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The computer-based tutorial for a 21-point vision examination (CT21)

Abstract

The Computer-based Tutorial for a 21 point vision examination (CT21) is an educational program intended to enhance optometry students' knowledge and understanding of a standardized comprehensive vision exam. The program may also be used in conjunction with clinical procedures classes as an educational aid. The entire tutorial is presented in a computerized format for Macintosh computers using CD ROM. Video clips are presented along with questions for students to respond to, thereby enhancing understanding of individual components of a "21 point" vision examination. The individualized program allows students to answer questions at their own pace and receive immediate feedback in a non-threatening environment.

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Scott C. Cooper

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**THE COMPUTER-BASED TUTORIAL FOR
A 21-POINT VISION EXAMINATION
(CT21)**

By

**Karen Ikegami
Jan Hurtubise, M.Ed.
Jaclyn Phan
Sarah Yee**

**A thesis submitted to the faculty of the
College of Optometry
Pacific University
Forest Grove, Oregon
for the degree of
Doctor of Optometry
May, 1997**


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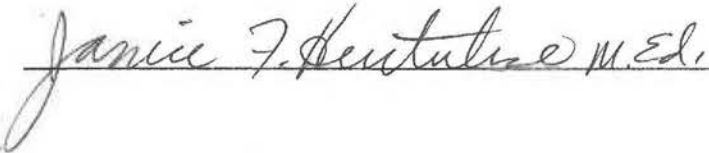
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BIBLIOGRAPHY

KAREN IKEGAMI

Karen K. Ikegami is a California native who graduated with a Bachelors of Science degree in Biology from the University of California, Riverside. She is currently a fourth year graduate student at Pacific University's College of Optometry in Forest Grove, Oregon and plans to receive her Doctor of Optometry in May 1997. Upon graduating, Karen plans to practice either in the western or mid-western region of the United States, with emphasis on primary care, sports vision, contact lenses and geriatrics.

JAN HURTUBISE

Jan Hurtubise will be a 1997 graduate of Pacific University with a Doctorate in Optometry. She also holds a Master's and Bachelor's degree in Education from the University of Nevada, Las Vegas (UNLV). She is a certified teacher in Nevada and has taught high school in Texas. From 1988 to 1993, Jan was the Director of the Reading Center and Clinic/Learning Abilities Program at UNLV. Prior to entering optometry school, the majority of Jan's time has been dedicated to providing assistance to college students with learning disabilities as well as tutoring school aged children in reading. She plans to return to Las Vegas to practice optometry.

JACLYN PHAN

Jaclyn T. Phan attended Pacific University where she received a Bachelor of Science degree in Visual Science. She will be graduating with a Doctor of Optometry in May of 1997. Her future plan is to obtain an employment in a multi-disciplinary clinic/hospital or group practice with emphasis on contact lenses and pediatric optometry.

SARAH YEE

Sarah Yee is from British Columbia, Canada. She graduated from Simon Fraser University with a Bachelor of Science in Biochemistry. She will be graduating from Pacific University in May, 1997 with a Doctor of Optometry. Sarah will be returning to B.C. upon graduation to practice full scope Optometry.

ABSTRACT

The Computer-based Tutorial for a 21 point vision examination (CT21) is an educational program intended to enhance optometry students' knowledge and understanding of a standardized comprehensive vision exam. The program may also be used in conjunction with clinical procedures classes as an educational aid. The entire tutorial is presented in a computerized format for Macintosh computers using CD ROM. Video clips are presented along with questions for students to respond to, thereby enhancing understanding of individual components of a "21 point" vision examination. The individualized program allows students to answer questions at their own pace and receive immediate feedback in a non-threatening environment.

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To Dr. Alan LeRoy, our computer programmer, for his immense knowledge of the Macintosh system, invaluable hours of contribution to the design and format of the tutorial and for being such a joy to work with.

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INTRODUCTION

The Computer-based Tutorial for a 21 point vision examination (CT21) was designed to reinforce optometry students' knowledge and understanding of a basic vision exam. It provides an educational advantage with its many modes of learning, thus allowing the program to be used as a visual aid in the classroom to enhance presentations on test topics. The CT21 is an independent learning aid that allows interaction and immediate feedback to the user. It also provides the optometry student with a visually stimulating and non-threatening learning environment. The program is on a CD, available for the Macintosh computer (chosen for its user friendliness). With the advanced technological capabilities of using a CD ROM, the options for expansion are available for future self-tutorials.

