _____

d. The index number for 1969 indicates that the price of Impalas has risen how much since 1964? _____%

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e. To convert from 1964 to 1969 as the base year, each value in column 1 could be divided by _____ then multiplied by 100 or each value in column 2 could be divided by _____ then multiplied by 100.

f. From 1969 to 1974 the price of Impalas increased by what percent? (Note the different results when 1964 = 100 and 1969 = 100.) _____%

g. If you use the data from column 2 (1964 = 100), the difference in the index values for 1969 and 1974 is?

_____%   Why is this not correct?

h. Suppose you wished to use 1974 as the base year. One could do this by dividing each of the prices

by $_____, then multiplying by 100.

5. One must be careful when comparing index values graphically for two periods when one is not the base period. For example, look at the CPI for Medical Care and Transportation shown in Figure 2. Did Medical Care or Transportation have the greatest relative increase from 1972 to 1974? Why?

FIGURE 2

CONSUMER PRICE INDEX

% OF 1967

ALL ITEMS | **FOOD** | **MEDICAL CARE** | **TRANS-PORTATION** | **HOUSING*** | **APPAREL AND UPKEEP**

1974

1972

1970

160

140

120

100
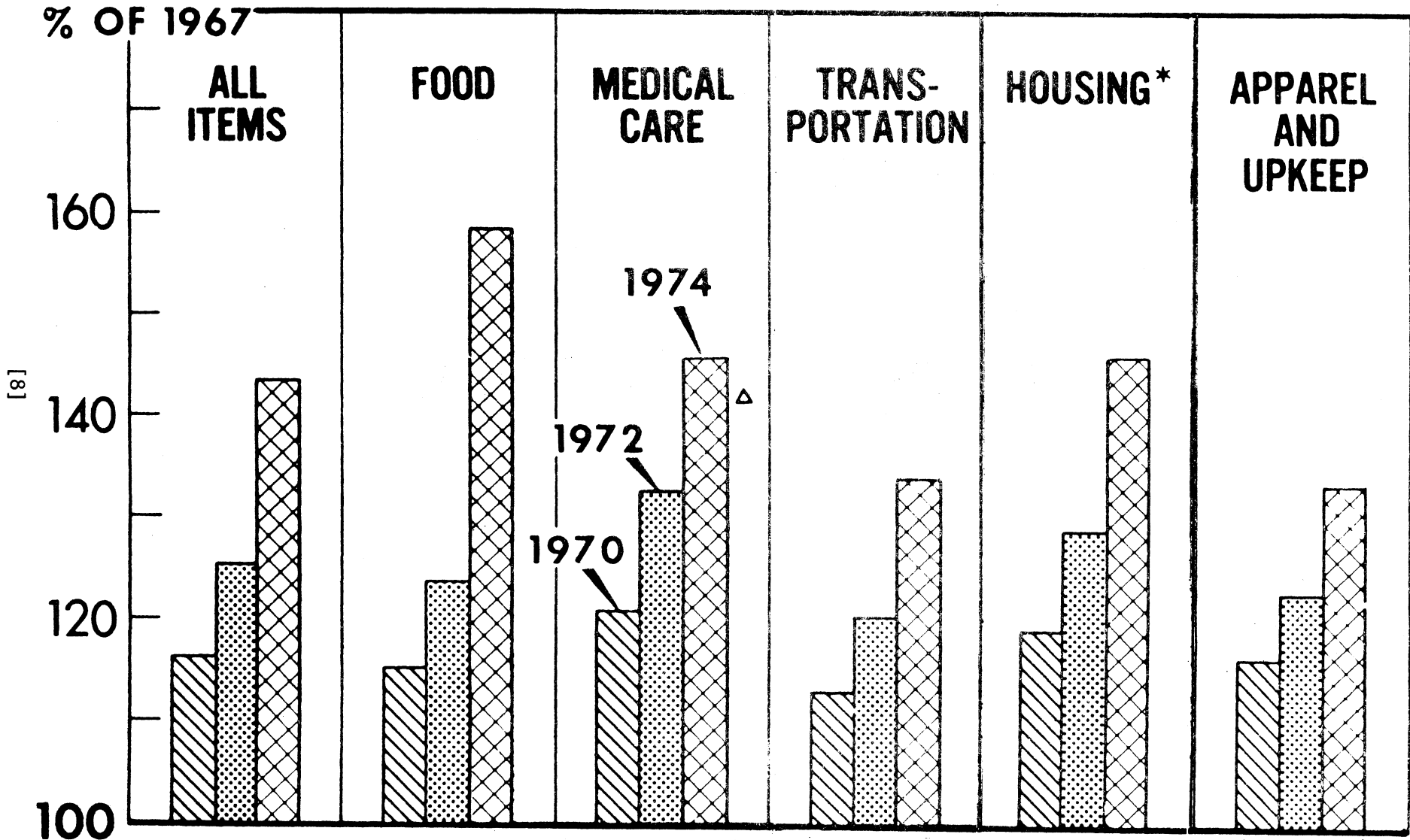
*INCLUDES SHELTER, FUEL, UTILITIES, HOUSEHOLD FURNISHINGS, AND OPERATION.   △ 6-MONTH AVERAGE FOR 1974.

[8]

Food, Fiber and Natural Resource Economics

CONCEPT APPLICATION

<u>Circular Flow of Economic Activity</u>

1. The circular flow of economic activity is affected by consumers, producers and the government. In this section, we shall examine the basic impact these three have upon economic activity. First, referring to Figure 1, complete each of the following:

   a. Producers have certain costs of production which they pay individuals (who are the consumers) whenever any economic activity is engaged in; these are _____, _____, _____, and _____.

   b. In return for the above, the consumers (individually or collectively) provide the producers with the factors of production which are: _____, _____, _____, and _____.

   Thus far we have an exchange, or a two way street, between producers and consumers. If the economy is humming along smoothly, this exchange should just balance out. But we have indicated that there is a circular flow, so let's look at the bottom half of the circle.

   c. Producers utilize the factors of production provided by individuals in (b) to _____ goods and services for the consumers.

   d. On the other side, consumers take the money which they received in (a) and _____ goods and services from producers.

   Now it is obvious that there are a pair of counter circular flows. Going clockwise, producers give to consumers the costs of production which are used by consumers to purchase goods and services from producers. Going counter clockwise, consumers provide the factors of production to producers which they utilize to provide goods and services for consumers. Basically this is what economics is concerned with.

   Proceeding to Figure 2, to add some detail to the economic circular flow, let's clarify just who are the producers and consumers in our economy.

   Fill in the squares in Figure 2 by responding to the following.

   e. Producers can really be divided into three distinct categories of: _____, _____, and _____.

Figure 1. Circular Flow Relationship Between Producers and Consumers
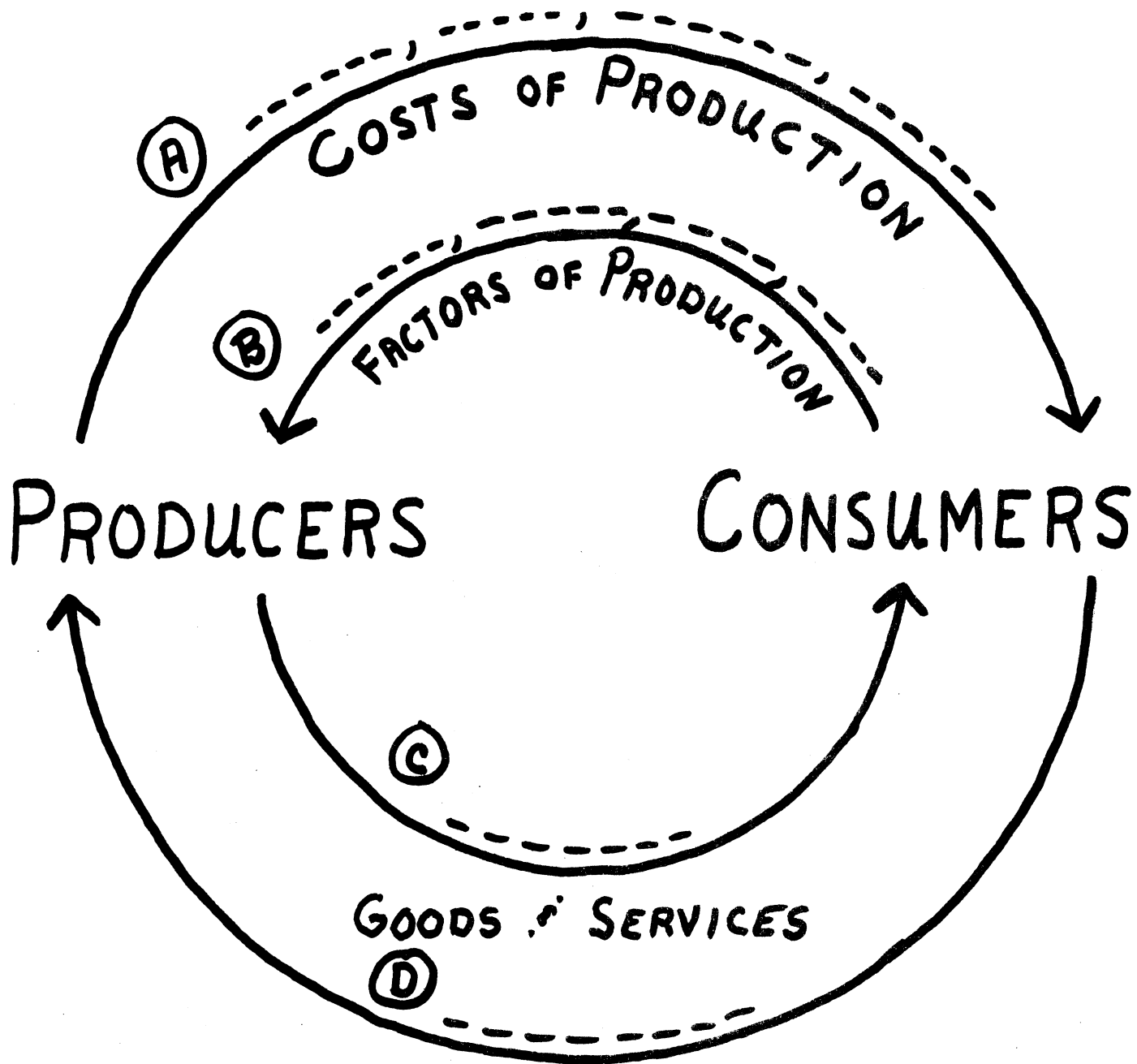
Figure 2.   Component Categories of Producers and Consumers

E

F

PRODUCERS   CONSUMERS
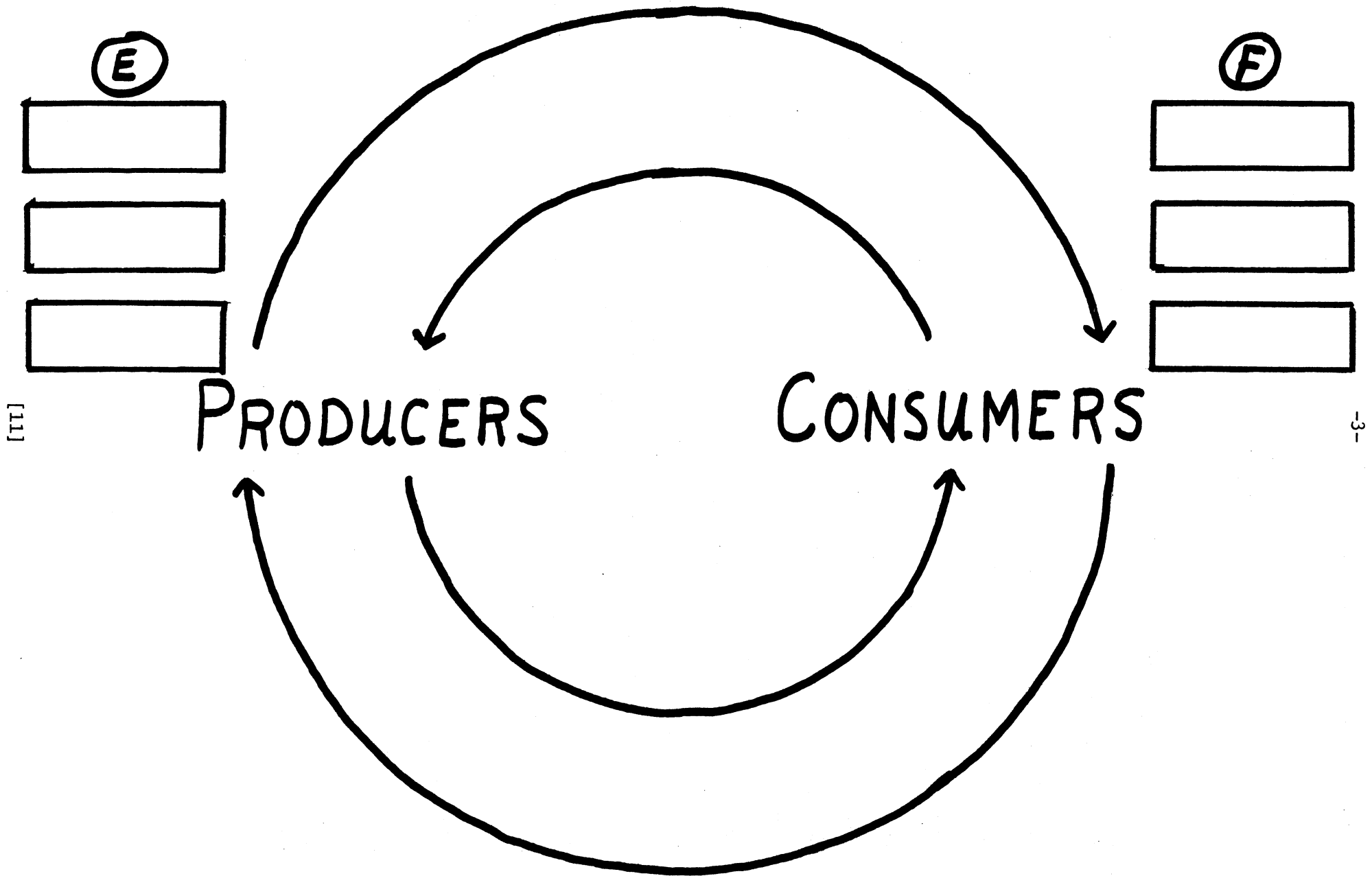
f. Looking at the other side, consumers can also be classified
    into three categories. These are: _____,
    _____, and _____.

Now we are really going in circles. Is it really true that
producers and consumers can be the same?

Unfortunately not all of the consumer receipts in (a) are
available or used by them to purchase goods and services (d) from
producers. Figure 3 shows how some funds are taken out of the
circle and later reintroduced.

g. Most people would like to have their entire income to spend,
    but unfortunately on April 15th each year they must make an
    accounting for _____. Also most of us like to set aside
    a little for a rainy day; we usually do this in the form of
    _____.

h. The government does not collect money from taxpayers because
    they want to hoard it. Rather they are continuously _____
    it for goods and services. Also, neither banks nor savings
    and loan associations like to see money accumulating in their
    vaults; they loan funds to individuals or businesses who wish
    to put them in _____, which means they re-enter the circle
    as part of the demand for goods and services.

i. So, what comes out goes back in. Well . . . not always. Some-
    times producers become over zealous and produce more goods than
    consumers are willing to purchase, or they like to have some
    cushion to take care of day-to-day fluctuation of orders; there-
    fore, they usually keep some goods in _____. In addition,
    if some goods are used to produce other goods, these are known
    as _____ _____; should both sets of goods be
    included in the final product?

j. If the economy is a closed circular system as the foregoing
    seems to indicate, how do we get economic growth? Among other
    things, the quantity of money available will influence the
    velocity of the circular flow. The amount of money in circu-
    lation in our economy is controlled by the _____
    system. More money tends to speed up the circular flow and
    less has the reverse effect.

Figure 3. Modification in the Circular Flow of Economic Activity
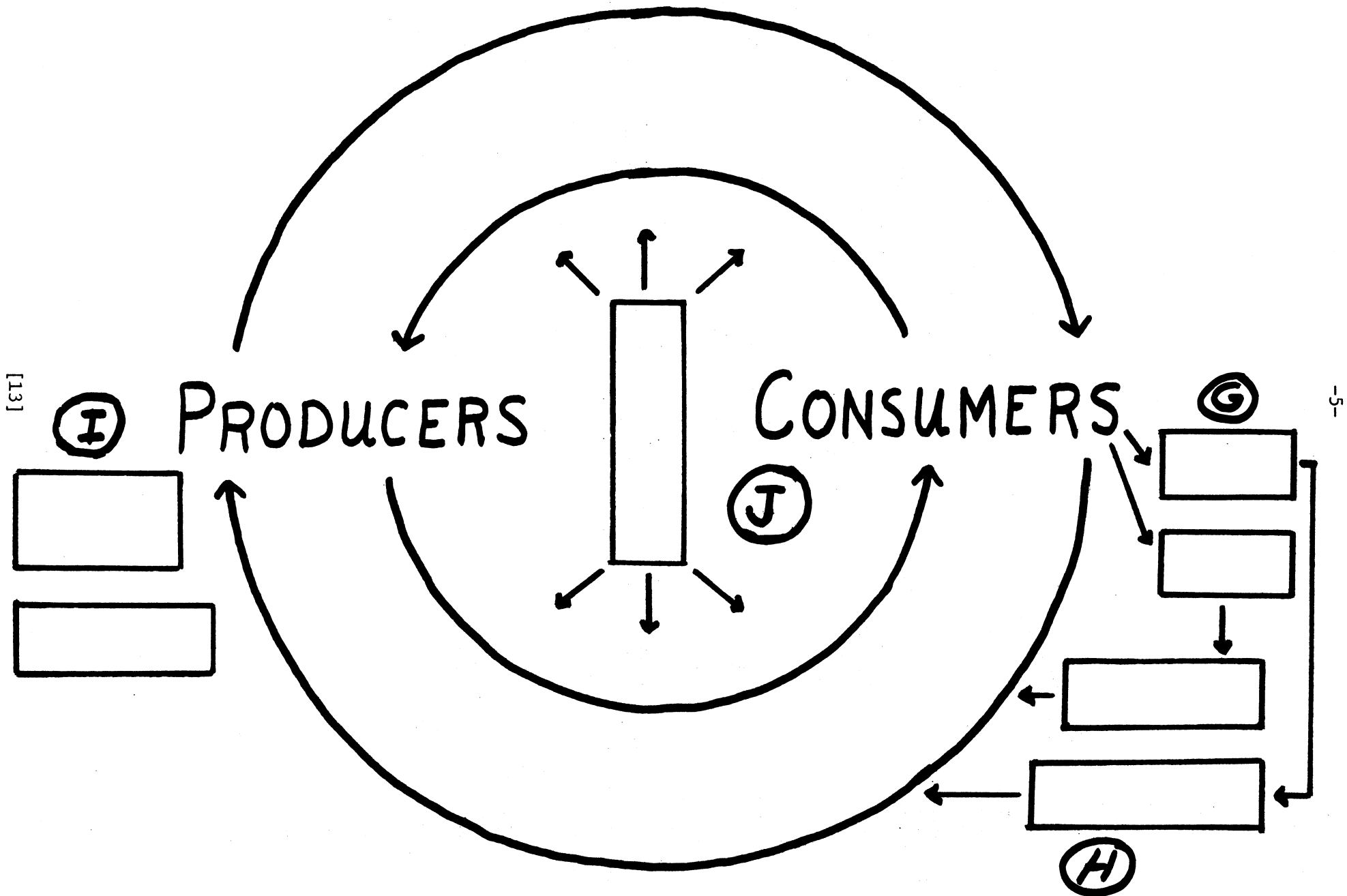
Figure 4. Framework for Gross National Product
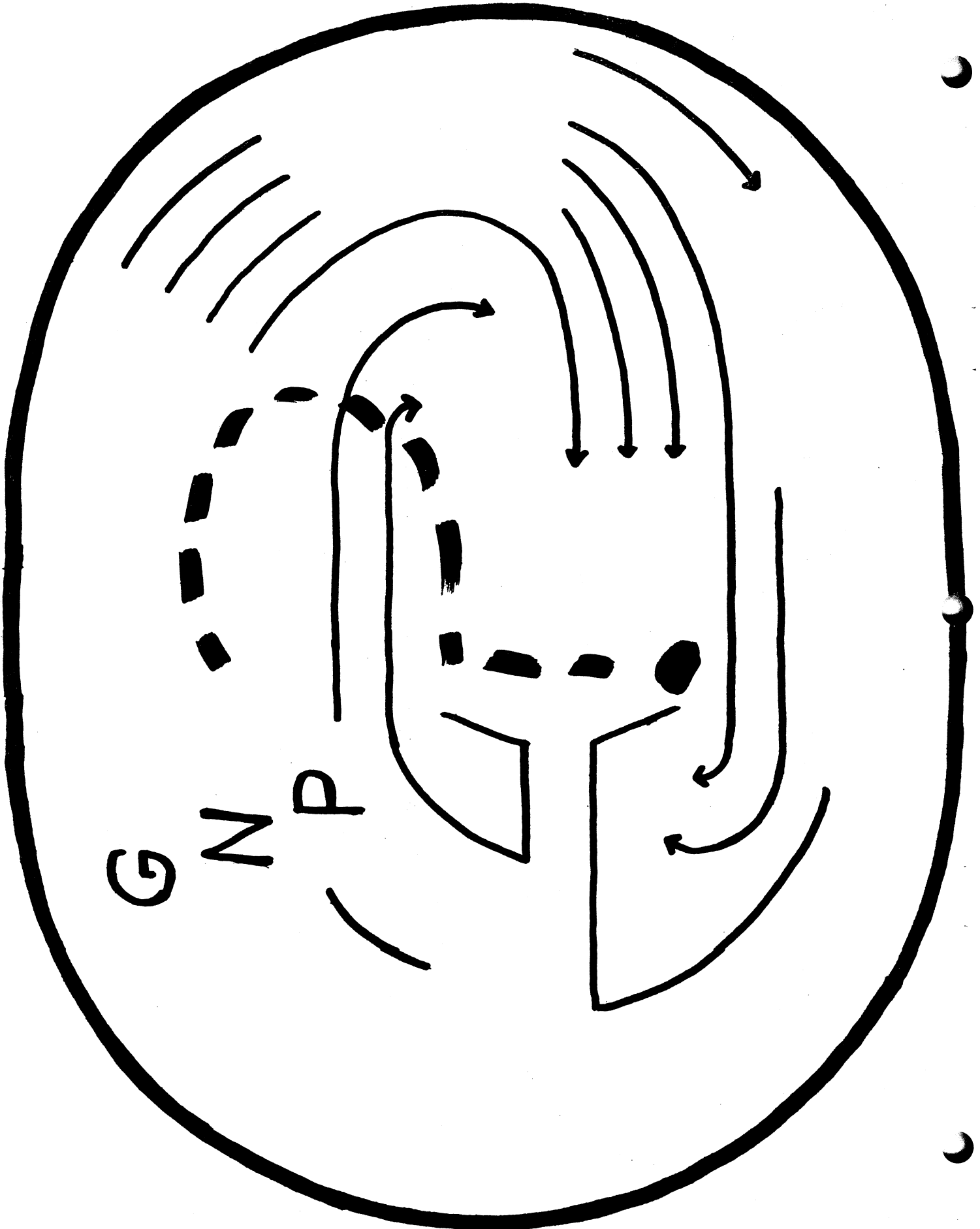
GNP and its Components

We have seen in the previous section that there is a circular flow of economic activity between the producer and the consumer. This is good, but how do we measure the flow to determine whether we are better off now than we were at some time in the past?

Perhaps Figure 4 can help us; it represents a framework for GNP. What is GNP?

2. Obviously there are economic indicators other than GNP which might provide more insight into the functioning of our economy at the macro level. Figure 5 is partially filled in but has a few blanks for you to complete.

    a. The production of any good or service requires the use of capital goods (i.e., buildings, equipment, etc.) which wear out or become obsolete. If depreciation is subtracted from GNP, the result is called _____ _____ _____.

    b. By law businesses are required to pay indirect business taxes such as sales taxes, federal excise taxes, etc. If these are deducted from NNP, we have _____ _____ which is made up of interest, profit, wages and rent.

    c. Out of NI comes a number of items such as social security taxes, corporate income taxes, and retained corporate profits. If unearned income (i.e., social security and retirement payments) is added in, the result is _____ _____. Of course, just because we receive a stated income does not mean that we have it at our disposal. Nearly everyone pays some personal income taxes.

    d. From what is left as disposable personal income most of us attempt to save a little. What is left is known as _____ _____ _____. This is the amount which consumers use to purchase goods and services.

    e. Combined with the demand created by consumers, either individuals, businesses, or the government are using the taxes, retained profits and savings for new investments. Thus, investment demand and consumer demand call for the _____ of goods and services - both consumer and capital - which by definition is GNP.

Figure 5. Components of Gross National Product
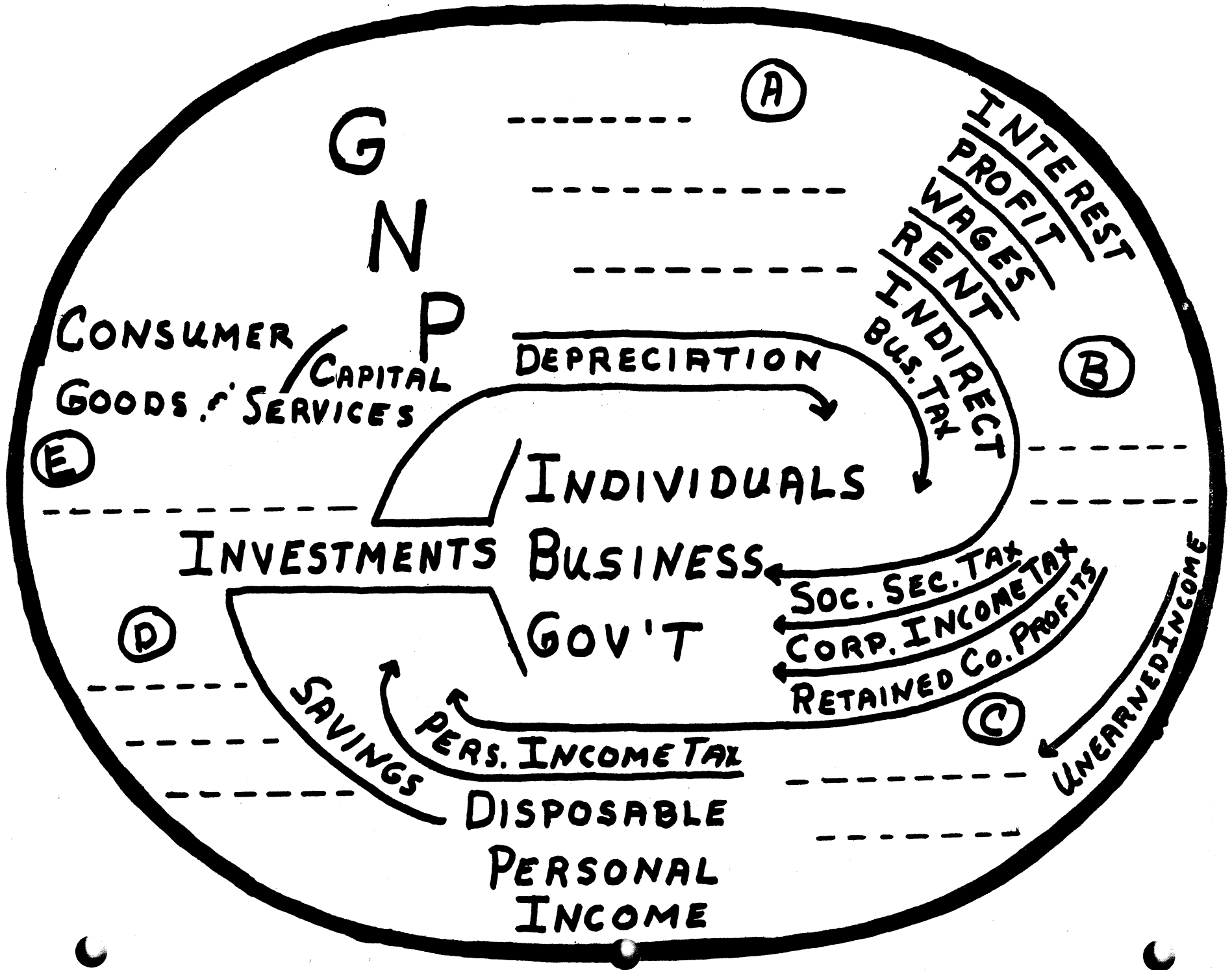
Macro-Economic Equation

3. If you have followed everything this far, an example using actual data for 1974 should bring everything into focus. Fill in the blanks of Table 1.

    a. In 1974, how much money was available to replace worn out capital equipment used in the production process? $_____

    b. How much money was set aside which could be used to invest in new capital equipment which would result in a greater GNP in following years? $_____

    c. As a result of (a) and (b) we could expect the demand for capital equipment for following years to be what percent of GNP?   _____%

    d. What percent of GNP do the Local, State, and Federal governments have at their disposal (exclude social security taxes)?   _____%

    e. In 1974, the U.S. was in the depth of the most serious recession in 30 years, yet consumers managed to save what percent of their Disposable Personal Income? How do you explain this?   _____%

    f. What percent of GNP do consumers end up with in their spending power?   _____%

    g. The circular flow of our economy can be seen if you add all of the items whose value is given in the first column to the value obtained for Consumer Spending Power. What do you come up with?

TABLE 1. MACRO-ECONOMIC EQUATION, U.S. 1974

		($ Billions)
GNP	GROSS NATIONAL PRODUCT	1,397
- DEP	Depreciation	-120
NNP	NET NATIONAL PRODUCT	_____
- IBT	Indirect Bus. Taxes	-135
NI	NATIONAL INCOME	_____
- SST	Social Security Tax	-102
- CIT	Corp. Income Taxes	- 56
- CS	Corporate Savings	- 52
+ TP	Transfer Payments	+218
PI	PERSONAL INCOME	_____
- PIT	Pers. Income Taxes	-170
DPI	DISPOSABLE PERS. INCOME	_____
- PS	Personal Savings	- 77
CSP	CONSUMER SPENDING POWER	_____

Source: Economic Report of the President, February 1975.

Food, Fiber and Natural Resource Economics

CONCEPT APPLICATION

Monetary and Fiscal Policy

Most of us use money every day -- yet how many of us can define it accurately or fully realize its role in our economy. The two major functions of money are: 1) a standard of value, and 2) a medium of exchange. Consequently, many things can serve as money. Historically, various metals, shells, animals, paper, etc. have served as money in different societies.

Today, in the U.S., approximately three-fourths of our money is in the form of credit -- bank demand deposits to be more exact. The Federal Reserve System (commonly known as the FED) was established during the banking crisis after the turn of the century. The FED controls the quantity of money in circulation and through this has a direct impact upon the velocity of the "circular flow" and the GNP of our country.

1. To warm up with, let's see if you can answer a few simple questions about the FED.

    a. Who controls the FED? _____

    b. How many branch banks does the FED operate? _____

    c. Approximately how many member banks do they have? _____

    d. What are some of the major ways the FED has of controlling the quantity of money? Briefly explain how each works.

        1) _____

        2) _____

        3) _____

        4) _____

2. One of the tools you should have mentioned above is that the FED
   sets the reserve requirements of member banks. This is the per-
   centage of "deposits" which banks must keep in cash, or on deposit
   with a Federal Reserve Bank. To demonstrate the impact the reserve
   requirement has on the quantity of money, complete Tables 2 and 3;
   then respond to the statements following.

Table 2. Expansion of Quantity of Money (Bank Credit)
with 10% Reserve Requirement

Bank (1)	Deposit (2)	Reserve (3)	Loans (4)

Both Philco and GE make refrigerators and television sets. If GE or Philco used
all their resources to produce either refrigerators or TV's, they could produce
the amounts shown in Table 3. (They each have the same amounts of raw materials
and labor.)

Table 3. Potential Refrigerator and Television Production by the
General Electric and Philco Companies

Company	Total Production (000,000 units)	
	Refrigerators	TV's
G.E.	50	450
Philco	150	300

4. Using Table 3, respond to the following questions: (40 pts.)

   a. Using all of its resources to produce TV's, (GE_____/Philco_____) can
      produce more TV's than can (GE_____/Philco_____).

   b. (GE_____/Philco_____) can produce more refrigerators than can (GE_____/
      Philco_____) with the same inputs. Thus, (GE_____/Philco_____) has
      a(n) (comparative_____/absolute_____) advantage in the production of
      (TV's_____/refrigerators_____/both products_____).

   c. For G.E., the opportunity cost of producing 450,000,000 TV's is _____
      million refrigerators.

   d. How many TV's must GE give up to produce one refrigerator? _____

   e. For Philco, the opportunity cost of producing 300 million TV's
      is _____ million refrigerators.

   f. How many TV's must Philco give up to produce one refrigerator? _____

   g. This means that GE's relative cost of producing refrigerators
      is (greater_____/smaller) than Philco's, so GE has a(n)
      (comparative_____/absolute_____) advantage in the production

a. From the initial $2,000 deposit in Bank A, how much will it be able to loan out with reserve requirements of 10%? _____ 20%?_____ Consequently with a 10% rather than a 20% reserve requirement it can make loans of an additional $_____.

b. After the initial $2,000 deposit has worked its way through Banks A, B, C, D and E, how much total money will there be in demand deposits with a reserve requirement of 10%? $_____ 20%? _____

c. If the process continues through a series of other banks, eventually the totals for each of the columns in each of the tables will be:

Reserve Requirement	TOTAL Deposits	Reserves	Loans
10%	$_____	$_____	$_____
20%	_____	_____	_____
Difference	_____	_____	_____

d. From the above, we notice that if reserve requirements are 10%, the total amount of deposits will eventually be _____ times the original deposit. Whereas, if the reserve requirements are 20%, the total amount of deposits will eventually be _____ times the original deposit. This is called the multiplier and can easily be determined by dividing the fractional reserve requirement into 1.0 (i.e., 1.0 ÷ .20 = 5).

3. To further test your understanding of the impact of the reserve requirements upon the quantity of money, respond to the following:

a. To pay for this quarter's tuition and dormitory, your father wrote a check to The University for $800. The Bursar deposits this check in City National Bank. If City National has a 25% reserve requirement, how much of the $800 can they loan out? $_____

b. Joe Bloke needs cash to buy a used car. He goes to City National for a loan and borrows the amount City National can give him from The University's deposit (your answer to a). He gives this money to the Square Deal Motor Company who then deposits Joe's check in the Huntington National Bank. How much can Huntington loan Al Jones from the deposit they just received if Huntington's reserve requirement is 25%? $_____

c. Al takes his money and buys a sofa at the Lazarus Department Store. Lazarus deposits the check in the First National Bank. If First National also has a 25% reserve requirement, how much of this deposit can they loan out? $_____

d. If this original deposit of $800 goes through more
   banks and more loans, eventually how much money,
   with a 25% reserve requirement, will there be in
   each of the following:

   Total Money Deposited $_____

   Total Reserves $_____

   Total New Money (Loans) $_____

e. Let's assume we're working with $5,000. If the
   reserve requirement is 12.5%, how much money will
   there be in each of the following after the multi-
   plier has had its complete effect?

   Total Money Deposited $_____

   Total Reserves $_____

   Total New Money (Loans) $_____

f. What is the value of the multiplier in question d? _____

g. What is the value of the multiplier in question e? _____

4. Monetary policy, of the Federal Reserve System, is usually comple-
   mented with Fiscal Policy. List several examples of Fiscal Policy
   and explain how they differ from actions taken through Monetary
   Policy.

5. Indicate whether the following actions are related to monetary (M)
   or fiscal (F) policy.

	M	F
a. Federal income tax rate is increased.	___	___
b. The FED changes the discount rate from 6 to 6 1/4.	___	___
c. The President announces a cutback in federal spending.	___	___
d. Reserve requirements are lowered from 18% to 16%.	___	___
e. The FED buys $10 million of Treasury bills from the public.	___	___

6. The following questions pertain to monetary and fiscal policy. To the right of the given statement, indicate if that statement is a result of monetary (M) policy, fiscal (F) policy, or neither (N) policy.

	M	F	N
a. The President declares in a speech that the discount rate for banks should be lowered.	___	___	___
b. The Federal Reserve Board sells one million dollars of government securities on the open market.	___	___	___
c. The Chairman of the Federal Reserve Board persuades Chase Manhattan Bank to lower its prime rate.	___	___	___
d. Price controls are lifted.	___	___	___
e. Social Security payments are increased 15% by Congress.	___	___	___
f. The Federal Reserve Board lowers the discount rate by 1/2%.	___	___	___
g. The rate at which banks can borrow money from the Federal Reserve Banks is raised by the Federal Reserve Board.	___	___	___
h. HEW announces a 3 million dollar housing project for inner cities.	___	___	___

7. We have studied the basic tools of monetary and fiscal policy. Respond by underlining the correct way in which these tools would be used in the following situations.

Many economists are predicting a recession in the coming months. To forestall this recession, or to bring the country out of a recession, the Federal Reserve Board would (increase/decrease) the reserve requirement of member banks, (buy/sell) securities on the open market, and (raise/lower) the discount rate.

Coupled with the Federal Reserve actions, the government would (increase/decrease) the Federal Income Tax rates and (increase/decrease) transfer payments.

In the case of rising inflation, the government may (increase/decrease) the Federal Income Tax rates and (raise/lower) governmental spending. The FED would (buy/sell) open market securities, (increase/decrease) the member bank reserve requirement, and (raise/lower) the discount rate.

8. Recently, the <u>Wall Street Journal</u> printed the following statement:
"West Germany's bank rate [Federal Reserve Bank's discount rate]
was cut to 4.5% from 5% in an attempt to . . . ease credit because
of the nation's economic slow down."

Answer the following questions:

a. Is this a monetary or fiscal policy? Why?

b. Will this action tend to be inflationary or deflationary? Why?

c. If West German banks are required to maintain 20% of their
deposits in reserves, what will the multiplier be?

d. As a result of the lower interest rate, $155 million is
borrowed by member banks. How much of a total impact
(in dollars) will this have on the economy?

Food, Fiber and Natural Resource Economics

CONCEPT APPLICATION

Loans and Interest

1. If you have an opportunity to purchase 100 acres (all tillable) of good corn
    land and are given the following information, answer the questions below.

    Corn production   =   105 bushels/acre

    Price   = $2.80/bushel

    Total cost of farming   = $16,170
            the 100 acres

    Interest   =   8 percent

    a. How much should you have to pay for the 100 acres if you were buying it?

    b. What would you expect the rental charge to be per acre if taxes are
        $1.75 per acre?

2. You have just visited the Shady Deal Motor Co. and a 1959 Porsche Carerra caught your eye. The salesman noticed your interest in it and offered you a deal you couldn't refuse. The Porsche is worth $4500 and he's giving you $1750 for your '71 GTO. The balance will be paid in 36 easy monthly payments at only 7% interest. Calculate the effective interest rate.

$$i = \frac{2(Y)(C)}{P(N+1)}$$

i = effective interest rate
Y = No. pay/yr.
C = total interest charges
N = total no. payments
P = principal

3. You have just seen the latest super-screen, duper-color televisions and like a model which sells for $675. The salesman is very "low-key" and manages to get your signature on a contract before you leave the store. The following terms are in the contract: you leave a deposit of $35; your payments will only be every other month for 3 years; and the interest rate is only 7 1/2% per year. Calculate the effective interest rate.

Present Value

4. Juan Sanchez has suffered a disability in an accident at the tomato factory, and the insurance company has offered to make a settlement. The insurance company will pay Juan $25,000 now, or $3600 a year for the next 10 years. Which should Juan accept, and why, if he can receive a 7% return on his money?

Table 9-3. Present value of $1 discounted at various rates of interest and by year received

Year	Interest rate (%)						
	3	5	7	9	11	13	15
	----------------------present value ($)----------------------						
1	.97	.95	.93	.92	.90	.89	.87
2	.94	.91	.87	.84	.81	.78	.76
3	.92	.86	.82	.77	.73	.69	.66
4	.89	.82	.76	.71	.66	.61	.57
5	.86	.78	.71	.65	.59	.54	.50
6	.84	.75	.67	.60	.53	.48	.43
7	.81	.71	.62	.55	.48	.43	.38
8	.79	.68	.58	.50	.43	.38	.33
9	.77	.64	.54	.46	.39	.33	.28
10	.74	.61	.51	.42	.35	.29	.25
15	.64	.48	.36	.27	.21	.16	.12
20	.55	.38	.26	.18	.12	.09	.06
25	.48	.30	.18	.12	.07	.05	.03
30	.41	.23	.13	.08	.04	.03	.02
35	.36	.18	.09	.05	.03	.01	.01
40	.31	.14	.07	.03	.02	.01	*
45	.26	.11	.05	.02	.01	*	*
50	.23	.09	.03	.01	.01	*	*

*Less than $.01.

5. Mr. Baker has just reached retirement age. An insurance policy he bought years ago will either pay him $16,000 today, or $4,000 a year for 5 years. If he can receive a 9% return on his money, which alternative should he accept? (Use the present value table in question 5.)

Notes

Food, Fiber and Natural Resource Economics

CONCEPT APPLICATION

Common Stock

Everyone who buys securities, especially common stock, expects to realize some capital gains. However, the common stockholder shares in both the profits and losses of a firm. He is a part owner of the business and shares in its control to the extent of his "shares" of stock. Consequently, the investor should be well informed before investing. This section points up some of the basic factors of understanding common stock for investment.

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Friday, July 11, 1975

Thursday's Volume
28,880,000 Shares; $26,600 Warrants

Volume since Jan. 1:	1975	1974	1973
Total shares	2,809,842,020	1,780,157,645	1,990,903,372
Total warrants ..	63,356,500	14,862,000	23,614,600

ACTIVE STOCKS

	Open	High	Low	Close	Chg.	Volume
Texaco Inc	26⅛	26⅜	26⅛	26⅜	+ ¼	484,000
Occiden Pet	22	22	21¼	21½	+ ½	479,900
Macmillan	5½	6¼	5½	6¼	+ ¾	351,900
Kidde Co	21¾	22⅞	21⅜	22¾	+1⅛	318,200
Mead Corp	14⅞	15⅜	14⅞	15¼	+ ⅜	289,100
Melv Shoe	15⅜	16⅛	15½	16	+ ⅜	275,200
Braniff Int	8	8⅛	7¾	7⅞	......	251,400
Polaroid	40⅜	40⅜	38⅜	39⅜	−1⅛	221,900
UAL Inc	24½	24⅞	23⅜	23⅞	+ ⅜	221,800
Chrysler	13½	13⅞	13¼	13½	+ ½	220,900

Average closing price of most active stocks: 19.35

−1975−			P-E	Sales				Net
High	Low	Stocks Div.	Ratio	100s	High	Low	Close	Chg.
		− A−A−A −						
78	46½	AbbLab 1.44	18	194	77⅛	76	77	+ ⅞
45¾	33¼	ACF In 2.60	9	40	45	44⅞	44⅞	......
10⅜	7	AcmeClv .50	5	25	9½	9⅛	9½	+ ⅜
4⅛	1¾	AdmDg 1.04e	9	60	3¾	3⅜	3¾	+ ⅛
10½	7¾	AdmEx .77e	...	43	10⅜	10⅛	10¼	......
3⅜	2⅛	Adms Millis	...	13	4	3⅜	4	+ ⅜
9⅜	3¼	Addressog	85	231	8⅜	8¾	8½	......
10	7¼	AdvInv .28e	...	89	9⅛	8¾	9	+ ¼
29⅜	20	AetnaLf 1.08	12	456	27½	27⅛	27½ +	½
43⅞	31	AetnaLf pf 2	...	6	41½	39¾	41	+ 1
7	4¾	Aguirre Co	7	10	6	6	6	+ ⅛
12	6⅞	Ahmans .20	7	620	10¼	9⅞	10¼ +	⅜
4⅜	1⅜	Aileen Inc	10	38	4¼	4⅛	4¼	......
79⅜	44¾	AirPrd .20b	20	127	79¼	78	78⅜ −	⅜
13⅜	4⅜	AirbnFrt .50	10	331	11⅜	11½	11½	......
23⅜	10½	Aircoinc .90	7	214	23	22¾	22¾ −	¼

−1975−			P-E	Sales				Net
High	Low	Stock Div.	Ratio	100s	High	Low	Close	Chg.
6⅜	4⅜	BwnShrp .20	6	27	8¼	8	8¼ +	⅜
9	5	BrwnFer .20	18	356	9	8¾	8¾	......
15¾	9	Brunswk .40	8	202	14⅜	14⅜	14⅜ +	¼
16	9¼	BrushW .40	6	3	14½	14⅜	14½ +	⅜
7	3½	BT Mtg .90e	...	5	4	3⅜	3¾ −	⅛
51¼	28	BucyErie 1	19	200	48½	47½	47¾ +	¼
10½	7⅜	BuddCo .60	12	58	10½	10⅛	10⅜ +	⅜
5⅜	4½	BudCa pf.60	...	3	5¼	5	5¼	......
23	12	BuffFor 1.20	20	53	25¼	24¾	25 +	2⅜
9⅜	6¾	BulovaW .20	6	108	7⅜	7½	7¾ +	⅜
22⅛	18½	BunkHil 1.86	...	5	20⅜	20	20 −	¼
7½	3¼	BunkrRa .40	55	35	7¼	7	7½ +	⅛
15	9⅞	Bunkr pf1.50	...	10	14½	14⅜	14½ +	⅛
28¼	14⅞	Burlind 1.20	12	109	27¼	.27	27	......
42⅞	33	BurlNor 1.70	8	120	38¾	37¾	37⅞ −	⅛
7⅜	6⅜	BurlNo pf.55	...	8	7⅛	7⅛	7⅛	......
31⅜	11¾	Burndy .78	10	8	30½	30½	30½ +	⅜
110¾	61¾	Burrghs .60	28	242	108¼	103⅞	103⅞ −	4⅜
		− C−C−C −						
5½	2⅜	CabCab For	...	18	3¾	3⅜	3⅜	......
22¼	15¾	Cabot Cp .92	142	24	23	22¼	22¾ +	⅜
3⅜	1⅜	Cadence Ind	...	17	2½	2⅜	2⅜	......
6¼	2⅜	Caesars Wrl	9	37	5⅜	5½	5½ −	⅛
4⅜	2⅛	Cal Finanl	...	38	3⅜	3½	3½	......
16¾	13⅜	CalP Ut 1.52	7	18	16⅜	16¼	16¼ +	¼
17¾	7½	Callahn .36f	15	320	17¾	16⅜	17¾ −	⅛
3⅜	1⅜	Camrn Brn	...	13	2¾	2¾	2¾	......
36¼	26¼	CamRL .60a	19	214	30¾	30	30 −	½
33⅞	27⅜	CamSp 1.24	12	50	34	33½	33⅜ −	¼
49	32	CanSouRy 3	8	z20	51	50	51	+ 2
17¼	13¾	CdnPac .86e	6	229	14⅜	14½	14½	......
11⅜	7¾	CanalR 1.10	8	4	10⅞	10¾	10⅞ +	⅜
43½	22	CapClt Com	14	2	42⅜	42¼	42¼ +	⅜
28⅛	21⅜	Cap Hold .34	16	134	28¼	27¾	27⅞ −	⅜
3⅜	1¾	Capit Mtg	...	21	2⅜	2	2⅜ +	⅜
47¾	28¼	Carbor 1.70	7	26	46¾	46¼	46½ +	½
3	2	Carling OKe	...	3	2⅜	2½	2⅜ +	⅛
14⅜	10¼	Carlisle .88	5	23	13¼	12⅞	13 +	⅜
6⅜	4⅜	CaroFrg .20	88	13	7	6½	7 +	⅜
18⅜	11	CaroPw 1.60	7	168	17⅛	16¾	17 +	¼
25½	24½	CarP pf2.67	...	7	25⅜	25½	25⅜ +	⅛
24¾	15⅜	CarTec 1.60	4	33	23¾	23	23¾ +	1¼
13½	6⅞	CarrCp .52	41	121	11	•10½	10⅜ −	⅛
13¼	10⅜	CarrGn .90e	...	2	12	12	12	......

EXPLANATORY NOTES
(Footnotes apply to New York and American exchanges)

z−Sales in full.

Unless otherwise noted, rates of dividends in the fore going table are annual disbursements based on the last quarterly or semi-annual declaration. Special or extra dividends or payments not designated as regular are identified in the following footnotes.

a−Also extra or extras. b−Annual rate plus stock dividend. c−Liquidating dividend. e−Declared or paid in preceding 12 months. h−Declared or paid after stock dividend or split up. k−Declared or paid this year, an accumulative issue with dividends in arrears. n−New issue. p−Paid this year, dividend omitted, deferred or no action taken at last dividend meeting. r−Declared or paid in preceding 12 months plus stock dividend. t−Paid in stock in preceding 12 months, estimated cash value on ex-dividend or ex-distribution date.

cld−Called. x−Ex dividend. y−Ex dividend and sales in full. x-dis−Ex distribution. xr−Ex rights. xw−Without warrants. ww−With warrants. wd−When distributed. wi−When issued. nd−Next day delivery.

vj−In bankruptcy or receivership or being reorganized under the Bankruptcy Act, or securities assumed by such companies. fn−Foreign issue subject to interest equalization tax.

Year's high and low range does not include changes in latest day's trading.

Where a split or stock dividend amounting to 25 per cent or more has been paid the year's high-low range and dividend are shown for the new stock only.

1. Using the above clipping from the <u>Wall Street Journal</u>, respond to the following (remember that Friday's paper gives transactions for Thursday's market).

    a. What did Abbot Laboratories (AbbLab) close for on July 10, 1975?   _____

    b. What is the lowest price BRUNSWK has sold for during 1975?   _____

    c. What is the highest price that BuffFor sold for during 1975?   _____

    d. If you would have purchased 100 shares of CapCit for its lowest price of 1975 and sold it at Thursday's closing price, how much capital gains would you have realized (ignore the commission and any dividends)?   _____

    e. What did AirPrd close at on Wednesday, July 9, 1975?   _____

    f. What is the current P-E Ratio for Burndy?   _____

    g. Given the current P-E Ratio, how much are the earnings per share of Burndy?   _____

    h. If one share of AcmeClv was purchased at Thursday's closing price and it paid the current dividend for the next year, what would the return on investment be from the dividends alone?   _____

    i. If 100 shares of BurlNor were purchased at its closing price on Thursday and held for exactly three years, then sold for its 1975 high, how much total profit would be realized (include dividends but exclude commissions)?   _____

    j. What would the annual return on investment be for the BurlNor stock purchased in "i"?   _____

k. How many shares of AetnaLf pf were traded on
Thursday's market? _____

l. How many shares of its common stock were traded? _____

Bonds

If an investor is seeking a steady income rather than an opportunity for capital growth, he would most likely invest in bonds rather than in common stock. The purchase of a corporate bond represents a loan to the company. The company promises to pay the bondholder a fixed amount of interest each year and to repay the face value (principal) of the bond on its maturity date. If the company gets into financial difficulties, it may not be able to either pay the interest or repay the principal. Buying bonds represents a risk; however, because bondholders are lenders rather than part owners, they have priority claims to company profits and assets--in bankruptcy proceedings.

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New York Exchange Bonds

Thursday, July 10, 1975

Total Volume, $24,200,000

SALES SINCE JANUARY 1

1975	1974	1973
$2,999,932,800	$1,994,745,300	$2,352,809,600

	Domestic		All issues	
	Thurs	Wed	Thurs	Wed
Issues traded	823	844	832	854
Advances	373	350	376	355
Declines	220	258	222	259
Unchanged	230	236	234	240
New highs, 1975	55	47	58	50
New lows, 1975	5	7	5	7

Dow Jones Bond Averages

	−1973−		−1974−		−1975−			---THURSDAY---		
	High	Low	High	Low	High	Low		−1975−	−1974−	−1973−
40 Bonds								68.93 + .08	66.93 + .01	73.87 + .14
10 Hi Rails								49.66	49.17 + .30	54.22 + .02
10 2nd Rails								61.77 + .20	64.05	67.10 + .09
10 Utilities								85.98 + .12	81.32 − .08	90.60 + .24
10 Industrial								78.33 + .03	73.17 − .20	83.98 + .22
Inco Rails								43.81 + .24	46.52 + .10	51.11 − .07

2. Using the above clipping from the <u>Wall Street Journal</u>, respond to the following:

   a. ATT is listed 14 times whereas Abex is listed only once, why?

   b. What did Alcoa 9s95 close at on Thursday, July 10, 1975? $_____

   c. What was the current yield of an AMAX 8s86 bond on Thursday?   _____%

   d. When does the EXXON 6s97 bond mature?   _____

   e. If the EXXON 6s97 bond is held for one year, how much "coupon" interest will it pay? $_____

   f. If Abex 8 3/4 s 77 matures on July 10, 1977, what would its "yield to maturity" be?   _____%

   g. What was the Thursday closing price and current yield of the following two ATT bonds? Explain the difference.

	Price	Yield
8.7 s 02	$_____	_____%
2 5/8 s 86	$_____	_____%

   h. How many N Cash bonds were traded on Thursday?   _____

   i. What was the closing price of the FMC 4 1/4 s 92 bonds on Wednesday, July 9, 1975? $_____

Analyzing Common Stocks

A widely used measure of stock market movement and change is the Dow Jones Average. Actually there are four separate Dow Jones averages: 1) industrial stocks, 2) utility stocks, 3) transportation stocks, and 4) a composite of the three separate groups. One must thus note which of the averages is being emphasized in a given market report. The industrial group average is based on stocks of 30 companies, the utility average on 15 companies, and the transportation average on 20 airlines, railroads, and trucking companies, for a total of 65 stocks in the composite total. This average uses a complex mathematical formula to try to adjust weights of stock prices for changes in number of shares through stock splits and stock dividends occurring since the measure was originally designed.

The Standard and Poors Stock Index is a more broadly based measure of stock market action since it covers a total of 500 different stocks that account for about 85 percent of the total value of all stocks traded on the New York Stock Exchange. In that index (and its components) the price of a share of stock is weighted by the number of shares outstanding. Standard and Poors indexes are also calculated separately for 425 industrial, 15 railroads, and 60 utilities.

Less widely used measures of stock market activity include: 1) The New York Stock Exchange Index of 1250 common stocks divided into four groups - industrials, transportation, utilities, and finance, 2) The American Exchange Market Value Index, and the National Association of Securities Dealers (NASDAQ) Index of stocks traded "over the counter" (these are typically stocks of smaller companies with more of a local or regional interest), and 3) the "Value Line" index uses a measure of stock prices that is a geometric average that includes 1,383 industrials, 159 utilities, and 17 railroads, for a total of 1,559 stocks.

Let's assume that you are interested in investing in the common stock of one or more firms in the grocery retail industry and have narrowed your selection to the following three firms. The quotations are given as of July 21, 1975.

	1975 H	1975 L	Div.	PE Ratio	Sales (100's)	High	Low	Close	Chg.
Big Bear	25	– 12 3/4	1.20	5	8	23 3/4	23 5/8	23 3/4	–1/4
Gt A & P	12 1/4	– 7 1/2	–	–	148	11 3/8	10 7/8	11 3/8	+1/2
Kroger	24 1/8	– 15 3/4	1.36	7	226	22 1/2	21 3/4	22 1/4	–1/4

3. Using the information above, respond to the following:

    a. Which of the three companies realized the greatest price appreciation during 1975?

b. If purchased at the July 21st closing price, what would the expected return on investment be for each company, given a continuation of the dividends indicated?

    1) Big Bear

    2) A & P

    3) Kroger

c. Using the above information, which of the three companies would be the best investment? Why?

      The information given in the daily stock quotations is usually insufficient to determine whether one firm is a better investment than another. For this reason, there are a number of firms which provide detailed data on the financial history of the firms listed on the stock exchanges and many of the over-the-counter stocks. The following references represent three different sources of investment analysis information.

4. Using the three attached exhibits, respond to the following:

a. On what stock exchanges is Kroger stock traded?

b. What is the lowest and highest price which Kroger stock has sold for since 1960?

c. For how many consecutive years has Kroger paid dividends?

d. What was the amount of dividends Kroger paid per share in 1973?

_____ 1974? _____

e. What has happened to Kroger's earnings per share since 1970?

f. How many of each of the following does Big Bear Stores have?

Supermarkets   _____

Other Stores   _____

Employees   _____

Shareholders   _____

Shares of Class A common stock _____

Shares of Class B commom stock _____

g. Who actually controls Big Bear and how?

h. What happened to each of the following for Big Bear for the period of 1965-74?

Earnings/share

Dividends

Book value

i. What might have caused the increase in the price of Big Bear during 1971?

j. What were the earnings/share for A & P at the end of 1972?

k. Why is there no P/E ratio given for the year 1972?

l. What happened to gross sales per store from 1964 to 1965?

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STANDARD & POOR'S CORPORATION

Index	Ticker Symbol	STOCKS NAME OF ISSUE (Call Price of Pfd. Stocks) Market	Earns &Div Rank-ing	Par Val.	Inst.Hold Cos	Shs. (000)	PRINCIPAL BUSINESS	1960-72 High	1960-72 Low	1973 High	1973 Low	1974 High	1974 Low	Dec. Sales in 100s	Last Sale Or Bid High	Last Sale Or Bid Low	Last Sale Or Bid Last	% Div. Yield	P-E Ratio
1	KOP	Koppers Co........NYS,Bo,MW,PB,PS	A—	5	33	790	Forest prod: chemicals road bldg:plastics:metal	48¾	16¾	44½	31	55	33	729	39½	35½	37½	6.4	4
2	Pr	4% cm Pfd (107¾)........NYS	A	100	9	21		93¾	49½	58½	50	55	42½	22	46	42½	42½	9.4	
3	KOSS	Koss Corp........OTC	NR	1¢		3	Stereophonic headphones	15	2¾	16¾	9¾	11	4	183	5	4¼	4¼ B		5
4	KRA	Kraftco Corp..NYS,Bo,Ci,De,MW,PB,MS,TS	A	2½	121	2004	Packaged foods: dairy prod	50½	22½	50½	35¼	47½	26¾	2092	35¼	31¼	34¾ B	5.5	9
5	KTOS	Kratos........OTC	NR	No			Mfr electr comp/instruments	85	¼	6¼	⅞	5	2	31	2½	2	2 B		7
6	KG	Kresge (S.S.)........NYS,Bo,De,MW,PB,PS	A+	1	299	13230	Discount: variety stores	49½	1½	51½	28¾	38½	18¼	16388	23¼	19¼	22¼	1.0	18
7	KFM	Kroehler Mfg........NYS,Ci,PB	B	1	2	9	Upholstered living rm furn	47¼	9¼	27½	11½	17½	7½	331	9½	7½	8½	9.4	6
8	KR	Kroger Co........NYS,Bo,Ci,De,MW,PB	B+	1	55	1852	3rd lgst fd supermkt chain	46	19	24¾	15	24¾	14¾	2263	16¼	14¼	15¾	8.8	5
10	KRUE	Krueger (W.A.)........OTC	B		4	47	Magazine and book printer	35½	6½	11¾	7	8¾	5	115	7½	6¼	6¾ B	8.0	4
11	KTL	K-Tel Int'l........ASE,TS	NR	10¢			Merchandises specialty prod	27½	9¼	12	3	5¼	1½	161	1¾	1¼	1¼		d
12	KUHL	Kuhlman Corp........OTC	B	1			Transformers:com'l springs	30½	2½	12	7½	10¾	4¼	449	4½	4¼	4¾ B	14.3	3
13	KBK	Kuhn's-Big K Stores........ASE	NR	1	4	76	Disc dept & variety strs	41	19	21¾	5¼	7¼	2	380	2¾	2	2¾	4.2	2
14	KLIC	Kulicke & Soffa Ind........OTC	B—	No	4	171	Equip to mfr semiconduct'rs	27	1¾	11½	5¾	6½	1¾	132	1¾	1¾	1¾ B		1
15	KVPH	K-V Pharmaceutical........OTC	NR	1	1	16	Mfr drugs for major firms	34½	14¼	30	4	12¾	3¼	118	5	3¼	3¾ B	6.2	7
16	KZ	Kysor Ind'l........NYS	B+	1	1	80	Truck eq,mch tool,mat hndlg	43¾	2⅜	12	8½	11¾	4¼	466	6½	4¼	4¾	9.4	2
17	LB	La Barge........ASE	B	25¢			Tubular,electronic,concrete	19½	½	3½	1½	3	1½	282	2¾	2¼	2½	1.5	3
18	LBT.A	Labatt(John)Ltd Cv A........TS,MS	A	No	31	828	Beer & soft drinks,food prod	32	4	31	20¼	25½	12½	878	16½	12½	16	6.2	8
19	LAB	Labrador Mng & Expl........TS,MS	B+	3	31	Has large iron ore reserves	44½	17	48	38½	43	22	65	24	22½	22¾	8.0	8
20	LG	Laclede Gas........NYS,MW,PB	B+	4	9	54	Distr nat gas in St. Louis	32½	16½	22½	17¼	20¼	11¾	342	13¾	11¾	12¾	12.6	7
21	LCLD	Laclede Steel........OTC	B	5	2	3	Semi & finished steel prods	29¾	3½	9¼	6½	30	8	359	24	21	24 B	e8.3	3
22	LAF	Lafayette Radio Elec........ASE	B	1	9	92	Sells hi-fi components, etc.	40½	2¾	30½	6¼	7¾	3	753	4	3	3½		3
23	LAG	L'Aiglon Apparel........ASE	C	1	1		Mfrs women's dresses	47	3¼	4½	1¼	2½	1¼	88	1¾	1¼	1¾		d
24	LKK	Lake Shore Mines........#ASE,MS,TS	B—	1		3	Invest in mining & hldg cos	9½	1¾	4¼	2½	8¾	2½	1121	4½	3¼	3½		9
25	LAKE	Lake Superior Dis Pw........OTC	B+	10			Elec util-Wisc & Mich areas	15¾	8½	13	9¾	11½	8	74	8½	8¼	8½ B	10.8	7
26	LMR	La Maur, Inc........ASE	B	3⅓¢	3	46	Hair preps, cosmetics, etc.	40	2¾	12¾	3	4¾	2¼	278	2¾	2¼	2½	14.4	5
27	LMS	Lamson & Sessions........NYS	B+	5	2	3	Mfr industrial fasteners	31¼	5¾	15¼	9¾	20	10¼	179	17½	14	16½	6.9	3
28	LAMS	Lamston (M.H.)........OTC,Bo	B+	1			Variety strs, NYC & environs	20½	5¾	16½	9	9	7	49	8	7¼	8 B	12.5	6
29	LANC	Lancaster Colony........OTC	B+	4	9	152	Housewares: ind'l products	43¾	6¾	37½	6	9½	3¾	596	4½	3¾	4 B	9.0	4
30	LNCE	Lance, Inc........OTC	B+	1¼	3	85	Packaged food prod: snacks	45	5¾	37¼	20	24	10	617	12¼	10	12 B	4.9	9
31	LHRT	Lanchart Indus........OTC	NR	10¢	2		Mobile home mfr	20¾	5¾	9¼	1¾	2¾	⅞	172	1¼	⅞	⅞ B		44
32	LRES	Land Resources........OTC	NR	10¢			Real estate interests	13½	1¾	3¾	1¾	3½	½	282	¾	½	½ B		1
33	LML	Landmark Land........ASE,MW	B—	50¢	4	302	Land develop:bldg mtls dstr	30¾	1¾	3½	1¾	3	1¼	202	1¾	1¼	1¼		d
34	LNY	Lane Bryant........NYS	A—	No	11	128	Apparel chain,mail order	34	5¾	31¾	11	14	7½	332	9	7½	8¼	8.9	4
35	LANE	Lane Co........OTC	B+	5	8	103	Furniture mfr.	59	4¾	36¾	15	22½	9¾	154	10¾	9¾	9¾ B	7.2	4
36	LWI	Lane Wood........ASE	B—	No			Mobile home financing,insur	24¾	3¾	7¾	2¼	3¾	¾	250	1¼	¾	¾ B		d
37	LNO	Laneco, Inc........ASE	NR	1			Supermkts,disc dept strs	12	4¾	6	1¾	2¾	1¼	114	1½	1¼	1¾		5
38	LPI	La Pointe Indus........ASE	B	1			Elec/electronic components	25	½	6½	3¼	4¼	2¼	105	3¾	2¼	2½		6
39	LARS	Larsen Co........OTC	B	6⅔	2	14	Canned & frozen vegetables	38	8½	34¾	21¼	27½	21¼	12	22	22	22 B	7.7	5
40	LWN	Larwin Mtg Inv SBI........NYS		1	7	106	RE invest tr: constr & dev	35	14	32¾	13¾	18	¾	1910	1½	¾	1¼		d
41	LRM	Larwin Rty Mtg Tr SBI........ASE,Bo,PB		1	3	7	Real estate investment trust	18	13¾	16½	8	11	3¾	1522	4¼	3¾	3½	25.4	3
42	WS	Wrrt (Purch 1 SBI at $20)........ASE		1				4½	1¾	1½	¾	¾	⅛	1311	½	⅛	¼		
43	LTHM	Latham Process........OTC	B	10¢	1	5	Fin'l and comm'l printing	14¼	1¾	2¼	1	1¾	¾	7	1½	1	1 B		
44	LBF	LaTouraine-Bickfds Fds........ASE	C	10¢			Food serving & mfg: dstr	4¾	1½	1¾	¾	1¼	½	526	¾	½	½		
45	LSC	Latrobe Steel........NYS,Bo,PB	B	2½			Tool & die steels:spec alloys	33¾	6¼	9¾	4¼	9¾	4¾	198	6¾	5¾	6	s1.7	

Uniform Footnote Explanations—See Page 1. Other: [51]@$1.69,'73. [52]Incl $0.25 loss fr sale. [53]□$1.59,'71. [54]@$0.46,'74. [55]To change fiscal year to Dec. [56]Vote name change to LMI Investors.

COMMON AND PREFERRED STOCKS   Kop—Lat 127

Index	Same Divs. En.Yr. Since	DIVIDENDS Latest Payment $	Date	Ex. Div.	So Far 1974	Total Ind. Rate	Paid 1973	Cash& Equiv.	Curr. Assets	Curr. Liabs.	Balance Sheet Date	L.Term Debt Mil-$	Shs.000 Pfd.	Shs.000 Com.	1970	1971	1972	1973	1974	Last 12 Mos.	Period	1973	1974	Index
1	1939	Q0.60 12-14-74	11-8		2.14	2.40	1.80	15.2	255.	107.	12-31-73	113.	150	p5800 Dc	▲2.16	▲3.26	4.01	5.14	E8.60	9.44	12 Mo Sep	5.10	9.44	1
2	1946	Q1.00 1-1-75	11-8		4.00	4.00	4.00						150	Dc	78.01	123.5	154.3	196.9						2
3		None Since Public		Nil				0.74	7.91	3.00	6-30-74	2.66		1685 Je	0.13	0.27	0.41	0.60	f0.76	0.80	3 Mo Sep	0.15	0.19	3
4	1924	Q0.48 12-10-74	11-12	1.882	1.92	1.768		34.0	854.	411.	12-29-73	239.		27720 Dc	2.93	3.25	▲3.57	₃3.70	E3.75	3.54	3 Mo Sep	2.69	2.53	4
5		None Since Public						0.13	3.88	2.05	3-31-74	0.66		614 Mr	▲d1.40	d0.02	*0.26	*0.52		0.30	6 Mo Sep	*0.33	*0.11	5
6	1913	Q0.05½ 12-12-74	11-8	0.21½	0.22	0.193		101.	1263	659.	1-31-74	221.		122000 Ja	0.62	0.85	1.00	1.15	E1.25	1.25	9 Mo Oct	0.71	0.81	6
7	1963	Q0.20 12-11-74	11-19	0.80	0.80	†1.00		n/a	56.1	10.7	10-6-74	4.10	3	1290 Dc	□0.78	2.04	▲2.67	2.63	E1.40	2.07	40 Wk Oct	1.51	▲0.95	7
8	1902	Q0.34 12-14-74	10-21	1.34½	1.36	1.30		70.4	564.	319.	12-29-73	149.		13482 Dc	3.00	□2.71	□1.87	2.22	E3.15	3.31	36 Wk Sep	1.18	2.27	8
10	1957	Q0.12½ 11-25-74	11-1	0.50	0.50	0.44		0.78	13.6	10.4	12-31-73	11.3	90	856 Dc	1.31	1.80	1.50	f51 1.76		1.58	10 Mo Sep	1.23	1.05	10
11		None Paid		Nil				1.57	21.1	15.2	9-30-74	0.59		4003 Je	0.77	0.81	0.58	0.82	d0.15	d0.24	12 Mo Sep	0.78	d0.24	11
12	1946	†0.25 1-10-75	12-19	†0.61	0.62½	0.40		1.15	29.8	14.1	p12-31-73	5.60		1966 Dc	0.97	▲0.58	▲0.87	1.78		1.65	9 Mo Sep	1.25	1.12	12
13	1946	Q0.02½ 11-1-74	10-25	0.10	0.10	0.10		7.92	36.8	13.2	12-31-73	7.50	4	1715 Dc	1.08	1.03	1.56	1.71		1.38	9 Mo Sep	0.37	0.04	13
14		Q0.05 12-20-74	11-18		0.20	0.15		1.99	13.0	5.35	9-30-74	4.26		888 Sp	0.62	d0.76	□0.54	*0.97		1.08	9 Mo Jun	*0.68	0.79	14
15	1971	Q0.05 12-20-74	11-18		0.20	0.15		0.50	4.87	2.96	3-31-74	1.96		1620 Mr	0.79	d0.53	0.71	520.27		0.48	6 Mo Sep	0.36	0.57	15
16	1936	Q0.10 3-31-75	3-3	†0.80	0.40	†0.65		1.17	50.5	21.1	5-31-74	12.7		p2307 My	1.09	1.15	▲1.47	2.03	2.08	1.83	6 Mo Nov	0.72	0.47	16
17	1974	S0.02 9-16-74	8-20	0.02	0.04			1.68	20.8	11.5	12-31-73	6.95		6894 Dc	0.15	□0.09	d0.13	0.16		1.00	9 Mo Sep	0.10	0.94	17
18	1945	gQ0.25 1-15-75	12-18	g0.94	1.00	g0.83		10.2	149.	82.1	j4-30-74	119.	p2820	±9224 Ap	▲1.45	1.46	□1.58	□1.93	2.15	2.12	6 Mo Oct	1.22	1.19	18
19	1957	Q0.45 11-22-74	10-30	g1.80	1.80	g1.90		20.6	25.3	0.57	j12-31-73			3300 Dc	▲2.99	2.87	1.89	2.94		2.74	9 Mo Sep	2.03	1.83	19
20		1-2-75	12-9		1.56	1.56	†1.487		1.97	26.3	23.6	9-30-74	115.	461	4363 Dc	2.37	2.39	2.46	2.46	1.75	1.75	9 Mo Sep	1.27		20
21	1972	Q0.50 11-22-74	11-1	†1.50	a2.00	0.50		7.48	50.0	25.0	9-30-74	25.3		1652 Dc	2.97	▲*0.53	*1.61	2.29		7.99	9 Mo Sep	1.98	7.68	21
22		5%Stk 1-7-64	12-5		Nil			4.56	41.3	11.8	6-30-74	0.80		2333 Dc	▲1.24	1.38	▲1.61	□1.63	1.04	1.08	3 Mo Sep	0.22	0.26	22
23		0.50 11-15-68	10-8		Nil			0.13	1.94	1.20	p6-30-74	0.60		366 Je	▲d0.55	▲0.86	d0.58	*0.54	d1.09	d1.20	9 Mo Sep	*0.13	*0.02	23
24		0.15 11-15-55	10-7		Nil			7.55	7.75	0.08	j12-31-73			5084 Dc	□0.11	□0.02	▲0.01	▲0.38		0.40	9 Mo Sep	▲0.28	▲0.30	24
25	1937	Q0.22 12-2-74	11-6	0.88	0.88	0.86		0.32	4.53	7.49	12-31-73	18.2	30	1224 Dc	▲0.87	1.10	1.36	1.23		1.09	12 Mo May	1.28	1.09	25
26	1965	Q0.09 12-27-74	11-25	0.36	0.36	0.36		0.63	8.68	3.28	12-31-73			1362 Dc	1.04	0.76	0.92	0.65		0.47	9 Mo Sep	0.59	▲0.41	26
27	1942	Q0.28¾ 3-10-75	2-14	0.977	1.15	0.909		1.49	37.0	13.0	12-31-73	16.0		1536 Dc	□1.38	□1.04	1.32	1.91		6.12	9 Mo Sep	1.43	5.64	27
28	1945	Q0.25 12-2-74	11-12	1.00	1.00	1.00		0.54	4.41	2.06	1-31-74	0.22		347 Ja	1.83	1.77	1.41	1.29		1.36	3 Mo Apr	0.10	0.17	28
29	1945	Q0.09 1-2-75	12-4	0.34	0.36	s0.31½		2.26	65.9	33.9	6-30-74	p15.8		p3754 Dc	0.86	1.07	1.76	1.76	1.49	1.46	3 Mo Sep	0.42	0.39	29
30	1945	Q0.12 10-8-74	9-13	†0.49	0.54	†0.52		4.43	15.0	4.07	12-29-73			5452 Dc	1.04	1.22	□1.38	1.34		1.40	36 Wk Sep	0.95	1.01	30
31		None Since Public		Nil				0.60	4.81	2.03	9-30-73	0.80		949 Sp	▲0.18	0.61	□0.96	0.61	P0.02	0.02				31
32		None Paid		Nil				Equity per shr $6.65			12-31-73	67.3		3089 Sp	▲0.37	53□0.14	0.01	f0.42	P54 0.55	d0.41				32
33	1941	2.50 10-21-58	10-10		Nil			Equity per shr $3.76			12-31-73	2.97		3097 Dc	▲d0.04	□0.16	□0.10	*0.54		d0.14	9 Mo Sep	*0.61	d0.07	33
34	1941	Q0.18 11-30-74	11-1	0.72	0.72	0.68½		8.31	91.5	33.5	2-2-74	15.4		4742 Ja	1.56	1.71	1.86	1.75	E1.90	1.83	9 Mo Oct	1.22	1.30	34
35	1922	†0.10 1-4-75	12-17	†0.74	0.70	†0.64½		12.1	45.3	8.82	6-30-74	0.99	53	2693 Dc	1.70	2.07	2.16	2.85		3.15	9 Mo Sep	1.86	2.16	35
36		5%Stk 9-13-74	8-12	5%Stk	Stk	5%Stk		Equity per shr $9.56			4-30-74	38.5		1398 Ap	0.57	□0.39	▲0.55	0.82 55	□ d1.52	d1.52	6 Mo Oct	0.02	d0.97	36
37		None Since Public						1.63	6.10	6.35	6-30-74	6.89		1038 Sp	0.54	□0.82	0.45	0.46	P0.52	0.52				37
38	1967	0.10 8-23-74	6-24	0.20	0.20	0.20		0.31	10.2	5.45	6-30-74	2.92		822 Je	1.73	0.07	0.45	□0.79	0.71	0.39	3 Mo Sep	0.03	d0.29	38
39	1936	Q0.35 12-20-74	11-27	†1.65	1.70	†1.65		0.67	9.41	4.14	6-30-74	2.92		374 My	▲1.85	2.93	3.32	3.28	3.93	4.26	3 Mo Aug	0.97	1.30	39
40	1969	0.34 6-4-74	5-14	0.84	Nil	2.70		Equity per shr $18.09			6-30-74	22.3		2009 Je	1.50	2.08	2.56	2.71	1.39	0.28	9 Mo Sep	0.65	d0.46	40
41	1972	0.23 11-1-74	10-9	1.22½	0.92	1.27		Equity per shr $18.54			6-30-74	15.0		3610 Nv			1.10	1.31		1.23	9 Mo Aug	0.97	0.89	41
42		Terms&trad. basis should be checked in detail						Warrants expire Dec 27,1976						3610 Nv										42
43		None Since Public		Nil				0.89	2.85	1.07	6-30-74	0.11		523 Je	0.53	0.63	0.47	0.48	0.28	0.33	9 Mo Sep	0.09	0.14	43
44		None on new company		Nil				0.85	7.27	6.33	12-31-73	1.48		2716 Dc	▲d0.19	▲d0.21	□1.19	▲d0.20		d0.09	9 Mo Sep	0.18	d0.07	44
45		0.10 10-31-74	10-15	s0.10	0.10			1.80	24.2	16.3	12-31-73	10.7		1261 Dc	▲d0.50	▲d2.33	▲*0.13	*0.92		1.94	9 Mo Sep	*0.62	1.64	45

◆ **Stock Splits & Divs By Line Reference Index** [51]1-for-5 reverse,'73. [53]3-for-1,'72. [1]4-for-3,'72. [21]100%,'72:4-for-1,'74. [28]100%,'72. [37]10%,'74:vote 15%,ex Jan 27. [29]6-for-5,'71:3-for-2,'72:adj to 3%,'73. [34]2-for-1,'72. [38]2-for-1,'70:adj to 4%,'73. [39]Adj to 5%,'74. [45]Adj to 5%,'74.

BB
Big Bear Stores   **7312**

Stock—
CLASS A COMMON . . . .

	Price Jun. 13'75	Dividend	Yield
	20⅜	⁴$1.20	5.9%

APPRAISAL: Sales and earnings of this Ohio and West Virginia supermarket chain and discount department store operator rose to record levels in 1974–75, despite a fourth quarter earnings decline. First quarter 1975–76 earnings resumed the uptrend, and the quarterly dividend was raised to $0.30 a share, from $0.28.

THE COMPANY'S POSITION

Big Bear Stores operates a chain of 52 retail food supermarkets located primarily in central and southern Ohio (23 in Columbus) and northern West Virginia. Through wholly owned subsidiaries, the company also operates 11 discount department stores, three junior department stores, four drug stores, a trading stamp business, and a central bakery. In 1974–75, food operations accounted for 76% of total revenues and 72% of pretax earnings, while general merchandise activities contributed the remainder.

The supermarkets carry a complete line of grocery products, including meats, produce, frozen foods, dairy and bakery goods. In addition to national brand items, Big Bear offers many products bearing brand names of Topco Associates Inc., a cooperative of which the company is a member. All of the units are located within 150 miles of Columbus.

Through its Hart Stores subsidiary, the company operates 11 discount Harts Family Center Department Stores, each of which contains or is near a Big Bear supermarket. Hart also operates three junior department stores located in basements of Big Bear supermarkets, and four free-standing drug stores.

The trading stamp business is operated by wholly owned Buckeye Premium Stamps Inc. Most Big Bear supermarkets, excluding those operating in Harts Family Centers, give Buckeye stamps. Buckeye stamps are also sold to and distributed by a large number of independent merchants in Columbus and central Ohio. There are 15 stamp redemption centers in operation.

During 1974–75, the company remodeled seven stores and opened a 100,000-sq.-ft. combination Harts Family Center and Big Bear supermarket in Lancaster, Ohio. Capital expenditures totaled $3,496,769, down from $4,477,494 in 1973–74.

Rental expense was $3,415,016 in 1974–75. Minimum annual rental commitments (net of subleases) for 1975–76 aggregate $3,306,288.

Employees: 5,200. Shareholders (of record): 5,889.

BIG BEAR STORES · A
OTC MONTH-END BID PRICES
SHARES TRADED — THOUSANDS

	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	
Sh. Earn.	2.31	²2.17	³2.31	2.42	2.73	3.19	²3.00	3.94	4.44	----	¹Of Next
Divs.	0.85	1.00	1.00	1.00	1.00	1.06	1.08	1.08	1.12	0.58	Cal. Yr.
Price	19¾-14	21-14¼	27½-17¼	26½-17⅛	20⅜-16	34⅜-17⅞	41¼-19½	29¾-16¾	24¼-12	20¼-12¾	Calendar
PE Ratio	9-6	10-7	12-7	11-7	8-6	11-6	14-6	8-4	6-3	----	Years
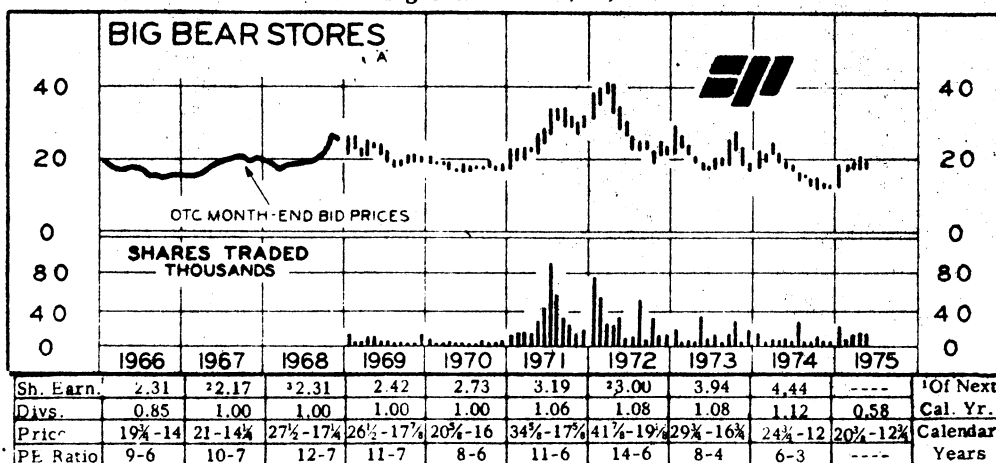
NOTE: Earns. on comb. Cl. A & B Common; Divs. & Price on Cl. A.   ¹Yrs. ended about Feb. 28.   ²53 wks.   ³Bef. spec. chg. of $0.05.   ⁴Indicated rate.

7312   BIG BEAR STORES COMPANY

EARNINGS AND BALANCE SHEET POSITION (Million $)

YEAR ENDED FEB(1)	OPER REVS	% OPER INC OF REVS	OPER INCOME	DEPR & AMORT	NET BEFORE TAXES	NET INCOME(3)	PRIMARY EARNGS(3)	CASH DIVS	BOOK VALUE
1974	291.47(2)	4.9	14.27	4.04	10.23	5.59	4.44	1.120	30.74
1973	263.17	4.4	11.51	3.97	9.53	4.97	3.94	1.080	27.42
1972	240.94	3.6	8.77	3.77	6.67	3.77	3.00	1.080	24.56
1971	208.86	4.2	8.71	3.05	7.10	3.99	3.19	1.060	22.67
1970	184.23	4.4	8.13	2.55	6.64	3.40	2.73	1.000	20.57
1969	166.85	4.4	7.27	2.21	6.14	3.04	2.42	1.000	18.84
1968	156.06	5.2	8.18	1.93	5.98	2.95	2.31	1.000	17.23
1967	145.25	4.8	7.03	1.84	5.19	2.82	2.17	1.000	15.81
1966	134.12	5.5	7.37	1.71	5.64	3.05	2.31	0.850	14.50
1965	123.72	5.0	6.24	1.64	4.70	2.64	1.99	0.688	12.99

(1) FEB	GROSS PROP	CAPITAL EXPEND	CASH ITEMS	RECEIV- ABLES	INVEN- TORIES	ASSETS	LIABS	NET WORKG CAP	CUR RATIO ASSETS TO LIABS	LONG TERM DEBT	RET ON COMMON EQUITY
1974	43.3	NA	11.9	1.1	31.6	45.8	19.0	26.8	2.4-1	5.2	15.3%
1973	41.0	4.5	7.3	1.4	32.8	42.6	20.5	22.0	2.1-1	5.4	15.2%
1972	37.4	5.9	7.0	1.3	27.7	37.2	17.4	19.8	2.1-1	6.4	12.7%
1971	33.1	6.2	7.4	0.8	24.8	33.5	14.5	19.0	2.3-1	6.6	14.8%
1970	28.0	4.1	5.5	1.4	21.1	28.5	12.6	15.9	2.3-1	3.1	13.8%

NOTE(S): DATA AS ORIG. REPTD. AND ADJ. FOR STK. SPLITS AND DIVS. EX PRIOR TO 06/12/75. 1)OF FOL. CAL. YR. 2)INCL. OTHER INC. 3)BEF. SPEC. ITEM(S) OF -$0.05 P/S IN 1968. NA=NOT AVAILABLE.

RECENT DEVELOPMENTS

Sales and other income for the 52 weeks ended March 1, 1975, rose 9.5% from those of the corresponding year-earlier period, aided by higher selling prices and the addition of a combination unit. Margins narrowed, however, as costs expanded somewhat more rapidly. Operating income edged up 5.8%. Following a smaller rise in depreciation charges, pretax income was up 7.4%. After taxes at 45.3%, against 47.9%, net income gained 13%, to $4.44 a share (following provision for preferred dividends), from $3.94.

On June 10, 1975, W. E. Brown, president, stated that first-quarter earnings for 1975-76 were "somewhat above" the year-earlier total on a 9.1% gain in sales.

In late April, 1975, the company announced that construction would begin immediately on two large supermarkets, one in Springfield, Ohio, and the other in Columbus. A new Harts Family Center, to be located in Huntington, W. Va., is also planned, and is scheduled for an early fall opening.

SALES & OTHER INC. (Million $)

13 Wks.:	1975-6	1974-5	1973-4	1972-3
May	76.50	70.13	62.85	56.04
Aug.		70.90	64.71	56.60
Nov.		74.89	68.20	'65.62
Feb.		75.56	70.41	65.35

DIVIDEND DATA

On June 3, 1975, the company raised its quarterly dividend to $0.30 a share, from $0.28. Recent payments were:

Amt. of Divd. $	Date Decl.	Ex-Divd. Date	Payment Date
0.28	Sep. 4	Sep. 11	Oct. 1'74
0.28	Dec. 4	Dec. 11	Jan. 2'75
0.28	Mar. 4	Mar. 11	Apr. 1'75
0.30	Jun. 3	Jun. 10	Jul. 1'75

CAPITALIZATION

LONG TERM DEBT: $5,000,000.
$5 CUM. PREFERRED STOCK: 1,274 shs. ($100 par).
CL. A COMMON STOCK: 1,070,768 shs. ($0.33 1/3 par); one vote each.
CL. B COMMON STOCK: 186,766 shs. ($0.33 1/3 par); 10 votes each, except one vote on issuance of cl. A stk. and certain other matters; 93% owned by W. E. Brown.

COMMON SHARE EARNINGS ($)

13 Wks.:	1975-6	1974-5	1973-4	1972-3
May	N.A.	0.99	0.87	0.74
Aug.		0.79	0.75	'0.46
Nov.		1.58	1.08	'1.03
Feb.		1.08	1.24	0.77

'14 wks, N. A.: Not available.

GREAT ATL. & PAC. TEA

NYSE	RECENT PRICE	DIV'D YIELD	P/E RATIO		1545
GAP	8.9	5.1% (NORM 4.4%)	NMF (NORM 13.0)		

High →	44.8	37.8	34.6	39.1	35.8	28.8	33.2	22.0	19.0	14.9		1976 1977 1978
Low →	32.8	25.5	26.4	26.6	25.2	21.5	18.0	15.3	8.0	6.5		Range Est'd Avg Prices

"See inside back cover for Definition of Terms."

Range Est'd Avg Prices: 37 (+315%), 25 (+180%)

7.0 X "Cash Flow" p sh

Price Stability 70 (Scale from 100 to 5)
Growth Persistence 10

12 MOS EARNINGS Per Share Quarterly (B)

INDEX of INSIDER DECISIONS

% shares traded

PERFORM'CE Next 12 Mos. **3** Average
SAFETY **3** Average
(Scale: 1 Highest to 5 Lowest)
BETA .80 (NYSE Avg. = 1.00)

March 14, 1975 Value Line
© Arnold Bernhard & Co., Inc.   77-79 E

Shares Held by Investment Companies

12/31/73	3/31/74	6/30/74	9/30/74
286,000	306,000	432,000	457,000
(3 funds)	(3 funds)	(3 funds)	(3 funds)

Sales per sh $400, $200

HISTORICAL GROWTH TRENDS $100, $50

Book Value per sh $20, $10

"Cash Flow" per sh $5, $3

Earnings per sh

	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975		77-79 E
Sales per sh	202.93	204.27	220.65	219.96	219.01	231.31	227.70	221.45	256.03	271.26	278.90	241.75		280.00
"Cash Flow" per sh	3.76	3.82	4.18	4.26	3.86	4.17	4.03	2.54	d.10	2.48	2.40	2.95		4.75
Earnings p sh (yr-end)	2.08	2.09	2.27	2.25	1.82	2.14	2.02	0.59	d2.06	.49	.30	.75		2.35
Egs p sh as reported	2.08	2.09	2.27	2.25	1.82	2.15	2.02	0.59	d2.06	.49	.30	.75(B)		2.35
Div'ds Decl'd per sh	1.47	1.49	1.53	1.60	1.30	1.30	1.30	1.18	0.60	--	0.45	Nil-.45(C)		1.45
Book Value per sh	23.02	23.65	24.63	25.28	25.80	26.63	27.34	26.75	24.09	24.58	24.40	24.70		27.40
Common Shs Outst'g	25.03	25.06	24.81	24.82	24.82	24.87	24.88	24.88	24.88	24.88	24.90	24.90(D)		25.00
Avg Ann'l P/E Ratio	19.1	17.2	13.7	13.5	17.2	13.0	13.0	40.2	--	24.3	34.0			13.0
Avg Ann'l Div'd Yield	3.7%	4.1%	4.9%	5.3%	4.2%	4.6%	5.0%	5.0%	3.5%	--	4.4%			4.7%
Sales ($mill)	5079.6	5119.0	5475.3	5458.8	5436.3	5753.7	5664.0	5508.5	6368.9	6747.7	6945	5560(A)		7000
Number of Stores	4585	4625	4693	4724	4713	4575	4427	4264	3940	3680	3500	2300		2500
Sales per Store ($mill)	1.1	1.1	1.2	1.2	1.2	1.3	1.3	1.3	1.6	1.8	2.0	2.4		2.8
Inventories ($mill)	354.2	370.1	387.5	401.3	417.1	456.8	463.2	442.9	484.0	544.1	489	373		465
Inventory Turnover	14.3	13.8	14.1	13.6	13.0	12.6	12.2	12.4	13.2	12.4	14.2	14.9		15.1
Net Income ($mill)	52.1	52.3	56.2	55.9	45.3	53.2	50.1	14.6	d51.3	12.2	7.5	18.7		58.3
Income Tax Rate	47.2%	45.8%	46.8%	45.0%	49.9%	49.3%	45.3%	30.8%	--	36.1%	45.0%	45.0%		50.0%
Net Income Margin	1.03%	1.02%	1.03%	1.02%	0.83%	0.93%	0.89%	0.27%	NMF	0.18%	0.11%	0.34%		0.83%
Funded Debt ($mill)	--	--	--	--	--	--	--	--	55.0	--	Nil	100		100
Net Worth ($mill)	576.3	592.6	611.1	627.4	640.5	662.3	680.1	665.5	599.3	611.5	608	615		685
Working Cap'l ($mill)	291.0	296.3	300.2	310.3	317.3	335.8	350.7	326.5	329.4	294.6	306	337		375
% Earned Total Cap'l	9.1%	8.8%	9.2%	8.9%	7.1%	8.1%	7.4%	2.2%	NMF	2.5%	1.0%	3.5%		8.5%
% Earned Net Worth	9.1%	8.8%	9.2%	8.9%	7.1%	8.1%	7.4%	2.2%	NMF	2.0%	1.0%	3.0%		8.5%
% All Div'ds to Net Inc	70%	70%	67%	71%	71%	61%	65%	200%	--	--	150%	Nil-60%		62%

ANNUAL RATES of change (per sh)

	Past 10 Yrs	Past 5 Yrs	Est '71-'73 to '77-'79
Sales	2.0%	2.5%	2.0%
"Cash Flow"	-8.5%	-16.5%	19.5%
Earnings	--	--	NMF
Book Value	1.5%	0.0%	1.5%

CURRENT POSITION ($mill.)

	1971	1972	2/23/74
Cash Assets	102.5	74.6	63.0
Receivables	25.6	26.5	30.3
Inventory (Avg Cst)	442.9	484.0	544.1
Other	26.0	70.3	17.4
Current Assets	597.0	655.4	654.8
Accts Payable	263.3	239.1	272.9
Debt Due	0.0	0.0	0.0
Other	7.3	86.9	87.4
Current Liab'ties	270.6	326.0	360.3

CAPITAL STRUCTURE as of 2/23/74

Debt None   **Interest** None
Leases Uncapitalized; annual rentals about $114.7 mill. a year.
Pension Liab'ty None
Pfd Stock None   **Pfd Div** None

Common Stock 24,875,684 shares

QUARTERLY SALES ($ Millions) (A) Full Fiscal Year

Fiscal Year Begins	May 31	Aug. 31	Nov. 30	Feb. 28	Full Fiscal Year
1971	1370	1372	1370	1397	5509
1972	1492	1587	1609	1681	6369
1973	1641	1659	1663	1785	6748
1974	1755	1697	1719	1774	6945
1975	1370	1350	1375	1465	5560

EARNINGS AS REPORTED (per sh) (A) Full Fiscal Year

Fiscal Year Begins	May 31	Aug. 31	Nov. 30	Feb. 28	Full Fiscal Year
1971	.46	.24	d.05	d.06	.59
1972	d.83	d.85	d.34	d.04	d2.06
1973	.10	d.14	.03	.50	.49
1974	(E).14	(E)d.06	(E)--	(E).12	(E).30
1975	d.95	.55	.55	.60	.75

QUARTERLY DIVIDENDS PAID (C) Full Year

Calendar	Mar. 31	June 30	Sept. 30	Dec. 31	Full Year
1971	.325	.325	.325	.325	1.30
1972	.20	.20	.20	.20	.80
1973	--	--	--	--	--
1974	--	.15	.15	.15	.45
1975	--				

BUSINESS: Great Atlantic & Pacific Tea Co., Inc. operates world's 2nd largest grocery store chain. Has 3,680 stores in U.S. and Canada, organized into 31 semi-autonomous retail divisions. Began business 116 years ago. Most stores located east of Mississippi. Has many manufacturing, processing and warehouse facilities. Items of own manufacture account for about 10% of sales. Wage costs, NA. Has 43,500 stockholders, 113,800 employees. Hartford Foundation owns about 33% of outstanding stock; Hartford family owns about 25%; insiders, 0.2%. Chairman and C.E.O.: J.L. Scott. Pres.: R.F. Longacre. Inc.: Maryland. Address: 2 Paragon Drive, Montvale, N.J. 07645.

Great A&P is shrinking. Up to 1,200 older stores — about 34% of the total — will be closed, perhaps by the end of the May quarter. Related write-offs in combination with the impact of an estimated switch from average-cost to LIFO inventory accounting are likely to result in a large deficit for the quarter. Should management decide not to go the LIFO route, earnings may be about 80¢ a share better than our estimate.

Dividends were omitted in January, and probably will not be resumed before August. By then, the outlines of a new, restructured A&P may be taking shape:

New management is at the helm. On Feb. 1st, Mr. J.L. Scott, formerly chief executive of Albertson's, began a renewable five-year stint as A&P's chairman and chief executive. Virtually all of Mr. Scott's first term will be occupied in implementing these objectives: (1) Decentralize — down to store managers. Previously, almost all authority was concentrated in top officers. (2) Step up private-label manufacturing and overseas marketing efforts. Currently, A&P's foreign sales account for only a fraction of 1% of its total volume. (3) In place of the smaller, older,

downtown units now being closed, try out 50,000 square foot "superstores," and devote at least 20% of all larger outlets' selling space to drugs and general merchandise, keeping the discount format but dropping the WEO slogan. At present, A&P's larger units allocate about 10% of their square footage to non-food items. (4) Establish a corporate real estate department to pinpoint choice locations and arrange for favorable long-term leases. Traditionally, A&P has leased back its stores on a short-term basis. Many of these tactics have been successfully adopted by Albertson's and (especially) Jewel. In A&P's case, they are intended to restore former pre-eminence in sales and (once the closings are made) number of stores; in the interim, A&P will be Number One only in age.

But the restructuring will take time — and money. Substantial long-term debt financing is probably pending.   M.W.G.

CASH POSITION

	5-Year Av'g	2/23/74
Current Assets to Current Liabilities:	214%	182%
Cash & Equiv's to Current Liab'ties:	30%	17%
Working Capital to Sales:	6%	4%

(A) Fiscal year ends about Feb. 28 of following calendar year.
(B) Based on avg shs. outstanding.
(C) Last div'd paid Nov. 1, 1974. Annual stock div'ds of 1% paid '64-'66.
(D) In millions, adjusted for stock splits and div'ds.
(E) Adjusted for estimated switch to LIFO, 80¢ a share.
NMF-No meaningful figure.
NA-Not available.

Notes

Food, Fiber and Natural Resource Economics

CONCEPT APPLICATION

Specialization and Comparative Advantage

Northwestern Ohio is very well suited for growing tomatoes. The Sanora Valley
of Mexico is also well suited for growing tomatoes. It is also true that edible
beans grow very well in both of these regions. Both the Americans and the
Mexicans like to have some beans and some tomatoes in their diet.

Table 1. Production Per Acre of Beans and Tomatoes for the U.S. and Mexico

	U.S.	Mexico
	(Production in Tons/Acre)	
Beans	10	10
Tomatoes	20	10

1. Respond to the following, using Table 1.

   a. The comparative prices will be:

       In U.S.   1 ton beans can be exchanged for _____ tons of tomatoes.

       In Mexico 1 ton beans can be exchanged for _____ tons of tomatoes.

   b. Having taken Ag. Ec. 100, you are well aware of trade and comparative
       advantage. Therefore, if you buy 20 tons of beans in Mexico and trans-
       port them to Ohio, you can exchange them for _____ tons of tomatoes
       which you could immediately take back to Mexico and exchange for _____
       tons of beans. You would have made a gross profit of _____ tons of
       _____ (tomatoes or beans). Of course you would have some hauling
       costs. If trucking costs amounted to $0.10/lb. one way and beans were
       worth $0.50/lb. in Mexico, you could make $_____ profit by taking advan-
       tage of the comparative difference of production possibilities in the
       two countries.

   c. As time passed and as your volume increased, the U.S. would end up
       specializing in the production of _____ and Mexico in the produc-
       tion of _____. Pretty soon it would become obvious to Mexicans
       and other Americans that you were becoming rich as a trader. Eventually
       other traders would enter the business thus forcing your costs and
       returns from trading down so you would not realize excess profits.

   d. In the production of tomatoes, it can be said that the U.S. has a(an)
       _____ advantage over Mexico. Also, Mexico has
       a(an)_____ advantage over the U.S. in the production
       of _____.

If either Argentina or Canada used all of its resources to produce either corn or wheat they could each produce the amounts shown in Table 2. (They each have one million acres suitable for the production of corn or wheat.)

Table 2. Corn or Wheat Production Possible by Either
Canada or Argentina on one Million Acres

Country	Total Production	
	Corn	Wheat
	(000,000 bu)	
Argentina	400	1,200
Canada	450	1,800

2. Using the information in Table 2, respond to the following:

   a. Using all its resources for corn, _____ can produce a larger crop than can _____.

   b. In the production of both corn and wheat, Canada has an _____ advantage. This means that with the same amount of resources, Canada can produce a _____ output.

   c. Or in other words, Canada can produce 1 bushel of either corn or wheat with _____ resources than Argentina.

   d. Referring to Table 2, it tells us that whenever Argentina chooses to increase its production of corn by 400 million bushels, it must (increase or decrease) its production of wheat by _____ million bushels.

   e. For Canada, the comparative cost of 450 million bushels of corn is _____ million bushels of wheat.

   f. How many bushels of wheat must Argentina give up to increase corn production by 1 bushel? _____

   g. How many bushels of wheat must Canada give up to increase corn production by 1 bushel? _____

   h. This tells us that Argentina has a _____ advantage in the production of corn because its cost of producing corn is _____ than in Canada.

   i. One bushel of wheat costs Argentina _____ bushel(s) of corn.

   j. One bushel of wheat costs Canada _____ bushel(s) of corn.

   k. Which country has the comparative advantage in the production of wheat? _____

   l. If these two countries were each to specialize, _____ should produce corn, and _____ should produce wheat.

3. More on Comparative Advantage

    a. If I can type four pages an hour and you can type six, you have a(n) _____ advantage over me in typing.

    b. If you can make four pies an hour and I can make two, you have a(n) _____ advantage over me in pie making.

    c. The opportunity cost of <u>each</u> pie I make is how much typing? _____

    d. The opportunity cost of each pie you make is how much typing? _____

    e. Then, society loses less typing if you (type <u>or</u> make pies) than if I do.

    f. The opportunity of each page I type is how much pie? _____

    g. The opportunity cost of each page you type is how much pie? _____

    h. Then, society loses less pie if I (type or make pies) than if you do.

    i. You have a(n)_____ advantage over me in _____;
        I have a(n) _____ advantage over you in _____.

    j. How many times more efficient are you in making pies than I am?
        _____

    k. How many times more efficient are you at typing than I am?
        _____

    l. If we decide to specialize, you would _____ and I would _____.

Both Philco and GE make refrigerators and television sets. If GE or Philco used all their resources to produce either refrigerators or TV's, they could produce the amounts shown in Table 3. (They each have the same amounts of raw materials and labor.)

Table 3. Potential Refrigerator and Television Production by the General Electric and Philco Companies

Company	Total Production (000,000 units)	
	Refrigerators	TV's
G.E.	50	450
Philco	150	300

4. Using Table 3, respond to the following questions: (40 pts.)

   a. Using all of its resources to produce TV's, (GE_____/Philco_____) can produce more TV's than can (GE_____/Philco_____).

   b. (GE_____/Philco_____) can produce more refrigerators than can (GE_____/Philco_____) with the same inputs. Thus, (GE_____/Philco_____) has a(n) (comparative_____/absolute_____) advantage in the production of (TV's_____/refrigerators_____/both products_____).

   c. For G.E., the opportunity cost of producing 450,000,000 TV's is _____ million refrigerators.

   d. How many TV's must GE give up to produce one refrigerator? _____

   e. For Philco, the opportunity cost of producing 300 million TV's is _____ million refrigerators.

   f. How many TV's must Philco give up to produce one refrigerator? _____

   g. This means that GE's relative cost of producing refrigerators is (greater_____/smaller) than Philco's, so GE has a(n) (comparative_____/absolute_____) advantage in the production of refrigerators.

   h. To produce one T.V., how many refrigerators must G.E. give up? _____

   i. To produce one T.V., how many refrigerators must Philco give up? _____

Food, Fiber and Natural Resource Economics

CONCEPT APPLICATION

Physical Production Relationships

Mr. Good Angel has a chain of Angel Food Cake bakeries in Ohio. Each plant has a different number of Angelogists (employees) and consequently a different volume of cakes are baked each day in each of the plants. Mr. Angel would like to know more about the combination of Angelogists and cake output. He asked you to select whatever number of plants necessary to make an economic analysis of the production process. Ten different plants were selected which we will call plants A through J.

Each plant has exactly the same resources except for the number of employees. The number of employees and their total daily production is given in Table 1 for each of the 10 plants.

Table 1

Number of Cakes Produced per Day (TPP) in Ten Bakeries Using Different Numbers of Employers (Inputs) with the Average Physical Product (APP) and the Marginal Physical Product (MPP) per Angelogist.

Plant	Number of Employees	Number of cakes baked per day	APP	MPP
A	0	0	_____	
B	10	180	_____	_____
C	20	380	_____	_____
D	30	690	_____	_____
E	40	1,040	_____	_____
F	50	1,350	_____	_____
G	60	1,500	_____	_____
H	70	1,610	_____	_____
I	80	1,680	_____	_____
J	90	1,620	_____	_____

[45]

1. If we assume that everything else is equal (i.e., location, incomes, tastes, number of potential customers, etc.) the 10 stores provide a good example of the productivity of angelogists in stores. This should become clear as you perform the following exercises. (Assume, where necessary, that the <u>per unit cost</u> of inputs is the same for each plant as well as for any quantity used).

    a. Calculate the Average Physical Product (APP) and the Marginal Physical Product (MPP) for Table 1.

    b. Which plant has the most total output? _____

    c. In which plant are the Angelogists the most efficient in the production of cakes? _____

    d. By using 10 more employees in plant D than in plant C, the average production per person is increased from _____ to _____.

    e. Ten more people are used in plant E than in plant D, and the APP increases from _____ to _____. Therefore, would you say that plant E or plant D is more profitable? _____

    f. Using the same logic, would plant F or plant E be more profitable? _____

    g. Plant I has _____ employees who produce _____ cakes per day for an average production of _____ cakes per person daily.

    h. Plant J has _____ employees who produce _____ cakes per day for an average daily production of _____ cakes per person.

    i. Using the information in questions (f) and (g), would you think it a wise decision to employ 90 people in one of Mr. Angel's bakeries? _____ Why?

    j. Using only the data in Table 1, one can conclude that at least _____ but not more than _____ Angelogists should be used per plant for the optimum level of output.

    k. The greatest increment in total production occurs when the number of employees per plant is increased from _____ to _____; at this level the MPP is _____.

    l. When the number of employees is increased from 80 to 90, the addition to total output is _____. Therefore, should Mr. Angel ever employ 90 people in any one plant? _____

    m. Plot the TPP on Graph 1 and then the APP and MPP on Graph 2. Clearly label the input and output axes and each curve.

    n. Indicate on the graphs where Stages I, II, and III are located.

o. Stage I ends when the _____ curve is at a maximum.

p. Stage III begins when the _____ curve is zero or when the _____ curve reaches a maximum.

q. Therefore, Stage II is when at least _____ but no more than _____ people are employed in one plant (use only round numbers of 10).

r. Using only the information provided in this homework, which of Mr. Angel's 10 plants will make the most profit? _____ Why?

Relationship of Angelogists (employees) and Angel Food Cake Production

Graph 1
(TPP)
Total
Physical
Product

Cakes/Day

Angelogists Employed
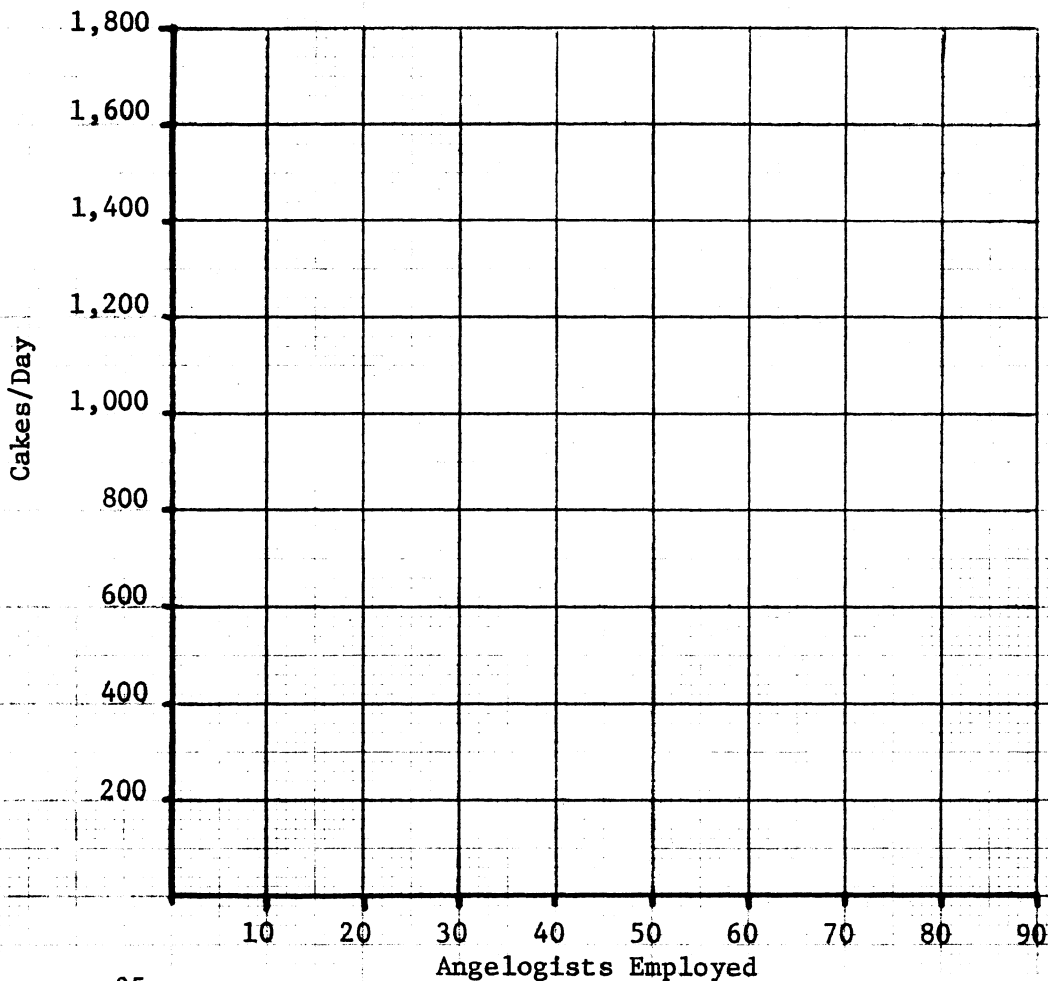
Graph 2
(MPP & APP)
Marginal
Physical
Product
and
Average
Physical
Product

Cakes/Day

Angelogists Employed
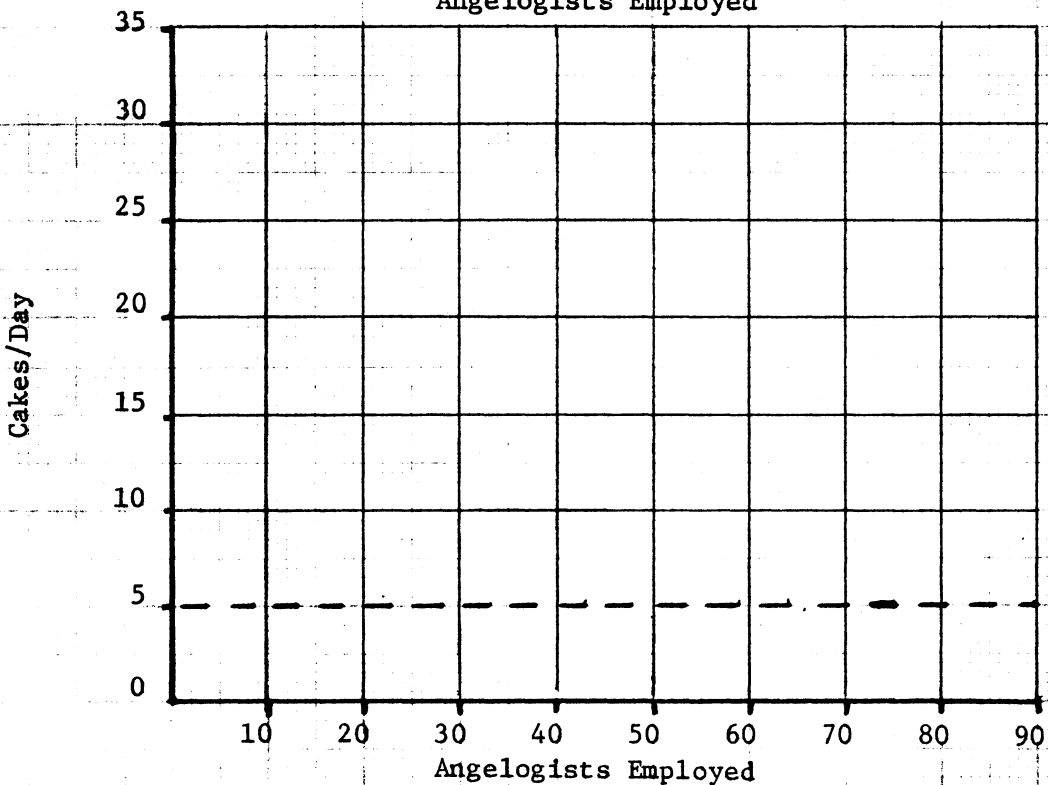
OPTIMUM USE OF INPUTS

I was recently called by Mr. Wally Sharp concerning a new business venture he is planning in Columbus. Unfortunately Mr. Sharp graduated from college a few years ago with very little economic training and is somewhat fuzzy about getting his business off the ground. Rinks Department Stores have indicated that they will buy all of the "Super Duper Pooper Scoopers" (SDPS) that Wally can manufacture at a price of $4.00 each.

Wally has asked me to help determine how many men he should hire and how many SDPS's he should make. I have assembled the following information from eleven different manufacturers of SDPS's throughout the U.S. I ask you, as a budding young economist, to help me analyze Wally's situation and provide him with good information so he can make a sound economic investment.

Table 2. Production Data for Manufacture of Super Duper Pooper Scoopers

Factory #	Number of Employees	Daily Output of SDPS's	APP	MPP	AVP or VAP	MVP or VMP	TVP or VTP	TC	Profit
1	10	40	___		$___		$___	$___	$___
2	12	50	___	___	___	$___	___	___	___
3	14	62	___	___	___	___	___	___	___
4	16	76	___	___	___	___	___	___	___
5	18	90	___	___	___	___	___	___	___
6	20	100	___	___	___	___	___	___	___
7	22	108	___	___	___	___	___	___	___
8	24	115	___	___	___	___	___	___	___
9	26	120	___	___	___	___	___	___	___
10	28	120	___	___	___	___	___	___	___
11	30	118	___	___	___	___	___	___	___

2. In the Columbus area Wally can hire all the help he needs at a wage rate of $15.00 per day for a 5-day week. Complete Table 2 and use the information to respond to the following:

   a. Increasing marginal returns are realized by using _____ to _____ employees.

   b. Decreasing marginal returns are realized when _____ to _____ persons are employed.

c. Stage II of the production function begins when _____ men are employed and ends when _____ men are employed.

d. Does the production function for SDPS's have a Stage I? Yes ____ No ____
Does it have a Stage III? Yes ____ No ____

e. What is the level of daily output of SDPS's which will result in the most gross income for Wally? _____

f. How many men should he employ if he wishes to maximize his daily profit?
_____

g. Is the answer to "e" and "f" the same? Yes ____ No ____ Why?

h. Assuming that Wally can operate his factory 50 weeks each year but will have to pay his men for 52 weeks, how much annual profit can he expect for his management services? _____

i. Plot the TPP (VTP), APP (VAP), and MPP (VMP) from Table 2 on Graphs 3 and 4.

3. You see how simple production relationships and the optimum level of input use are. Now let's attempt another situation in which the data are in a slightly more abstract (but actually more simplified) form.

Production Function and Optimum Use of Inputs
for Super Duper Pooper Scoopers

TPP

VTP

Graph 3

MPP, APP

Graph 4

VMP, VAP

Employees
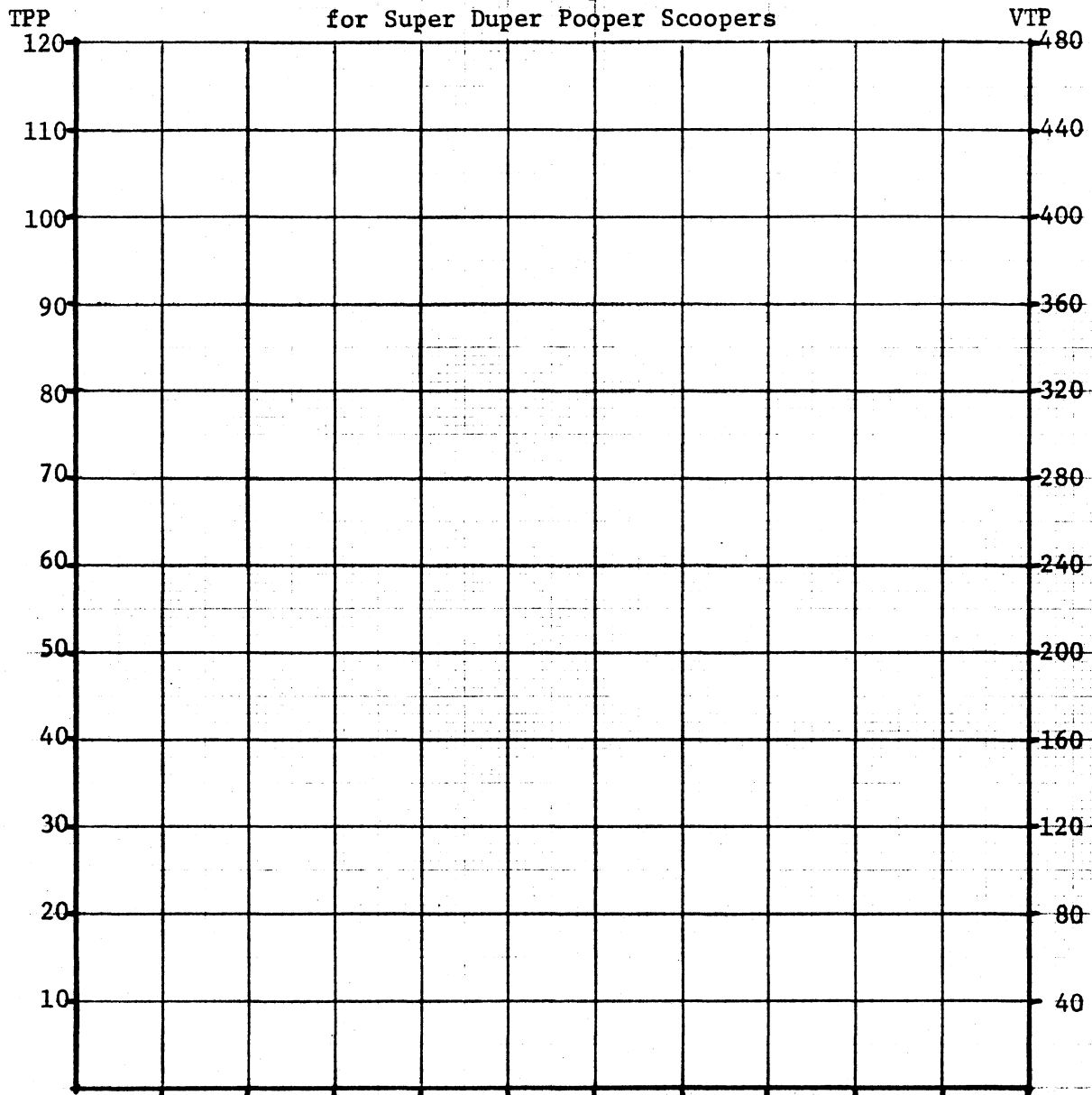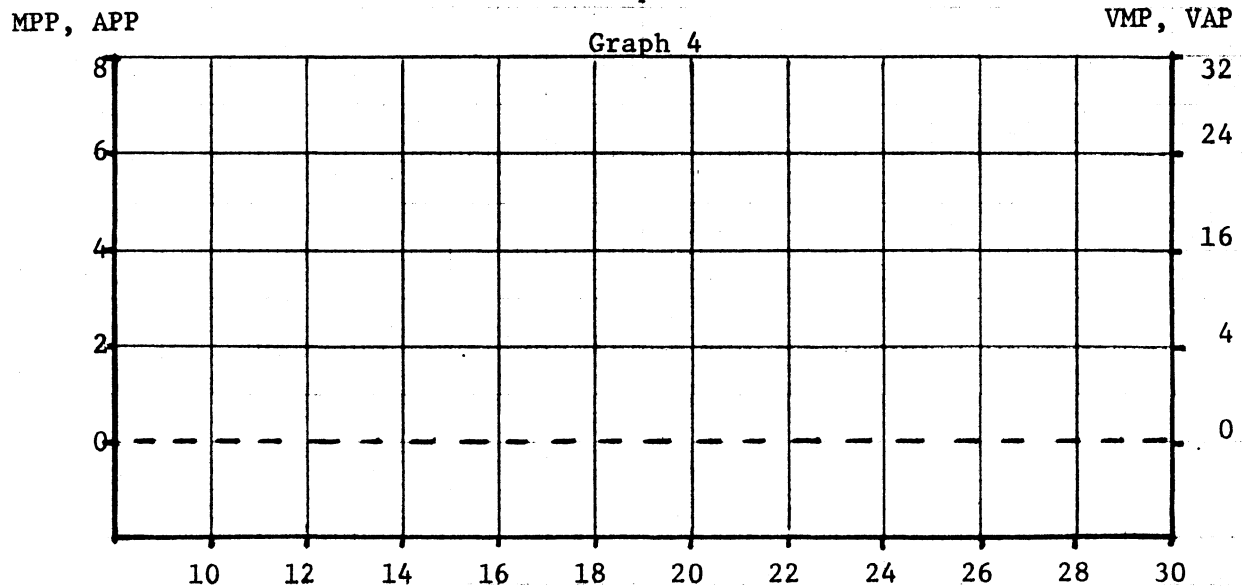
New processes are being developed everyday to reclaim and recycle no-deposit glass bottles. There are now firms who collect these bottles and sell them back to glass factories. These firms really require only two resources, trucks and labor, to produce their product, which is glass bottles.

a. Provided there is at least one worker per truck, the more workers the firm employs, the (more____, less____) glass it can collect in a day. Also, the more trucks the firm utilizes the (greater____, smaller____) the amount of glass it can gather in a day.

b. Let's hypothesize that the firm can sell all of the glass it collects at a price of 7 cents a pound over and above what it pays its suppliers of glass. This means that the MR from the sale of each additional pound of glass is _____ cents.

c. This also means that the VMP of each worker the firm employs is equal to the MPP of that worker multiplied by _____ cents, and that the VMP of each truck equals its MPP multiplied by _____ cents.

d. The firm can rent trucks from a local agency for $30 per day and hire unlimited common labor at $15 per day. Therefore, the cost of each truck (P_T) is $_____ a day, and the cost of each worker is $_____ a day.

e. The firm has been placing two men in each truck, and hires enough men and trucks to collect 10,000 pounds of glass a day. At 7 cents a pound for glass, the firm's TR is $_____.

f. To reach this goal of 10,000 pounds of glass per day, the firm has had to rent 5 trucks at $30 each per day and 10 men at a cost of $15 each per day. Thus, the firm's TC equals $_____ per day and daily profit is $_____.

g. The manager of the firm was wondering recently if he could collect more glass without hiring more labor or renting more trucks. He was also wondering if he could collect the same amount of glass with fewer trucks and men. Both of these would (increase____, decrease ____) total profits.

h. Calling in an economist, they found that the MPP of the 5th truck was 900 pounds of glass while the MPP of the 10th worker was 550 pounds of glass. The VMP of the 5th truck was therefore $_____, and the VMP of the 10th worker was $_____. (See Table 3.)

i. The economist pointed out that the VMP of the 5th truck divided by its cost (P_T) was equal to $_____ ÷ $_____, or _____.

j. The VMP of the 10th worker divided by his cost (P_W) was equal to $_____ ÷ $_____, or _____.

k. This showed that the ratio of the VMP to the P_T of trucks (was____, was not____) equal to the VMP to the P_W of workers.

Table 3. The VMP Schedules for Trucks and Labor

Number of Trucks	Daily VMP of trucks	No. of workers	Daily VMP of workers
1	99	8	43.50
2	90	9	41.00
3	82	10	38.50
4	72	11	36.00
5	63	12	33.50
6	54	13	31.00
7	45	14	28.50

l. In fact, the VMP/P_T for trucks was (greater____, less____) than the VMP/P_W for workers.

m. The manager of the firm (is ____, is not____) using the resources in the correct proportion because the two VMP/cost ratios (are____, are not ____) equal.

n. Suppose the manager looks at the data the economist has computed and lays off the 5th truck. Because this truck has a VMP of $_____, laying it off decreases TR by $_____.

o. Also, laying off the 5th truck decreases TC by $_____.

p. Let's take the $30 saved by laying off the 5th truck and hire more workers. The manager can hire _____ workers for $30.

q. According to the VMP schedule for workers in Table 3, hiring the 11th and 12th workers would increase TR by $_____ and $_____, respectively.

r. These two workers will increase TR by $_____. The loss of the 5th truck decreased TR by $____. As a result of the substitution of 2 workers for 1 truck, the TR of the firm has (increased ____, decreased____) by $_____.

s. Because he is still spending $300 for trucks and men, the replacement of the truck by two men has (increased____, decreased____) his daily profit by $_____.

t. Total revenue and total profits were increased without any increase in total cost by using more of the resource with the (higher____, lower____) VMP/cost ratio and less of the resource with the (higher____, lower____) VMP/cost ratio.

u. In other words, by spending the same amount for resources, a firm can increase its TR and profits by employing (more____, less____) of the resource with the smaller and (more____, less ____) of the resource with the larger VMP/cost ratio.

v. Look back at the VMP schedules in Table 3. The VMP of the 3rd truck is $_____, and the VMP of the 9th worker is $_____.

w. The ratio of VMP to cost for the 3rd truck is equal to $82 divided by $_____ or _____.

x. The VMP to cost ratio for the 9th worker is $41 divided by $_____, or _____.

y. So, when the paper collector employs 3 trucks and 9 workers, the VMP/cost ratios for trucks and workers (are____, are not____) equal.

z. The two ratios were not always equal; the ratio was originally 3 for workers and 2 for trucks. But when the firm cut back its use of trucks, the VMP increased and so the VMP/cost ratio (rose ____, fell____) for trucks.

aa. And when the firm expanded its employment of labor, the VMP of the workers decreased causing the worker's VMP/cost ratio to (rise____, fall____).

bb. Not realizing the change that takes place in these two ratios, the manager cuts back once more and lays off the 4th truck and decides to replace it with the 13th and 14th workers. Doing without the 4th truck decreases TR by $_____.

cc. He takes the $30 saved and hires two more workers. The employment of the 13th worker adds $_____ to TR and the employment of the 14th worker adds $_____ to TR.

dd. Altogether, the 13th and 14th workers add $_____ to TR, while laying off the 4th truck decreased TR by $72. The replacement of the 4th truck by two workers did not change TC, but it (increased____, decreased____) its TR and total profit by $_____.

ee. Let's draw some conclusions from these cases. First, when VMP/cost ratios are not equal, the firm can increase TR and total profits by spending (more ____, less____) on the higher ratio resource and (more____, less____) on the low ratio resource.

ff. Also, when the ratios are equal or nearly equal, spending more on one and less on the other resource will _____ the firm's TR and total profits.

gg. In short, when a firm is using two resources in the best or most profitable manner, the _____ ÷ _____ ratios for the two resources are _____.

hh. For any given total dollar amount (cost) the firms spends on several resources, it obtains the largest possible total _____, and consequently maximizes _____ when it hires resources in the best proportion.

Food, Fiber and Natural Resource Economics

CONCEPT APPLICATION

Costs, Revenue and Profit

Mr. Sam Chicco has a small farm in Vinton County, Ohio, where he raises broilers. Sam and I were chatting last week about his operation. He was puzzled as to just how long he should feed his broilers before selling them. I discovered that Sam had a good set of records and informed him that I had a group of students in Ag. Ec. 100 who would enjoy helping him arrive at an economic decision.

A complete broiler ration costs $.10 per pound
Broilers sell for an average of $.40 per pound
Sam feeds 50,000 birds at a time
Fixed costs are $30,000 per year

1. The above information and that in columns 1 and 3 of Table 1 came from Sam's records. Let's complete the rest of Table 1 and see if we can help Sam arrive at an economic decision concerning the optimum number of weeks he should feed his broilers.

   a. As we remember the marginal physical product (MPP) is the change in output (ΔO) resulting from using one more unit of input (ΔI). Therefore, we can calculate the ΔI for each level of feed use and record the information in column 2. From the 1st to the 2nd week feed fed increased from 0.30 to 0.60 lbs.; therefore, $\Delta I = .60 - .30 = \underline{.30}$, which should be recorded on the first line of column 2. The next line of column 2 is equal to $1.00 - .60 = \underline{.40}$ --- record this and continue for the rest of the column.

   b. The weight gained is the output of our production process. Therefore, the ΔO (column 4) is found by taking the difference between the figures in column 3 as we move from week #1 through #15. The first blank in column 4 is: $\Delta O = 0.25 - 0.15 = \underline{0.10}$. The second blank equals $0.40 - 0.25 = \underline{0.15}$. Proceed throughout column 4 in this manner.

   c. Now calculating the MPP (column 5) is very simple; all we have to do is divide column 4 by column 2 $\left(\text{MPP} = \frac{\Delta O}{\Delta I}\right)$ The first blank in column 5 is: $\text{MPP} = 0.10 \div 0.30 = \underline{0.33}$. Of course we could have used the data directly from columns 1 and 3, for example, going from the 2nd to the 3rd week $\text{MPP} = \frac{\Delta O}{\Delta I} = \frac{.40 - .25}{1.00 - .60} = \underline{.375}$, which is the same as $.15 \div .40$. Calculate the rest of the MPP values using either method.

   d. Calculating the APP (column 6) is very straightforward; it represents the average weight per pound of feed fed (APP = output $\div$ input) for all

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levels of input use. Therefore, the APP for the first week is the value in column 3 divided by the value in column 1 (i.e., APP = 0.15 ÷ 0.30 = <u>0.50</u>). Continue this procedure for each week.

e. Column 7 is for the cost of the input (P_x). Because Sam is only one of many broiler raisers and has a relatively small operation, he must pay the same price per pound regardless of the quantity of feed he purchases. Therefore, all the blanks in column 7 have the same figure which is the $0.10 cost of broiler ration per pound (provided from Sam's records).

f. In column 8, we see the MVP (marginal value of the product) which represents the MPP multiplied by the price received for the product (P_y). From the information above, we see that Sam receives $.40 per pound for his finished broilers; therefore, P_y = $.40 and the MVP of using .60 instead of .30 lbs. of feed is the MPP found in column 5 x P_y (i.e., 0.33 x 0.40 = <u>$0.13</u>). Record this value in the first blank of column 8 and calculate the MVP's for the rest of the levels of feed use.

g. Column 9 represents the total value of the product (TVP) or, as we'll see later, the total revenue (TR). The TVP is found by multiplying the output (column 3) by the price received for the product (P_y). Therefore, the TVP for the 1st week is: 0.15 x 0.40 = <u>$0.06</u> --- continue in this manner for the rest of the column.

h. Column 10 is for total fixed costs (TFC) which we know are $30,000 for the entire year. However, we are calculating the information in Table 1 per bird; therefore, we must know the optimum number of birds Sam should raise per year before we can calculate the TFC. This should not concern us because we know TFC influences the <u>amount</u> of profit but not the <u>most</u> profitable level of output. Let's return to this later.

i. Total variable cost (TVC) is recorded in column 11. This represents the amount of feed fed (column 1) times the cost of the feed (P_x) required to produce the gain in weight recorded in column 3. Thus, we can see that the 0.15 lbs. of weight gained in the 1st week cost <u>$.03</u> (0.30 x 0.10). Record this in the first blank of column 11 and calculate the TVC for the rest of the weeks (TVC for the 2nd week is: .60 x .10 = .06).

j. Because total cost (TC), in column 12, is found by adding TFC and TC, we'll have to leave it until later.

k. We remember that the marginal cost (MC) is the additional cost incurred by producing one additional unit of output (i.e., MC = $\frac{\Delta TVC}{\Delta 0}$ or $\frac{\Delta TC}{\Delta 0}$).

Because we do not have the TC, we will use the TVC (column 11). The ΔTVC (column 13) from week 1 to 2 is: 0.06 - 0.03 = <u>0.03</u> --- record this and calculate the rest of the column.

l. The MC (column 14) is now easily found by dividing the ΔTVC (column 13) by the Δ0 (column 4) for each week (i.e., MC = .03 ÷ .10 = <u>.30</u>). Continue and record for the rest of column 14.

m. Column 15 is for the marginal revenue (MR) which, of course, we realize is the same as the price received for the product (P_y) in perfect competition. Sam sells his birds for $.40 per pound; therefore, the MR = .40 for all levels of output.

Table 1. Production for Sam's broilers based on last year's average feed consumption, production, and prices

Column	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	PHYSICAL PRODUCTION DATA						Value of Production			Costs of Production					Py or	
Week	Feed Fed	Δ Input	Weight	Δ Output	MPP	APP	Px	MVP	TR or TVP	TFC	TVC	TC	Δ TC or Δ TVC	MC	MR	Profit
			(lbs/bird)					(dollars)			(dollars)					($)
1	0.30		0.15			___	___	___	___	___	___	___			___	___
2	0.60	___	0.25	___	___	___	___	___	___	___	___	___	___	___	___	___
3	1.00	___	0.40	___	___	___	___	___	___	___	___	___	___	___	___	___
4	1.40	___	0.60	___	___	___	___	___	___	___	___	___	___	___	___	___
5	2.10	___	0.90	___	___	___	___	___	___	___	___	___	___	___	___	___
6	3.10	___	1.30	___	___	___	___	___	___	___	___	___	___	___	___	___
7	4.10	___	1.70	___	___	___	___	___	___	___	___	___	___	___	___	___
8	5.20	___	2.10	___	___	___	___	___	___	___	___	___	___	___	___	___
9	6.50	___	2.50	___	___	___	___	___	___	___	___	___	___	___	___	___
10	8.00	___	2.90	___	___	___	___	___	___	___	___	___	___	___	___	___
11	9.60	___	3.30	___	___	___	___	___	___	___	___	___	___	___	___	___
12	11.40	___	3.70	___	___	___	___	___	___	___	___	___	___	___	___	___
13	13.20	___	4.00	___	___	___	___	___	___	___	___	___	___	___	___	___
14	15.00	___	4.30	___	___	___	___	___	___	___	___	___	___	___	___	___
15	17.00	___	4.50	___	___	___	___	___	___	___	___	___	___	___	___	___

Note: All the above figures are on a per bird basis. For the best results, carry column 16 to three places beyond the decimal and all others to two places.

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2. The difficult part is over, and we were very fortunate that Sam knew the average amount of feed fed per bird and the average weight for each of the weeks. He also had kept a record of: 1) his variable cost -- the price of feed, 2) his fixed costs -- the $30,000, and 3) the price he received for the broilers when sold.

Now let's zero in on the optimum number of weeks he should feed a batch of broilers.

  a. Using the value of production (columns 7-9), we know that the optimum point of production is when the Px = _____. Thus, from columns 7 & 8 we see this is when the birds are between _____ and _____ weeks old.

  b. From the cost-revenue aspect we know that optimum production is when _____ = _____; this is when MC = $_____ and MR = $_____. This also tells us that the birds should be between _____ and _____ weeks old.

  c. We will see a little later that either of the weeks found in "a" or "b" will result in exactly the same amount of profit -- so, let's use the least time period possible to feed out a batch of chickens.

  After each flock of birds Sam needs about 2 weeks to clean and disinfect his chicken houses before he can put in a new batch of chicks. Sam also likes to have his houses empty during the last two weeks of December and the first two weeks of January so he can visit his mother-in-law in Florida. What is the total number of birds he should feed out each year to maximize his profits?

  d. Did you calculate that Sam could feed out 200,000 broilers per year? Yes____ No____. If you did, let's use that figure to determine his TFC and TC per bird (Table 1, columns 10 and 12). TFC/bird = $30,000 ÷ 200,000 = $.15. We know that TFC remain the same for all levels of production; therefore, every blank in column 10 has the same value.

  e. Now that we know the TFC calculation of TC (column 12) is merely the sum of TFC (column 10) and TVC (column 11). The TC for the first week is $.18; determine and record in Table 1 the TC for each of the other weeks.

f. Now let's determine how much profit (column 16) Sam would make each week by subtracting TC (column 12) from TR (column 9 - also known as TVP). For the first week we have: profit = .06 - .18 = -.12; continue for the rest of the column.

g. Now we find that Sam will realize the most profit ($_____ per bird) when they are either _____ or _____ weeks old which is actually what we found above.

h. If Sam follows your instructions above, how much net profit will he make each year? _____

i. Sam's wife has always helped him care for the broilers. Suppose on January 1st she comes in and says, "Sam, I've had enough of these *!?x: chickens!" Sam has to hire a full-time man for $700 per month. Does this change the optimum weight to which he should feed his broilers? Yes____ No____ Why?

j. What is Sam's annual net profit now?

k. Do you think Sam should go see his mother-in-law next year????! Why?

l. From the data in Table 1, can you identify Stages I, II, and III? _____ If not, which one(s) is (are) missing? _____ Why?

m. There are three ways to determine the optimum level of production. They should all give you the same results. Show that they do with Sam's broilers when feed = $.10/lb. and broilers = $.40/lb.

n. If the price of broilers dropped to $0.25 per pound for a whole year, would 'ole Sam make more money? _____ Would the optimum weight to which he should feed birds change? _____ Why? What would the optimum age be now?

3. Now let's see if you can use production economic principles on a natural resources problem.

   Mr. George Tremont is the new general manager of Timberland, Inc., a lumber company that specializes in cutting trees and selling them to wholesalers and paper mills. George was in Columbus the other day for an Ohio Forestry Association meeting when I ran into him at a little place we used to visit in our younger days. After talk of old times and some cold brews, George explained that he was having a rough time.

   George had been a forestry major in his younger days at OSU and was too busy with horticulture courses to take Ag. Ec. 100. How sorry he felt now for missing the "best course" on campus! He graduated and started to work for Timberland in growing and cutting trees. Now he is in management, and in big trouble.

   After telling me his tale of woe, I suggested that my students in Ag. Ec. 100 were eagerly awaiting some problem on which they could apply their recently acquired knowledge. George supplied the following data and asked the questions following the table.

Table 2. Daily Log Production

Lumberjacks Employed	Logs Cut	APP	MPP	TFC	TVC	TC	TR	MC	MR	Profit
2	10	__		__	__	__	__			__
3	18	__	__	__	__	__	__	__	__	__
4	28	__	__	__	__	__	__	__	__	__
5	40	__	__	__	__	__	__	__	__	__
6	48	__	__	__	__	__	__	__	__	__
7	56	__	__	__	__	__	__	__	__	__
8	60	__	__	__	__	__	__	__	__	__
9	63	__	__	__	__	__	__	__	__	__
10	65	__	__	__	__	__	__	__	__	__
11	66	__	__	__	__	__	__	__	__	__

George has a contract with Conglomerated Container Corporation which states that CCC will buy all the logs George can supply at $25 per log. George must pay his lumberjacks $35 per day, plus supply each one with equipment which costs $40 per person per day. During the past few years, insurance, office expenses, depreciation, and other fixed costs have averaged $200 per day.

Using information you have gathered in Table 2, respond to the following:

a. What is the optimum number of lumberjacks George should hire? _____

b. If George and his men work 250 days next year, what will his yearly profit be? _____

c. George is presently hiring 10 men. Could he make more money with fewer men? _____ Why?

d. By changing his insurance plan to a different type of coverage, George can save $5 per day on his fixed costs. Would this change his optimum level of output? _____ Would it change George's annual profit? _____ If so, by how much? _____

Complete the graphs on the attached page.

PRODUCTION FUNCTION

COST CURVES

OUTPUT (eggs)

70
65
60
55
50
45
40
35
30
25
20
15
10

$1,100
1,000
900
800
700
600
500
400
300
200
100
0

OUTPUT

12
10
8
6
4
2
0

$50
40
30
20
10
0

2   4   6   8   10   12

10   20   30   40   50   60

INPUT

OUTPUT
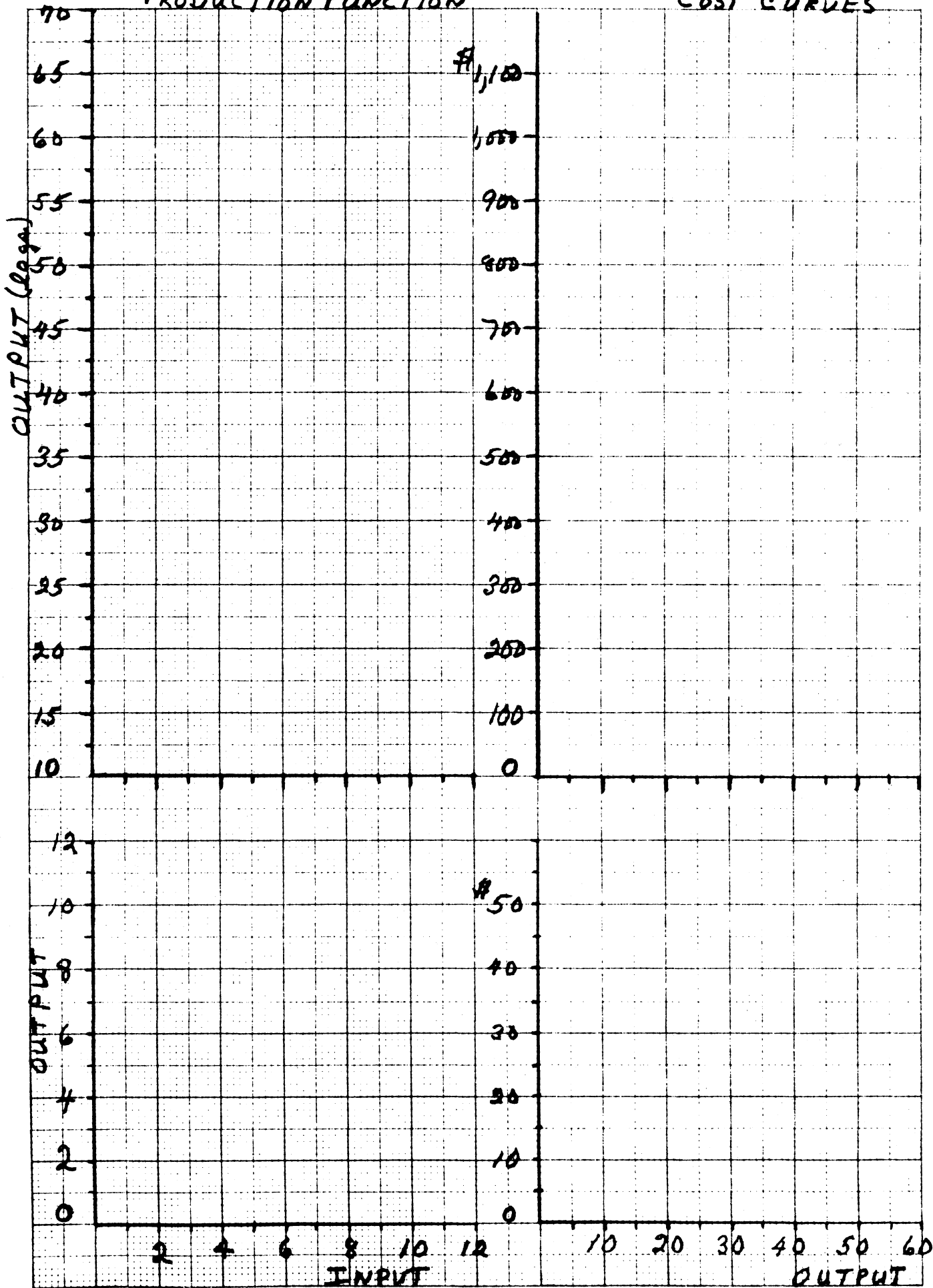
4. Complete Table 3 on the last page of this homework and then use the information therein to respond to the following statements.

Assume that the Santos Coffee Co. is operating under pure competition (i.e., they can hire all the labor they want at $10 per person per day and they can sell all the coffee they can produce at $.80 per pound). Also, assume that the only variable input in their production process is labor.

a. To increase output from 100 lbs. to 200 lbs. Santos has to hire _____ additional men. To increase output from 200 to 300 lbs., they must hire _____ additional men. Therefore, the firm is realizing (increasing_____, decreasing_____) marginal returns. Stage II of their production function begins when they increase their inputs from _____ men to _____ men.

b. Using 58 men, Santos can produce _____ lbs. of instant coffee, and with 69 men they can produce _____ lbs. Because TPP is still increasing as more units of the input are used, there is no Stage _____ of their production process as reflected by the data.

c. Because the MPP = APP at a low level of input (i.e., Stage II begins) and the MPP never goes to zero, we (cannot_____, can probably_____) determine the most profitable level of production, if we know the cost of X and the price of Y.

d. When Santos produces 200 lbs. of coffee, total fixed costs (TFC) are _____, and when they increase output to 800 lbs., TFC are _____; therefore, we see that the reason these costs are called "fixed" is that they (do not_____, do_____) change as output varies.

e. To produce 100 lbs. of coffee, _____ men (units of input) are required at a cost of _____ each or a TVC of _____.

f. To produce 600 lbs. of output, _____ men are required which means that the TVC is _____. Thus, it can be seen that as output increases, TVC _____, and as output decreases, TVC _____. In fact, this is the reason they are called variable costs.

g. Total fixed costs (TFC) remain the same for all levels of output. As output increases, the total fixed costs are being spread over a (greater _____, lesser_____) number of units of output; therefore, the average fixed cost per unit of output will continually _____.

h. To produce 100 lbs. of coffee, TC = _____, and to produce 200 lbs. of coffee, TC = _____; consequently, the AFC (decreases_____, increases _____) from _____ to _____.

i. To increase coffee production from 600 to 700 lbs., TC increases from _____ to _____; consequently, the AFC (decreases_____, increases_____) from _____ to _____, and the AVC (decreases_____, increases_____) from _____ to _____.

j. Thus, we can see that as output increases, AFC (continually decrease_____, decrease and then increase_____), and AVC (continually decrease_____, decrease and then increase_____).

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k. Average total costs are the sum of _____ plus _____; or they can be calculated by dividing _____ into _____; therefore, we would normally expect for ATC, like AVC, to first _____ and then _____ as production increased from 100 lbs. of output to 1,100 lbs. of output.

l. By now, we have calculated 6 of the 7 costs of production. It should be obvious that they can all be calculated if we have three small bits of information. These three bits of information are TFC, TVC, and _____.

m. The 7th cost of production is _____, which is calculated by dividing the change in _____ into the change in _____ or _____.

n. Basically, MC is the addition to TC as a result of producing one _____ unit of output.

o. Looking at column 11 of our table, we note that if output is increased from zero to 100, the MC = _____, and if output changes from 100 to 200, the MC = _____. This is a(n) (decrease_____, increase_____) in the MC; however, looking further down column 11, it can be seen that MC (decreases_____, increases_____, decreases then increases_____) for higher levels of output.

p. If Santos is producing in a purely competitive society, they can sell 100 lbs. of coffee for _____ per pound; they can sell 600 lbs. of coffee for _____ per pound; or, in other words, they can sell any amount of coffee for _____ per pound.

q. If all quantities of coffee produced can be sold for $.80 per pound, then the addition to total revenue from producing one additional pound of coffee is _____. Therefore, $.80 is the (MC_____, MR_____, TR_____) for all levels of output.

r. Thus, in pure competition, MR is the _____ received for the product. However, if we had to lower the price to sell more of a product, the MR would be the _____ divided by the _____.

s. The basic objective of any business is to maximize its _____. To do this, the Santos Company would hire _____ employees to produce _____ lbs. of coffee; because at that level of operation their TR would be _____ and their TC would be _____, which means that they would earn a profit of _____.

t. From the table we can see that if Santos produced 800 lbs. of coffee they would also earn $50 profit. Would you recommend that they produce an extra 100 lbs. of coffee if their profit remains the same? (Yes_____, No_____).

u. One way to determine the optimum level of output is where TR - TC = Maximum. Another way to arrive at the same conclusion would be when _____ = _____.

v. We note in the table that MC = MR when Santos increases their output from _____ to _____ pounds of coffee. Consequently, we can deduce that Santos would make slightly more than $50 profit if they produced exactly _____ pounds of coffee.

w. Looking at columns 11, 12, and 14, we can easily see a basic economic
    principle which governs production under pure competition. When MC > MR,
    profit will (increase_____, decrease_____) if output is decreased.
    Also, MC < MR profit will increase if output is (increased_____,
    decreased_____).

x. Given the TFC in the table, if Santos could sell only 300 lbs. of coffee
    they would (operate_____, close down_____). At this level of output,
    their TFC = _____, TVC = _____, TC = _____, TR = _____, and profit =
    _____. This means that although TR is insufficient to cover all the TC
    it will cover all the TVC and part of the _____. Therefore, the company
    would (minimize_____, maximize_____) its (profit_____, losses_____)
    by remaining in operation.

Table 3. The Following Factor-Product Data Represents The Daily Input of Labor
To Produce Instant Coffee At The Santos Instant Coffee Co.

Production Function				Costs of Production							Returns to Production		
Employees (X)	Output (TPP)	APP	MPP	TFC	TVC	TC	AFC	AVC	ATC	MC	MR	TR	Profit
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
0	0			$200	0	$200						0	$-200
			25							$ .40	$ .80		
4	100	25		___	$ 40	___	$2.00	$ .40	$2.40			$ 80	___
6	200	___	___	___	___	___	___	___	___	___	___	___	___
			33.3										
9	300	___	___	___	___	___	___	___	___	___	___	___	___
13	400	30.8	___	___	___	___	___	___	___	___	___	___	___
18	500	27.8	___	___	___	___	___	___	___	___	___	___	___
			16.7										
24	600	___	___	___	___	___	___	___	___	___	___	___	___
			14.3										
31	700	22.6	___	___	___	___	___	___	___	___	___	___	50
39	800	___	___	___	___	___	___	___	___	___	___	___	___
			11.1										
48	900	18.8	___	___	___	___	___	___	___	___	___	___	___
58	1,000	17.2	___	___	___	___	___	___	___	___	___	___	___
			___							1.10	.80		
69	1,100	___		200	690	890	.18	.63	.81			880	-10

Cost of labor = $10 per person per day; Price received for coffee = $0.80 per pound.

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Food, Fiber and Natural Resource Economics
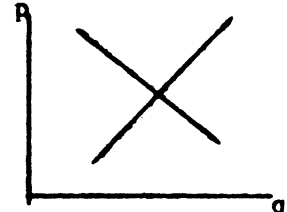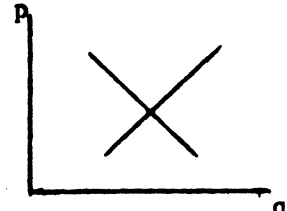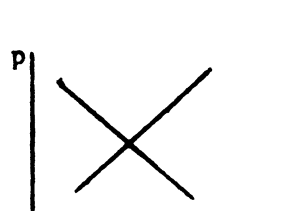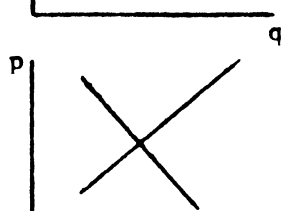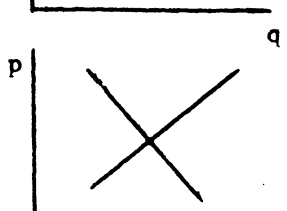
CONCEPT APPLICATION

Changing Equilibrium

1. Fill in the tables below and draw new supply and/or demand curves, when applicable, to show the initial effect of the event on the market product as predicted by the laws of supply and demand.

   Then show what happens to demand (D), supply (S), price (P) and quantity (Q) as we move from the old to the new market equilibrium by using:

$$+ = \text{increase}$$
$$- = \text{decrease}$$
$$0 = \text{no change}$$
$$U = \text{can't tell}$$

Market	Event	D S P Q	
a. Copper wire	Printed circuits are found to be a cheap substitute for wire in radios.	_ _ _ _	
b. Cotton	Congress stops supporting price of domestic cotton above equilibrium and a free market is restored.	_ _ _ _	
c. Colonial-style hooked rugs	A cheaper method of production is found, just as housewives tire of Early American and switch to modern styles of furnishings.	_ _ _ _	
d. Auto tires	Incomes and population rise as synthetic rubber, cheaper than natural rubber, is invented.	_ _ _ _	
e. Cigarettes	A new law requires warning on each pack: "Caution: cigarette smoking may be hazardous to your health."	_ _ _ _	

Coefficient of Elasticity

2. Calculate the elasticity of demand in each of the following cases:

a. Toothpaste (per month at drugstore)

	Price	Quantity
original	29¢	1,800
new	39¢	800

e = _____

b. Green toothpaste (per month)

	Price	Quantity
original	40¢	800
new	44¢	600

e = _____

c. Haircuts (per week at barber shop)

	Price	Quantity
original	$1.50	450
new	$1.75	375

e = _____

d. Cups of coffee (at coffee shop)

	Price	Quantity
original	10¢	750
new	12¢	675

e = _____

e. Portable radios

	Price	Quantity
original	$30	50
new	$20	70

e = _____

3. Calculate the elasticity for each of the following and indicate whether it is from a <u>supply</u> or <u>demand</u> schedule.

   a. Annual cabbage disappearance in Ohio:

	Price Per Cwt.	Quantity In Cwt.
1969	3.19	80,000
1970	5.69	77,000

     (Demand _____ Supply _____) e = _____

   b. Brussel sprouts in New York:

	Price Per Cwt.	Quantity In Cwt.
1969	8.06	77,000
1970	8.16	51,000

     (Demand _____ Supply _____) e = _____

   c. Tobacco in the Miami Valley (Ohio):

	Price Per Lb. (Cents)	Quantity In Lbs.
1969	32.5	2,805,000
1970	38	2,888,000

     (Demand _____ Supply _____) e = _____

   d. Milk Production in United States:

1966	Price Per Cwt.	Quantity Class I Milk Orders (1000 lbs.)
Aug.	$6.84	235,746
Sept.	$7.06	241,199

     (Demand _____ Supply _____) e = _____

   e. Haircuts (per week at the Knolls Barber Shop):

	Price	Quantity
1972	$2.00	500
1973	$3.00	450

     (Demand _____ Supply _____) e = _____

   f. Automobiles (per year):

	Price	Quantity
Original	$3,500	1,600,000
New	$2,800	2,800,000

     (Demand _____ Supply _____) e = _____

Elasticity of Demand and Total Revenue

4. The owner of a movie theater with a capacity of 1,000 and fixed costs of
$700 per day would like to set the price of admission so as to maximize
profits. When he set a uniform price for everybody, he got the following
results for each price:

Table 1. Relationship of Total Revenue to Elasticity of Demand

Price	No. of tickets sold	TR	Adults	TR	Students	TR
$1.50	500	___	400	___	100	___
1.00	650	___	450	___	200	___
.50	850	___	510	___	340	___

Using Table 1, respond to the following:

a. At a uniform price, is the total demand elastic or inelastic? _____

b. Is the demand by adults elastic or inelastic? _____

c. Is the demand by students elastic or inelastic? _____

d. What is the best single price to charge adults? _____

e. What is the best single price to charge students? _____

f. If a uniform price is charged everyone, what is the maximum amount of
profit the owner can make? _____

g. If a different price is charged adults and students, what is the
maximum amount of profit the owner can make? _____

Impact of Taxes on Equilibrium

Table 2 shows the effect of a tax on the demand and supply schedules.

Table 2. Demand Schedule and Supply Schedules for
Before and After a Tax on Product A

Demand schedule		Supply schedule without tax		Supply schedule with $3.00 per unit tax	
Price	Quantity demanded	Price	Quantity supplied	Price	Quantity supplied
$9	150	$9	900	$12	900
8	200	8	800	11	800
7	250	7	700	10	700
6	300	6	600	9	600
5	350	5	500	8	500
4	400	4	400	7	400
3	450	3	300	6	300
2	500	2	200	5	200
1	550	1	100	4	100

Graph 1. Plot the above information on the following graph, clearly labeling your work.
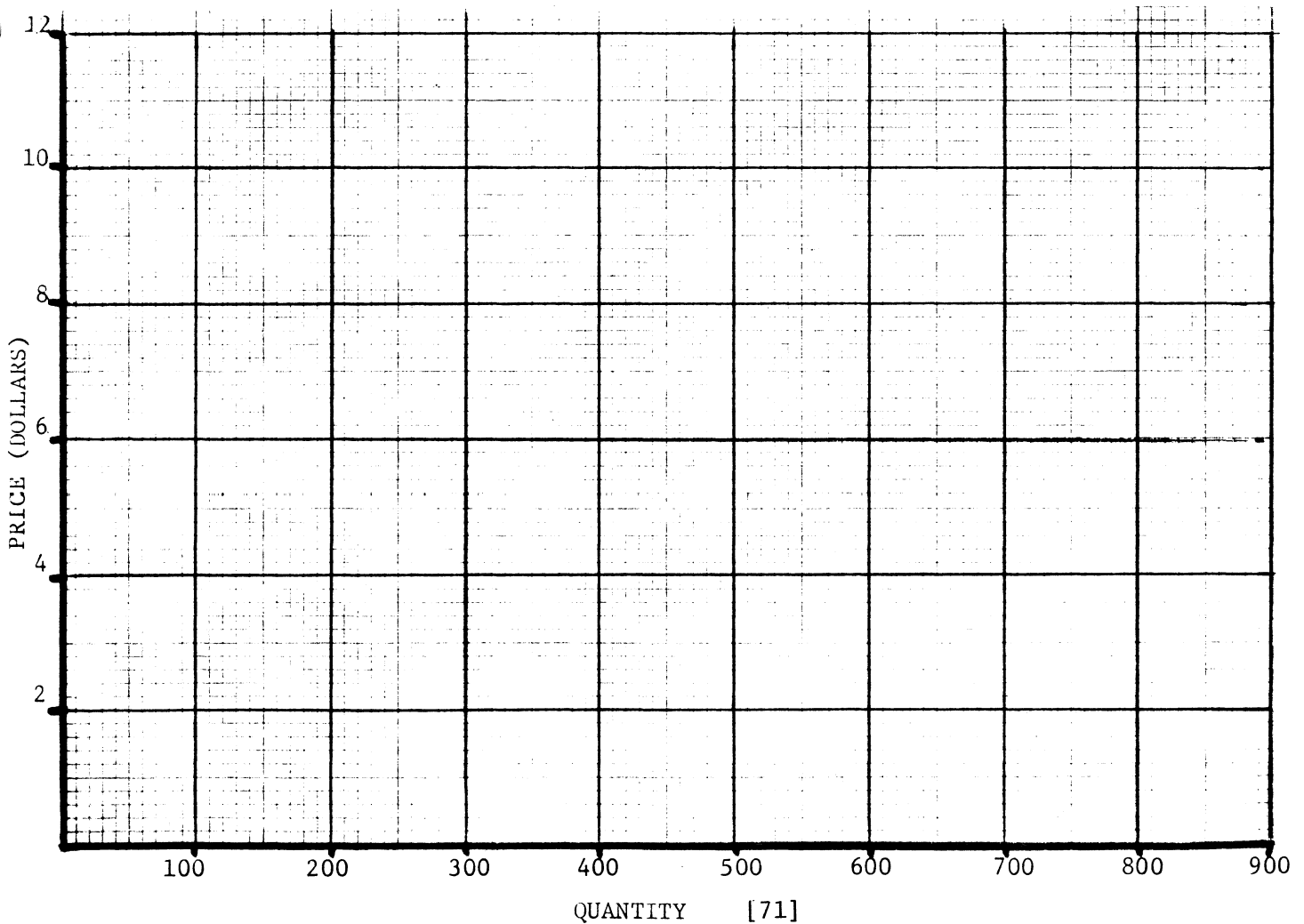
QUANTITY   [71]

5. Using Table 2 and Graph 1 you constructed, respond to the following:

    a. What is the product price without the tax? _____

    b. What is the quantity exchanged without the tax? _____

    c. What is the product price with the tax? _____

    d. What is the quantity exchanged with the tax? _____

    e. How much more do buyers pay for Product A after the tax? _____

    f. If the price were $6.00 before the tax, then demand would be
        (greater____ lesser____) than supply and a (surplus____ deficit____)
        would exist.

    g. At a price of $2.00 before the tax, consumers ~~will~~ *are willing to* purchase ____ units;
        however, suppliers will put only ____ units on the market; therefore,
        there will be a (surplus____ deficit____) of ____ units.

    h. Would consumers be better off or worse off after the tax?
        Explain why.

    i. With the demand schedule given, the total revenue (increases____
        decreases____) as the price increases; therefore, the demand schedule
        (as a whole) is (elastic____ inelastic____).

    j. As the price decreases from $9.00 to $7.00, demand has a coefficient
        of elasticity equal to _____.

    k. As the price increases from $1.00 to $3.00, demand has a coefficient
        of elasticity equal to _____.

    l. Explain why the coefficient of elasticity is different in (j) and (k).

    m. When the price increases from $4.00 to $8.00, what is the coefficient
   of elasticity for supply before the tax?

Shifts in Supply and Demand

Before we can use the tools of supply and demand, we need to understand what basic relationships and changes can occur. After this section is completed, hopefully we will have learned some of these relationships.

Economists express supply and demand as schedules of quantities offered or bought at various prices during a given time period. An example is the supply and demand for wheat in Wayne County, given in Table 3.

Table 3. During the past several years, the Ohio Feed and Grain Dealers Association has compiled the following data for the prices and quantity of wheat marketed during the months of July, August, and September.

Supply of Wheat (bu./day)			Price (dollars/bu.)	Demand for Wheat (bu./day)		
July	August	September		July	August	September
10,000	11,000	6,000	5.00	2,000	5,000	4,000
9,000	10,000	5,000	4.50	3,000	6,000	5,000
8,000	9,000	4,000	4.00	4,000	7,000	6,000
7,000	8,000	3,000	3.50	5,000	8,000	7,000
6,000	7,000	2,000	3.00	6,000	9,000	8,000
5,000	6,000	1,000	2.50	7,000	10,000	9,000
4,000	5,000	-0-	2.00	8,000	11,000	10,000

Graph 2

PRICE ($/bu.)

5.00
4.50
4.00
3.50
3.00
2.50
2.00

1 2 3 4 5 6 7 8 9 10 11

QUANTITY (000 bu./day)
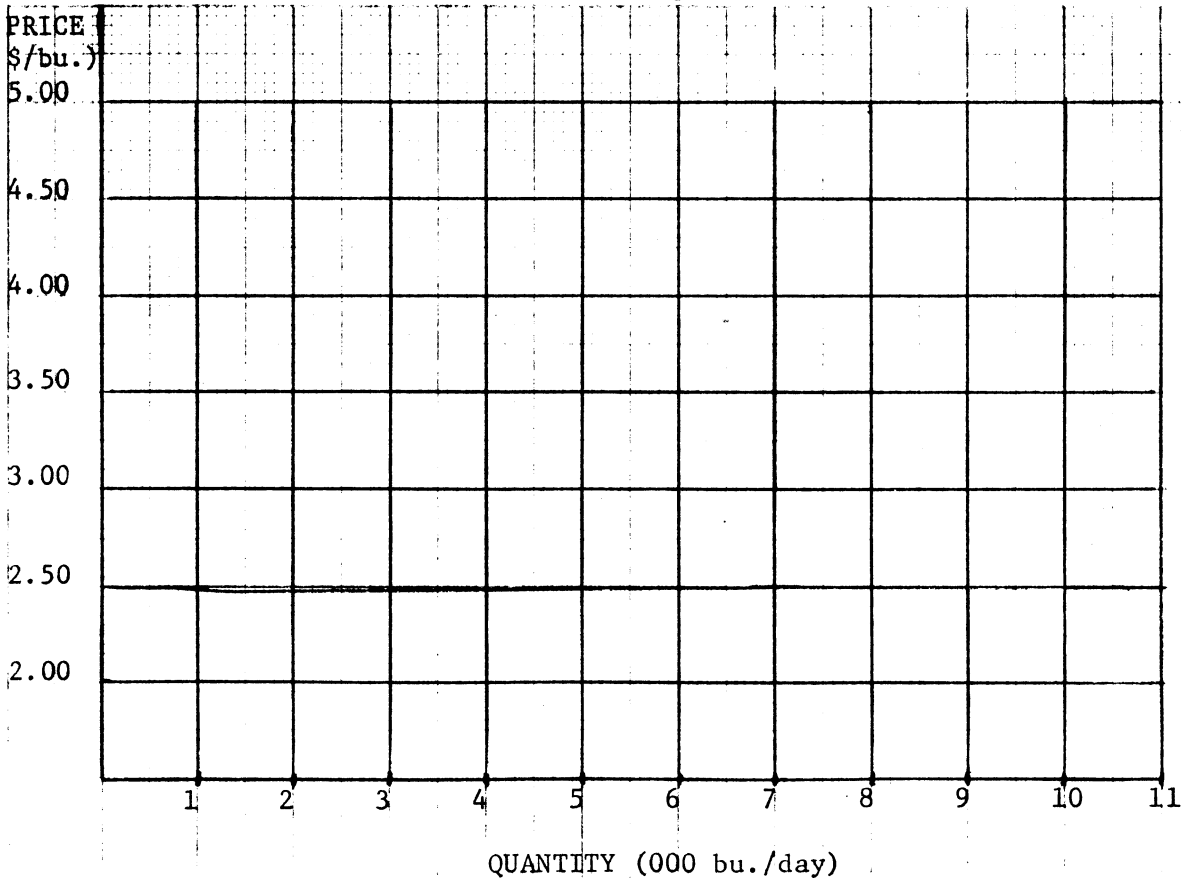
6. Using Table 3 and Graph 2, plot the supply and demand curves for each month (label clearly); then respond to the following:

   a. Between July and August, there was a change in the (demand for____/ quantity demanded of____) wheat.

   b. Between August and September, there was a(n) (increase____/decrease____) in the (demand for____/quantity demanded of____) wheat.

   c. When the demand curve moves to the left, the demand for that commodity has _____. When the demand curve moves right, the demand for that commodity has _____.

   d. Look at the July demand curve only. A change from 8,000 bu. purchased at $2.00/bu. to 6,000 bu. purchased at $3.00/bu. would be a (change in demand for____/change in the quantity demanded of____) wheat.

   e. Changes in the (demand for____/quantity demanded of____) wheat are a result of changes in tastes, incomes, etc., while changes in the (demand _____/quantity demanded _____) are a result of changes in the price of wheat.

   f. Between July and August, there was a change in (supply of____/quantity supplied of____) wheat.

   g. When the quantity offered on the market at every price increases, we may say that there has been a(n) (increase____/decrease____) in (supply ____/quantity supplied____).

   h. To determine what price wheat will actually sell for in the market, we need to know where _____ exactly equals _____ for a given month. This is called the point of _____.

   i. Looking at either Table 3 or Graph 1, we see that the equilibrium market price of wheat for July was _____/bu., August was _____/bu., and September was _____/bu.

   j. At the equilibrium price, there will be _____ bushels of wheat exchanged in July, _____ bu. in August, and _____ bu. in September.

   k. If the price of wheat in July were $3.50/bu., farmers would be willing to put _____ bushels on the market. However, at this price, millers would be willing to buy only _____ bushels. Therefore, a (surplus____/ deficit____) of _____ bushels of wheat would exist. Millers would receive more wheat than they need and consequently would offer (more____/ less____) for wheat until the quantity supplied (was greater than____/ equaled____/was less than____) the quantity demanded.

   l. Likewise, at prices below the equilibrium price, there will be a (surplus ____/shortage____) of wheat because the quantity demanded is (less than ____/greater than____) the quantity supplied.

   m. When there is a shortage of a commodity, buyers will tend to bid (more____/ less____) for the product in order to have an adequate supply for their need.

   n. This is in accord with the Law of Supply and Demand which says that when the price of a commodity declines, the quantity demanded will (increase____/ decrease____) and the quantity supplied will (increase____/decrease____).

7. "It's no good subsidizing housing for the poor, as some people have proposed lately. Subsidies will make the housing cost less to the poor, so demand will rise and force the price up again." Do you agree? Draw diagrams to illustrate this person's analysis, and yours.

8. We observe that the price of a university education has risen markedly in recent years, as has the number of educations "consumed." What combination of shifts in supply and demand curves could explain this?

Notes

Food, Fiber and Natural Resource Economics

CONCEPT APPLICATION

Model for Imperfect Competition

Graph 1.   The graph below represents the cost curves of a firm in imperfect
competition.
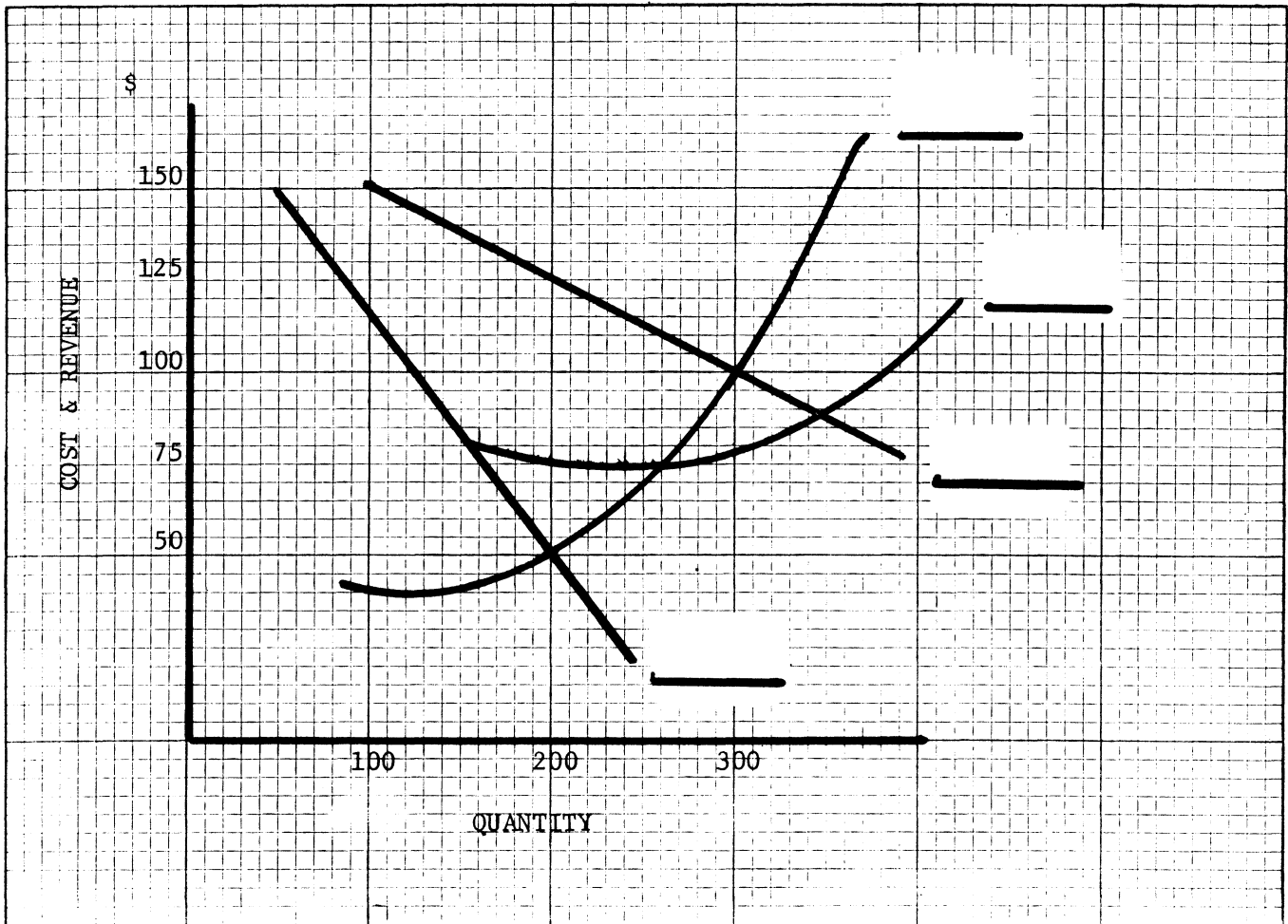
1.   Label each of the curves in graph 1; then respond to the following:

a.   What level of output will the firm produce if it wishes to maximize its
profit? _____

b.   At this level of production what price will the firm charge for the
product? _____

c.   When the firm produces the optimum level of output what average total
cost? _____ Therefore, the firm will make how much "pure profit?"

_____

d. At the optimum level of output what is the MC? _____ The MR? _____

e. Given the supply and demand schedules above, what would be the price of the product under pure competition? _____ At this price, what quantity would be offered on the market? _____

f. What is the result of imperfect competition on the consumer?

Profit Maximization: Pure Competition and Monopolist

The price and the total output, or production, of any product is determined by the cost of producing it and the demand for it. But the price and total production of a product also depend upon whether the product is produced by a purely competitive industry or by a single monopolist, and whether we are talking about the short-run or the long-run price and output.

In this section, we will learn how demand and cost determine price and output in both the short run and the long run when the product is produced by a purely competitive industry. Then we will study price and output determination in the short and long runs when a monopolist produces the product.

Pure Competition

Let's suppose that in the short run a purely competitive producer of snowblowers has the cost schedules shown in Table 1.

TABLE 1

Short-run costs of production schedule
(Snowblowers per hour)

Output	TFC	TVC	TC	MC	AFC	AVC	ATC
0	$200	$ 0	$ 200				
1	200	175	375	$175	$200	$175	$375
2	200	300	500	125	100	150	250
3	200	500	700	200	66 2/3	166 2/3	233 1/3
4	200	800	1,000	300	50	200	250
5	200	1,200	1,400	400	40	240	280
6	200	1,700	1,900	500	33 1/3	283 1/3	316 2/3
7	200	2,300	2,500	600	28 4/7	328 4/7	357 1/7

2. Using Table 1, respond to the following:

a. Suppose that the price at which any producer of snowblowers can sell a snowblower is $250. If the firm produces and sells 1 snowblower, its TC will be $_____, and its total revenue (TR) will be $_____.

b. At this price, if the firm produces 1 snowblower, it will have a total (profit/loss) of $_____.

c. If the firm produces 3 snowblowers and sells them at this same price, $250, its TC will be $_____, its TR will be $_____, and its total profit (+) or loss (-) of $_____.

d. If the firm were to produce no snowblowers, it would have no revenue. But it would have a TC of $_____ and as a result would have a total profit (+) or loss (-) of $_____.

e. When a firm produces no output in the short run, it has a (profit/loss) which is equal to its total _____ cost.

Assuming that the price of snowblowers is $250, here is a schedule indicating a firm's TR, its TC, and its profit or loss when it produces 0 through 7 snowblowers per hour.

TABLE 2

Output of snowblowers	TR	TC	Profit (+) or loss (-)
0	$ 0	$ 200	-$200
1	250	375	- 125
2	500	500	0
3	750	700	+ 50
4	1,000	1,000	0
5	1,250	1,400	- 150
6	1,500	1,900	- 400
7	1,750	2,500	- 750

3. Use Tables 1 and 2 to complete the following:

a. If the firm wants the maximum profit (or the minimum loss), it should produce _____ snowblowers per hour. Its total profit would then be $_____ an hour.

b. Because this producer is a purely competitive seller of snowblowers, the demand for its product is <u>perfectly elastic</u>. This means that marginal revenue is (greater than/equal to/less than) the price of the product.

c. The schedules in Table 2 assume that the price of snowblowers is $250, that this price does not change when the firm changes the amount it produces, and that the MR from the sale of each additional snowblower is $_____.

d. Now look at the MC schedule in Table 1. As we have seen, to have the maximum profit, the firm must produce 3 snowblowers an hour when the price of snowblowers (and the _____ from the sale of each additional snowblower) is $250.

e. This means that the firm must <u>not</u> produce any snowblowers which have an MR (greater/less) than the MC of producing the extra snowblower, and it should produce all snowblowers which have an MR (greater/less) than the MC of that snowblower.

f. The 4th snowblower has an MC of $300 and an MR of $250. If the firm produced this 4th snowblower, its TC would increase by $_____, its TR would increase by $_____, and its total profit would (increase/decrease) by $_____.

g. The firm should produce the 3rd snowblower because when it
increases its production from 2 to 3 snowblowers, its TC
increases by $_____, its TR increases by $_____, and
total profit (increases/decreases) by $_____.

h. We have discovered a principle: To maximize profits, a
firm must produce all units of a product which have an
(MC/MR) greater than their (MC/MR).

i. A profit-minded firm must <u>not</u> produce any units which have
an (MC/MR) greater than their (MC/MR).

j. As output increases we reach a production level at which
the MR is <u>equal</u> to the MC of producing the last unit of the
product. For example, suppose the MR from the sale of the
101st bushel of corn is $1.30 and that the MC to the farmer
of producing the 101st bushel is also $1.30. If the farmer
produced the 101st bushel, the TC would increase by $_____,
the TR would increase by $_____, and the total profit would
_____.

k. A firm <u>will</u> produce any unit of a product that has an MR
equal to its MC. Our principal determining how much a firm
should produce to maximize its profit thus becomes: Produce
all units of a product which have an MR _____ than or
_____ to their MC.

l. Going back to snowblowers, suppose the price of snowblowers
were $180. Under pure competition, the MR from the sale of
each additional snowblower is $_____.

m. Refer to the production schedule in Table 1. If the firm is
going to maximize its profits or minimize its losses, when the
price of snowblowers is $180, it should produce _____ snow-
blowers an hour. At this output it will have a TR of $_____
and a total (profit/loss) of $_____.

n. If the firm were to increase its production from 2 to 3 snow-
blowers an hour, its TR would increase by $_____, its TC
would increase by $_____, and its total profit would
(decrease/increase) by $_____.

o. And if the firm cut its production from 2 to 1 snowblowers,
its TR would decrease by $_____, its TC would decrease by
$_____, and its total profits would (decrease/increase) by
$_____.

p. Even if the firm cut its production to 0, the firm would have
a total loss of $_____ because at zero output this is the
amount of the firm's total _____.

q. Faced with the prospect of producing 2 snowblowers and having
a loss of $140, or 0 snowblowers and suffering a loss of $200,
the firm will choose to produce _____ snowblowers because
_____.

Just to confirm these conclusions, look at the schedule below. It shows the firm's TR, TC, and total profit or loss when the price of snowblowers is $180.

TABLE 3

Output of snowblowers	TR	TC	Profit (+) or loss (-)
0	$ 0	$ 200	$-200
1	180	375	-195
2	360	500	-140
3	540	700	-160
4	720	1,000	-280
5	900	1,400	-500
6	1,080	1,900	-800
7	1,260	2,500	-1,240

4. From Table 3, the responses to the following should be obvious.

a. No matter what output the firm produces, it has a (profit/loss).

b. But the firm's loss is a minimum when it produces _____ snowblowers an hour.

c. When the price of snowblowers is $250, the firm has a (profit/loss); it produces the output that results in the maximum profit or minimum loss.
   When the price goes to $180, the firm has a (profit/loss) when it produces its "best" output.

d. Suppose the price of snowblowers were $233 1/3. The firm:
   (will/will not) produce the 1st snowblower,
   (will/will not) produce the 2nd snowblower,
   (will/will not) produce the 3rd snowblower,
   (will/will not) produce the 4th snowblower.

e. At a price of $233 1/3, the firm will not produce the 4th snowblower because its _____ is greater than its _____.

f. The firm will produce the 1st, 2nd, and 3rd snowblowers because their MR is _____ than their MC.

g. So at a price of $233 1/3, the firm will produce just 3 snowblowers. The firm's TC will be $_____, its TR will be $_____, and its total profit will be _____.

h. If the price of snowblowers is $233 1/3, the firm has neither a profit nor a loss at this output. If the price of snowblowers were greater than $233 1/3, the firm would have a _____. If the price were anything less than $233 1/3, it would have a _____.

i. Look at the average-cost schedules for snowblowers. You will find that $233 1/3 is the minimum (AFC/AVC/ATC) shown there.

j. So we have this principle: A firm can earn a profit
   only if the product price is (above/below) the minimum
   ATC. Losses result if the _____ is below the
   (highest/lowest) ATC.

k. The purely competitive firm's short-run supply schedule
   is its _____ schedule above the minimum _____.
   Product price must _____ to induce the firm to
   supply a greater quantity of its product, because the MC
   of producing the product _____.

l. Having learned how much a single purely competitive
   firm will produce in the short run at various prices,
   let's find out what the price will be when a product
   is produced by a group (or industry) of purely competi-
   tive firms. In any competitive market the price of the
   commodity depends upon the _____ for and the
   _____ of the commodity.

Here is the supply schedule of a firm which sells snowblowers in a purely
competitive market.

TABLE 4

Price of snowblowers	Quantity supplied (per hour)
$600	7
500	6
400	5
300	4
200	3
140	0

5. How would you answer the following?

   a. If the price of snowblowers were $600, the quantity
      supplied by this firm would be _____ snowblowers
      per hour.

   b. Let's suppose that there are 1,000 producers of
      snowblowers and that each of them has the same cost
      schedule. If one firm were to supply 7 snowblowers
      an hour when their price is $600, then each of the
      999 other firms in the industry would also supply
      _____ snowblowers an hour at this price.

   c. When the price of snowblowers is $600, each firm
      will supply 7 snowblowers an hour; the 1,000 firms
      together will supply a total of _____ snowblowers
      each hour.

Complete the supply schedule for the snowblower industry by indicating the total quantity the 1,000 firms will supply at each price. You will have to look back at Table 4 to find the quantities supplied by one firm.

TABLE 5

Price of snowblowers	Quantity supplied (per hour)
$600	7,000
500	_____
400	_____
300	_____
200	_____
140	_____

6. Use the industry supply schedule to answer the following.

a. Look at the industry supply schedule in Table 5. As the price of snowblowers increases, the total quantity supplied _____, and as the price decreases, the total quantity supplied _____.

b. Why does the total quantity supplied diminish when the price of the product falls and increase when the product rises? Because each firm will produce a (larger/smaller) quantity when the price of the product **rises** and vice versa.

c. And each firm will increase its production only when the product price rises, because the marginal _____ of producing additional units of the product _____ as the firm increases its production.

d. So to maximize its profits, the firm would have to give up the production of those units which have an MC greater than their MR. This it could only do by (increasing/ decreasing) its total production.

e. To find the <u>total</u> quantity supplied at any price by all the firms in an industry, we _____ the quantities supplied by each firm at that price.

f. If we add the quantities supplied by each firm at some particular price, we find the total quantity supplied by the industry at that price. When we do this for several different prices, we have found the industry's _____ schedule.

g. Given each firm's supply schedule, we can, by adding,
find the _____ supply schedule. To know what
the price of the product will be, we must also know
the _____ schedule for the product.

Here is the demand schedule for snowblowers, together with the supply schedule
which you worked out in Table 5.

TABLE 6

Quantity demanded (per hour)	Price of snowblowers	Quantity supplied (per hour)
3,000	$600	7,000
4,000	500	6,000
5,000	400	5,000
6,000	300	4,000
7,000	200	3,000
8,000	140	0

7. Table 6 shows the industry supply and demand schedules; use it to answer
the following:

a. The price of snowblowers will be $_____. There will
be _____ snowblowers produced and sold each hour by
the firms in this industry.

b. Look back at the cost schedules in Table 1. When the
price of snowblowers is $400, the MR from the sale of
each additional snowblower is $_____. Each firm
will produce _____ snowblowers an hour. The 1,000
firms, each with the same cost schedule, will produce
a total of _____ snowblowers an hour.

c. Any single firm can sell each of the 5 snowblowers at
a price of $400. Its TR will be $_____, its TC will
be $_____, and its total (profit/loss) is $_____.

Pure Monopoly

Knowing what price a purely competitive firm will charge and how much it
will produce in both the short run and the long run, let's now find out what
price a pure monopolist will charge, and how much he will produce in both the
short run and in the long run.

To learn these things will not require as much time as it took to understand
the purely competitive firm and its industry. But before we examine the pure
monopolist, it will be worthwhile to recall several of the assumptions we made
at the beginning of this section. These assumptions are:

1. The goal of a firm is to maximize its profits or minimize its losses.
2. Whether or not a firm is a monopolist does not influence the costs of
production.
3. There are a large number of buyers of the product produced by a firm.
4. You already know, or can learn elsewhere, what is meant by monopoly,
the elasticity of demand, and marginal revenue.

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8. As a starting point, respond to the following:

   a. A pure monopolist, because he is an imperfect competitor, finds that the more he produces, the (higher/lower) is the price at which he can sell his product.

   b. He also knows that the higher the price he sets on the product he produces, the (more/less) of his product he can sell.

   c. In short, the relationship between the price the pure monopolist charges and the quantity of his product demanded is (direct/inverse). Put another way, the relationship between the output of the monopolist and the price at which his output can be sold is (direct/inverse).

   d. In more technical language, the demand for the product of a pure monopolist is (perfectly elastic/ less than perfectly elastic).

Here is the demand schedule for electric golf carts which, we assume, are manu-factured and sold by a pure monopolist. Also shown in the table are the total revenues (TR) the monopolist would receive if he charged the various prices given in the demand schedule.

TABLE 7

Demand and total-revenue schedule
(Golf carts per hour)

Price	Quantity demanded	Total revenue
$1,200	0	$ 0
1,100	1	1,100
1,000	2	2,000
900	3	2,700
800	4	3,200
700	5	3,500
600	6	3,600
500	7	3,500
400	8	3,200
300	9	2,700
200	10	2,000

9. Now let's look at demand and supply for a monopolist.

   a. The monopolist's TR is at a maximum when he produces and sells _____ golf carts an hour and charges a price of $_____ for every cart.

   b. Is the goal of the monopolist to have the maximum TR, that is, to maximize his TR? (Yes/No)

c. The goal of the monopolist is to maximize, not
    his TR, but his _____. To know how many
    golf carts this monopolist will decide to produce
    and sell in order to accomplish this goal, we
    also have to know the _____ of producing
    golf carts at various levels of output.

Following is the monopolist's short run total cost schedule for golf carts, along
with his TR schedule. Indicate in the column at the right his total profit or
loss when he produces 0 through 10 golf carts an hour.

TABLE 8

Quantity of golf carts (per hour)	Total revenue	Total costs	Total profit (+) or loss (−)
0	$ 0	$ 100	$_____
1	1,100	500	_____
2	2,000	700	_____
3	2,700	1,000	_____
4	3,200	1,400	_____
5	3,500	1,900	_____
6	3,600	2,500	_____
7	3,500	3,200	_____
8	3,200	4,000	_____
9	2,700	4,900	_____
10	2,000	5,900	_____

d. The monopolist's total profit is at a maximum,
    or his loss is a minimum, when he produces _____
    golf carts an hour.

e. Now look back to the demand schedule in Table 7.
    When he sells 4 golf carts, each cart can be sold
    at a price of $_____.

In Table 9 are the MR and MC schedules that go along with the TR and short-run TC schedules in Table 8.

TABLE 9

Quantity of golf carts (per hour)	TR	TC	MR	MC
0	$ 0	100		
1	1,100	500	$1,100	S 400
2	2,000	700	900	200
3	2,700	1,000	700	300
4	3,200	1,400	500	400
5	3,500	1,900	300	500
6	3,600	2,500	100	600
7	3,500	3,200	-100	700
8	3,200	4,000	-300	800
9	2,700	4,900	-500	900
10	2,000	5,900	-700	1,000

10. Use Tables 9 and 10 to complete the following.

a. When the monopolist produces 4 golf carts an hour, he has produced all carts which have an (MC/MR) greater than or equal to their (MC/MR).

In the table below is a complete set of cost schedules as well as demand and revenue schedules.

TABLE 10

Output of golf carts	TFC	TVC	TC	MC	AFC	AVC	ATC	Price	TR	MR
0	$100	$ 0	$ 100					$1,200	$ 0	
1	100	400	500	$ 400	$100	$400	$500	1,100	1,100	$1.100
2	100	600	700	200	50	300	350	1.000	2,000	900
3	100	900	1,000	300	33⅓	300	33⅓	900	2,700	700
4	100	1,300	1,400	400	25	325	350	800	3,200	500
5	100	1,800	1,900	500	20	360	380	700	3,500	300
6	100	2,400	2,500	600	16⅔	400	416⅔	600	3,600	100
7	100	3,100	3,200	700	14²⁄₇	442⁶⁄₇	457¹⁄₇	500	3,500	-100
8	100	3,900	4,000	800	12½	487½	500	400	3,200	-300
9	100	4,800	4,900	900	11¹⁄₉	533⅓	544⁴⁄₉	300	2,700	-500
10	100	5,800	5,900	1.000	10	580	590	200	2,000	-700

b. When the monopolist produces 4 carts an hour and sells each for $800, his total profit is $1,800. The ATC of each cart is $_____ and the profit on each cart is $_____.

c. If the monopolist produced just 1 golf cart an hour, he could sell this 1 cart at a price of $_____. The ATC of this cart would be $_____ and his profit on each cart would be $_____.

d. From this example we can learn two things. To maximize his total profits, the pure monopolist: (does/does not) charge the highest possible price, and (does/does not) try to earn the largest possible profit on each cart.

Comparison: Monopolist - Oligopolist, Purely Competitive Industries

The Clyde Enterprise is the only newspaper in that town, so it has, in effect, a total monopoly on advertising space. The demand schedule for newspaper advertising and the paper's costs for printing are given in Table 11.

TABLE 11. Cost and Revenue Data for Monopolist

Quantity	Price per Column	Total Revenue	Marginal Revenue	Total Cost	Marginal Cost	Profit
0	$50	$ _____		$ 45		_____
			$ _____		$ _____	
1	45	_____		54		_____
2	40	_____	_____	60	_____	_____
3	35	_____	_____	67	_____	_____
4	30	_____	_____	76	_____	_____
5	25	_____	_____	88	_____	_____
6	20	_____	_____	105	_____	_____
7	15	_____	_____	140	_____	_____

Graph 2. Demand, marginal revenue, and marginal cost curves for the Clyde Enterprise.
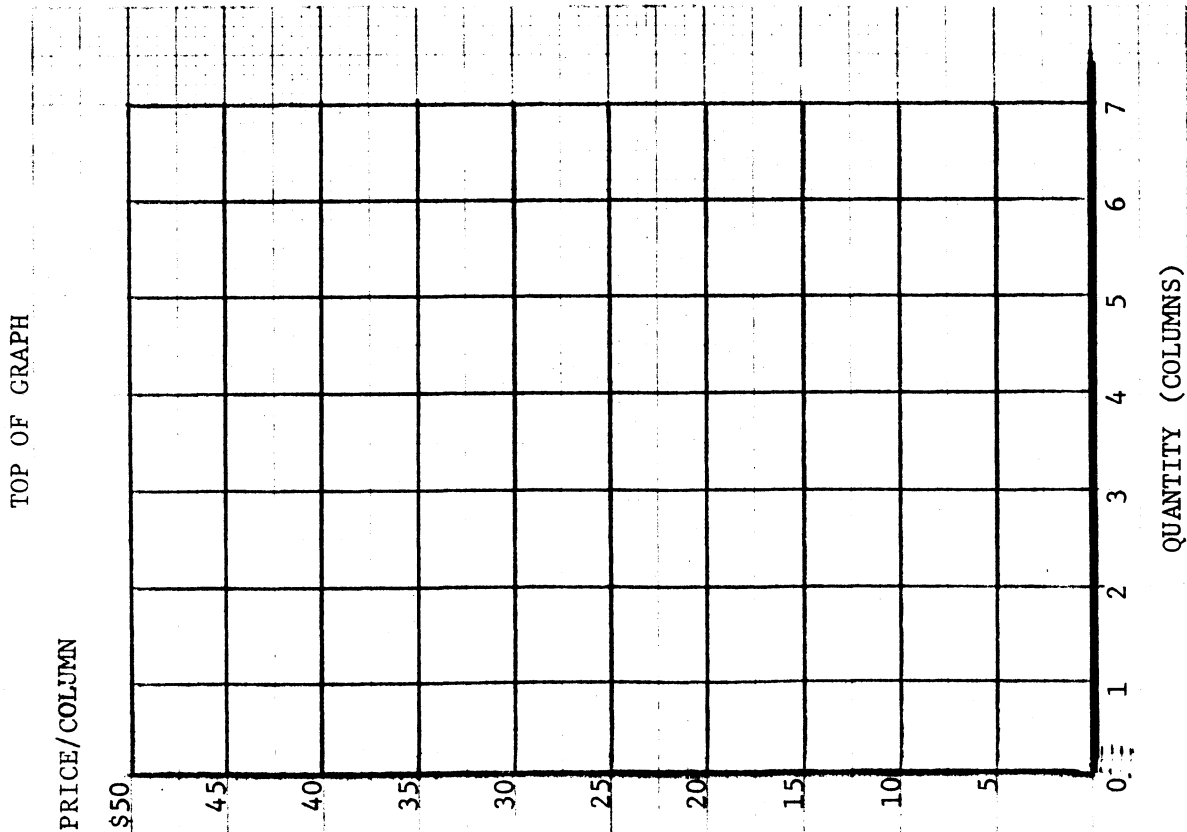
11. Using Table 11 and Graph 2, respond to the following.

    a. In order to maximize total profits, how many columns of advertising should the Clyde Enterprise sell? _____

    b. What price will they charge? _____

    c. What will their total profit be? _____

    d. If they charged $25 per column, how much would they sell? _____

    e. What would their profit be? _____

    f. At $40, they would sell _____ columns and would earn _____ in profits.

    g. Therefore, sales of _____ columns would be the optimum production.

Let's assume that two other newspaper publishers see the monopoly that the Clyde Enterprise has. They decide to print a local edition of their papers (from nearby cities) and sell them in Clyde. This, in effect, creates an oligopolistic newspaper industry in Clyde. The Enterprise's new demand schedule is given in Table 12.

TABLE 12. Demand Schedule for Oligopolistic Industry

Columns of Space	Price Per Column	Total Revenue	MR	Total Cost	MC	Profit
0	$50	-0-		$ 45		_____
			$_____		$ 9	
1	47.50	47.50		54		_____
			_____		6	
2	45.00	90.00		60		_____
			_____		7	
3	42.50	127.50		67		_____
			_____		15	
4	40.00	160.00		82		_____
			_____		22	
5	35.00	175.00		102		_____
			_____		30	
6	30.00	180.00		132		_____
			_____		40	
7	25.00	175.00		170		_____
			_____		50	
8	20.00	160.00		220		_____

Graph 3. The demand, MR, and MC curves for an oligopolistic industry.

PRICE/COLUMN

(Graph with vertical axis labeled in dollars from $55 down to 5, and horizontal axis "QUANTITY OF COLUMNS" numbered 1 through 9.)
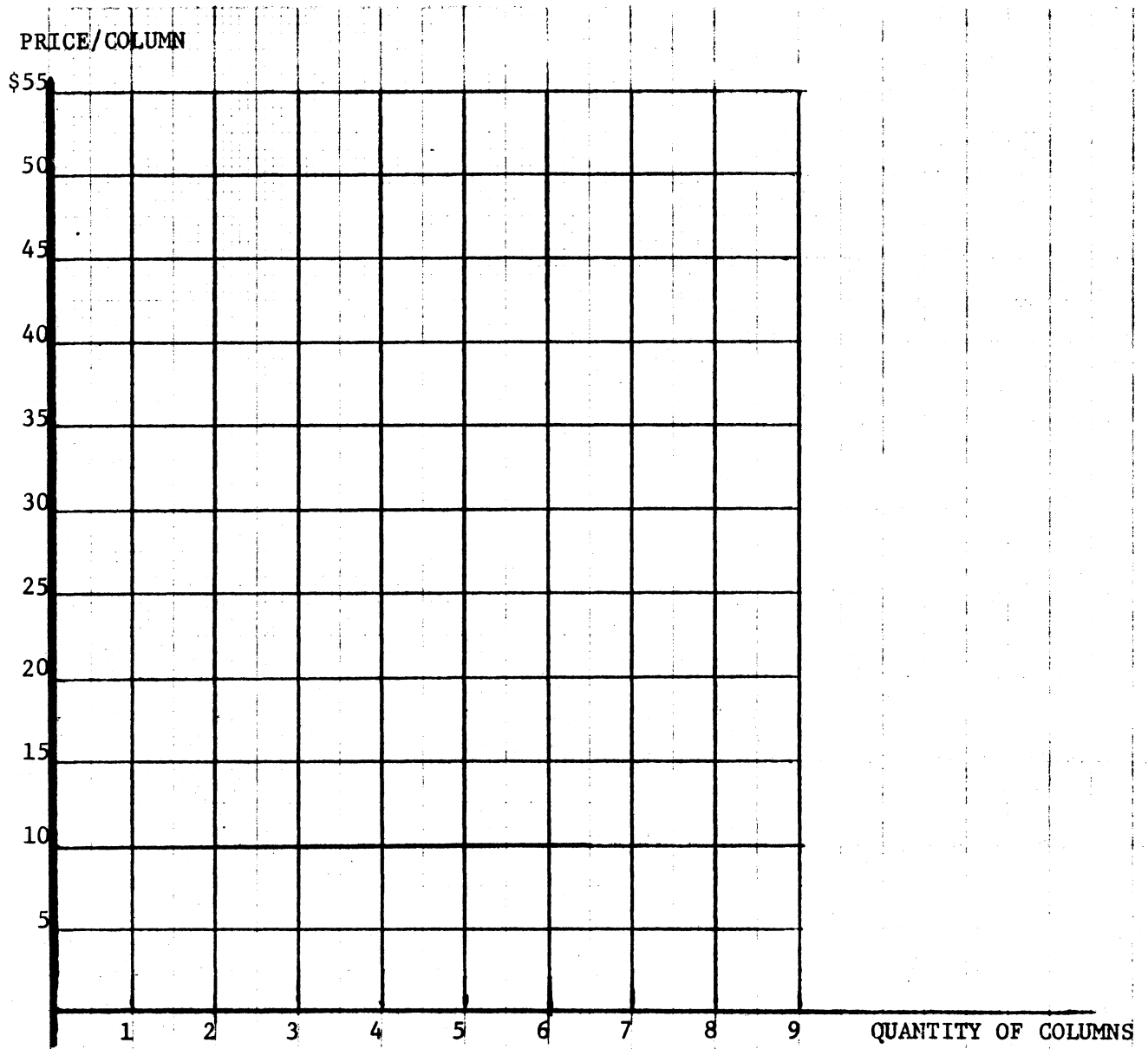
12. Using Table 12 and Graph 3, respond to the following:

a. Why is the demand curve kinked?

In such a case, the demand curve for the oligopolist's product would be (more elastic____/less elastic____) for price increases than for price decreases.

b. The oligopolist thus sells _____ columns of advertising at $_____ per column. (Use the nearest whole number for quantity).

c. Total profit is _____.

d. So an oligopolist, like a monopolist, sells where _____ = _____
    to maximize profits.

13. Heavy Industries, Inc. has just announced that it will build a new ball-
     bearing factory in Clyde that will employ 25,000 people. Clyde is suddenly
     more than just a dot on the map. T.V. stations, radio stations, more
     newspapers, and magazines have sprung up all over Clyde. Advertising is
     suddenly a purely competitive industry. To answer the following, assume
     that the TC and MC curves are the same as used in Table 12 or Graph 3.

     a. In perfect competition, demand = price = _____.

     b. The demand curve is (perfectly elastic_____/perfectly inelastic_____)
         in perfect competition.

     c. Look back at the marginal cost curve you drew in Graph 3. If the
         price of advertising is $26 per column, the Enterprise will sell _____
         columns under the conditions of perfect competition.

     d. The Enterprise's total revenue is _____ and profit equals _____.

     e. At 7 columns, total revenue is _____ and total profit is _____.

     f. At 4 columns, total revenue is _____ and total profit is _____.

     g. Thus, profit is maximized at _____ columns. This is where MC = _____.
         So, under the rules of perfect competition, oligopoly, and monopoly,
         profit is always maximized where _____ = _____.

Notes

Food, Fiber and Natural Resource Economics

CONCEPT APPLICATION

Trading in Futures

The futures market deals with commodities which are bought and sold for future delivery. The transaction does not involve the exchange of a commodity but of a contract for a specific quantity of the commodity. Trading in futures can be for either of two purposes: 1) protecting against price changes -- commonly called "hedging," or 2) investing, based on expected prices -- commonly called "speculating." Most future contracts are settled by offsetting contracts rather than delivery of the commodities.

For the buyer or seller of any commodity traded the "futures price" is probably the best indicator of what the market price will be at some future date. Since futures contracts represent transactions which are due in the future they can be traded without anyone possessing the commodity. However, for a true hedging position the hedger must expect to produce or want to purchase the commodity at some future date.

Futures Prices

Wednesday, April 30, 1975

	Open	High	Low	Close	Change	Season's High	Low
CHICAGO—WHEAT							
May	337	341	334	336½-336	−2½to3	557	329½
July	332½	339½	327¼	329-328½	−3¼to3¾	509	324½
Sept	339½	341	333	336-335½	−3¾to4¼	513	331½
Dec	347	350	342	344½	−2¾	523	340
Mar 76	355	356½	349½	351	−3¼	392½	348
CORN							
May	287	291¼	285	286¼-¾	−1¼to¾	413	240½
July	287	289½	283¾	285½-285	−1to1½	411	254¾
Sept	277	279	273	274-273	−2½to3½	388½	246¼
Dec	259	260¾	256	256¼-¾	−2¼to1¾	355	234
Mar 76	263	265½	261	261½-261	−2to2½	358	239
May	266	268	264	264¼	−1¾	283	262½
OATS							
May	164	167½	158½	164½	+¼	208½	129½
July	162	164	156½	158½-159	−4to3½	198½	123½
Sept	154	157	149½	151½-152½	−4to3	178	122¼
Dec	154½	155¾	150¼	153-153½	−3¼to2¾	188	126½
Mar 76	156	156	153	153	−2	160	153
SOYBEANS							
May	537½	545	535½	543½-545	+6to7½	971	487¼
July	527	534	525	534-532	+6½to4½	972½	497½
Aug	521	529½	520½	527½-528	+4½to5	961	502
Sept	518	523½	515½	521	+4½	945	498
Nov	516	521	512	518	+2¾	869	496
Jan 76	521½	526½	519	524	+1¾	860	503
Mar	527	533½	526	531	+2½	620	511
May	532½	539½	532½	536	+1	579	532
July	539	545	539	542	+1	582	536

	Open	High	Low	Close	Change	Season's High	Low
Nov	58.00	58.00	58.00	58.00	....	58.00	57.00
Dec	58.50	58.50	58.50	58.50	+.05	58.50	58.00
Sales estimated at: 392 contracts.							
POTATOES (IDAHO RUSSET)							
May	7.30	7.30	7.25	7.25	+.10	10.10	4.91
Sales: 2 contracts.							
FROZEN PORK BELLIES							
May	74.80	75.25	73.70	73.70a	−1.50	76.85	36.25
July	75.50	75.60	74.15	74.15a	−1.50	77.10	38.25
Aug	74.40	74.60	73.10	73.10a	−1.50	75.85	52.10
Feb 76	69.60	70.05	68.55	68.70-.80	−1.02to.92	72.80	55.25
Mar	68.90	68.90	67.60	67.65-.60	−1.15to1.20	69.95	58.20
May	68.65	68.65	67.40	67.40a	−.90	68.60	64.00
Sales estimated at: 5,287 contracts.							
HOGS							
June	47.70	47.72	46.70	46.90-.70	−.75to.95	49.90	35.30
July	48.25	48.35	47.25	47.25-.40	−.85to.70	51.10	36.72
Aug	47.80	47.85	46.40	46.40-.50	−1.15to1.05	49.40	39.00
Oct	46.00	46.00	44.90	45.05-44.90	−.80to.95	47.80	38.70
Dec	46.20	46.30	45.30	45.30-.45	−.87to.72	48.00	38.75
Feb 76	44.90	45.10	44.30	44.35-.30	−.50to.55	45.45	38.30
Apr	43.00	43.00	42.60	42.60	+.57	43.50	38.00
Sales estimated at: 4,241 contracts.							
LUMBER							
May	151.90	152.90	150.50	151.2-150.9	−.70to1.0	153.80	107.10
July	166.00	167.40	164.00	164.50	−1.90	168.00	111.00
Sept	162.00	164.00	159.80	160.20	−2.80	164.90	127.50
Nov	156.80	157.80	154.70	155.00-.80	−1.9to1.1	161.20	140.00
Jan 76	158.90	159.10	157.00	157.00a	−1.90	163.00	150.50
Sales estimated at: 1,413 contracts.							

To illustrate how the futures market and hedging can be used, let's make a few assumptions. First, let's assume that it is May 1, 1975 and that you have been retained as an Economic Advisor by Durkee Farms, Inc. which is owned and operated by Mr. Durkee and two sons. The Durkees have been reading and hearing about how they can "lock in a profit" if they hedge their 1975 soybean crop. Second, futures prices are quoted each weekday in the paper; however, for this problem let's use the market quotations for Wednesday, April 30, 1975 (given above). Finally, let's assume that the Durkees have kept meticulous production and cost

records. From these and your knowledge of hedging you have assembled
the following:

One soybean contract	5,000 bu.
Commission per contract	$50
Required margin	$3,000
Interest rate	8%
Basis	$.20/bu.
Expected yield	40 bu./A.
Total acreage	500 A.
Cost of production	$120/A.

1. Set up a selling hedge for the Durkees' 1975 soybean crop by res-
ponding to the following:

   a. What is the November futures price for soybeans
      (use the closing price from the <u>Wall Street</u> $_____ per bu.
      <u>Journal</u> clipping)?

   b. How many soybeans can the Durkees expect to
      produce on their 500 acres?   _____ bu.

   c. Consequently, if they hedged all of their
      production they could hedge how many contracts?   _____

   d. The total value of their soybean crop, at the
      November futures price, would be: $_____

   e. What will be the total cost for producing
      soybeans on the 500 acres? $_____

   f. If the Durkees must deposit with their broker
      $3,000 for each contract they will need how
      much margin? $_____

   g. To obtain the margin the Durkees withdraw the
      amount determined in "f" from their savings
      account. Given the going rate of interest,
      how much interest income will they lose if the
      contract is held for exactly 7 months? $_____

   h. How much total commission charges must the
      Durkees pay? $_____

i. Out of the futures price, the Durkees must pay for
    transporting the soybeans to a grain terminal which
    is authorized to receive soybeans contracted on the
    futures market (let's call this the "basis"). How
    much will the total basis be for the Durkees? $_____

j. Now calculate how much profit the Durkees can
    "lock in" by hedging their soybean crop at the
    November futures price.

    1) Expected future receipts (from d) $_____

    2) Less: "basis" (from i)   _____

    3) Equals: Gross Cash Receipts   _____

    4) Less: cost of production (from e)   _____

    5) Equals: Net Income from Production   _____

    6) Less: interest costs (from g)   _____

              commission (from h)   _____   _____

    7) Equals: Net Profit "locked in" $_____

k. Should the Durkees hedge their soybean crop?

2. Let's move time ahead until November after the Durkees have harvested
    their 500 acres of soybeans which yielded exactly 40 bu. per acre.
    The Continental Grain Co. has offered to pay the Durkees $4.50 per
    bushel for the soybeans and pick them up at the farm. Demonstrate
    that the Durkees will still end up with the "locked in profit."

    a. How much cash will they receive from Continental
        Grain Co. for their soybeans? $_____

    b. Less: cost of production (from 1-e)   _____

    c. Equals: profit from production   _____

d. Plus (or minus): profit (or loss) on contract(s)

   1) Sold for (from 1-d) _____

   2) Buy for (local market
      price plus basis) _____

   3) Net difference (1-2)   _____

e. Equals: gross profit   _____

f. Less: commission and interest costs (from 1-g and h) _____

g. Equals: Net Profit $_____

h. Should the Durkees have hedged their soybean crop?

3. Suppose that instead of a price decrease the Continental Grain Co. offers to pay the Durkees $6.00 per bushel for the soybeans and pick them up at the farm. Work through the following to show that the Durkees will still end up with the "locked in profit."

a. How much cash will they receive from Continental
   Grain Co. for their soybeans? $_____

b. Less: cost of production (from 1-e)   _____

c. Equals: profit from production   _____

d. Plus (or minus): profit (or loss) on contract(s)

   1) Sold for (from 1-d) _____

   2) Buy for (local market
      price plus basis) _____

   3) Net difference (1-2)   _____

e. Equals: gross profit   _____

f. Less: commission and interest costs (from 1-g and h) _____

g. Equals: Net Profit $_____

h. Should the Durkees have hedged their soybean crop?

We have seen how the producer can use hedging to assure himself of a _price_ for his product. Now let's see how the processor could use hedging to assure himself of a <u>cost</u> for his inputs.

Suppose that Continental Grain Co. knew on May 1, 1975, that they were going to need 20,000 bu. of soybeans in November. Furthermore, when they looked at the November futures price quotation of $5.18 for soybeans they felt that this would be a fair price.

4. Let's illustrate how Continental Grain Co. could have used hedging to have "locked in" a cost of soybeans for November. Assume that the local market price for soybeans is $6.00 in November.

<u>May Transactions</u>

    a. Buy: 4 Nov. soybean contracts @ $5.18/bu. $_____

    b. Less: Basis (to arrive at their cost on
                    the local market)   _____

    c. Equals: Estimated cost on local market   _____

    d. Plus: Trading costs

           1) Commission   _____

           2) Interest on margin   _____

              Sub-total   _____

    e. Equals: Locked in cost $_____

<u>November Transactions</u>

    f. Buy: 20,000 bu. of soybeans from Durkees
              @ $6.00/bu. $_____

    g. Plus (or minus): profit, or loss, on
                     futures contracts

      1) Bought: 4 contracts for   _____

      2) Sell: 4 contracts for
          (local price plus basis)   _____

              Net gain   _____

h. Equals: Actual cost of soybeans   _____

i. Plus: Trading costs   _____

j. Equals: Locked in cost $_____

k. How much money would Continental Grain have saved if they would have hedged rather than waited and purchased only on the local market in November? $_____

l. Suppose that both the Durkees and Continental Grain hedged. Were they buying and selling each other's contract? Why?

If there were always some producer willing to make a selling hedge and some processor willing to make an equal offsetting buying hedge the market would balance out. If the market price increased above the futures price the seller would "lose" and the buyer would "save" by hedging. If the market price decreased below the futures price the opposite would occur.

In reality there does not need to be a buyer offsetting each seller of a commodity. Another person, called a speculator, enters into the market. The speculator is a person who has studied price trends, factors of production, demand, etc. and concludes that the market price will be either above or below the futures price quotation at some future date.

Once the speculator arrives at a conclusion he invests accordingly. A speculator who thinks the price is going up will buy now and sell later at a higher price. Of course, for every speculator who thinks the price is going up there is another who thinks it's going down. Thus a market is created for constant trading.

5. The following problem illustrates the actions of a speculator. Use the Wall Street Journal clipping of April 30, 1975 futures prices, presented on page one, and the information below to respond to the statements following (references are to live hog futures):

     1 contract   = 30,000 lbs. (300 cwt.)

     Commission   = $55/contract

     Interest rate   = 6%

     Margin   = $2,000/contract

a. A strange disease threatens to kill one half of the current pig crop. What would you expect to happen to the price of hogs in the future? Why?   _____

b. If you, as a speculator, think the price of hogs will <u>increase</u> in the future, what would you do now? Why?   _____

c. Assume that you purchased 5 April (1976) futures hog contracts on April 30, 1975, how much would they have cost (use closing price)? $_____

d. Assume that 2 weeks later the April futures price of hogs is $45.00 and you decide to sell. How much would you receive for the contracts? $_____

e. What would your commission costs be? $_____

f. How much interest would you have lost on the "margin" during the two weeks (round to nearest whole dollar)? $_____

g. How much profit or loss did you realize?

   1) Sold contracts for $_____

   2) Bought contracts for   _____

   3) Gross profit   _____

   4) Less: costs of trading

Commission   _____

Interest   _____

Sub-total   _____

5) Net profit (loss) $_____