The entire tutorial consists of twenty-eight different tests performed in a standard OEP 21 point vision examination sequence. Questions are designed to reinforce students' knowledge in the areas of proper procedures, recording, interpretation, problem solving and calculation of data. For some of the questions, a video clip is played to allow the user to watch a specific test being performed. Based on that video clip, questions are asked with options presented in a multiple choice format. The computer gives immediate feedback to the user indicating whether or not the correct choice was made. The user is allowed to answer the questions at his or her own pace, skip sections or review questions as desired.

PROCEDURE AND METHODS

About CT21 Program

The CT21 combines the features of video, sounds, and graphics into one powerful, easy-to-use program. The different programs used to create the CT21 are the following:

- Metrowerks CodeWarrior v.1.4
- Avid VideoShop v.3.0.2
- QuickTime Video v.2.5
- FusionRecorder v.1.1

- Adobe Premiere v.4.0f
- MovieShop v.1.2.1
- Microsoft Word v.5.1a

System Parameters

The CT21 program is designed with the following parameters:

- Limit of 300 questions total
- Maximum of 100 examination components
- Maximum of 1000 character per test descriptions

System Requirements

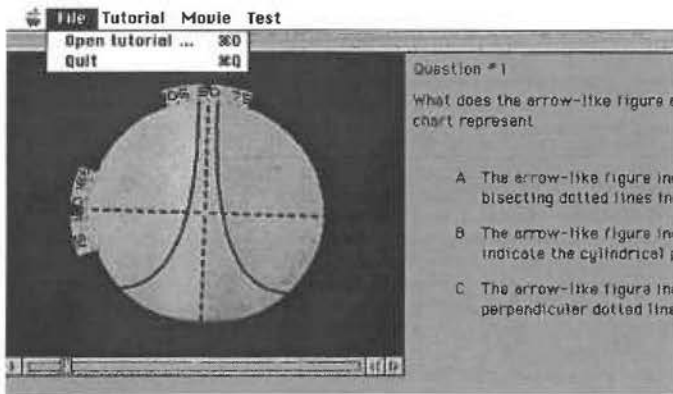
The CT21 is a program to be utilized on a Power PC Macintosh computer. The Power PC should have at least the following system configuration:

- 8-16 MB of available RAM
- System 7.5 or higher
- CD ROM drive
- QuickTime Video v.2.5
- QuickTime MPEG Extension

Getting Started

Double click on the CT21 Tutorial icon to open the application.

Note: To bypass the starting introduction, hold the escape button down immediately after double clicking the CT21 icon and keep the button depressed while the computer loads the tutorial program.



Function Options

Play/Stop Button The Play/Stop button is located on the bottom left corner of the video canvas window.

To play a video clip, click on the Play/Stop button.

To pause or stop a video clip in motion, press the Play/Stop button.

Play Backward The Play Backward button is located on the bottom right corner of the video canvas window. This button allows the user to go backward one frame at a time.

Play Forward The Play Forward button is located on the bottom right corner of the video canvas window. This button allows the user to advance one frame at a time.

Time Shuttle The Time Shuttle button enables the user to move forward and backward through the frames or to jump to various parts of the clip.

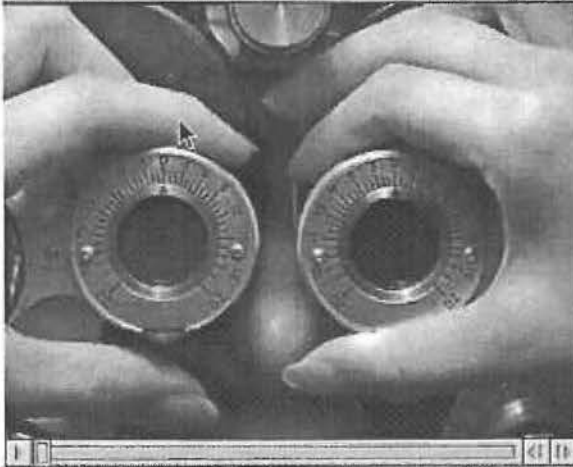
Answer Selection Key After the user reads the question and makes a decision on which of the three choices given is correct, the user will click on the appropriate Answer Selection Key.

Previous Test The user can go back to previous tests by clicking on this button.

Next Test The user can advance to the next test by selecting this button.

Previous Question Click on this button to go back to previous questions.

Next Question Click on this button to advance to the next question.



Question #1

Before taking K readings on a patient's eye, the horizontal and vertical power drum should be preset to the

- A Highest power
- B Lowest power
- C It doesn't matter

Play video

Still image

#2 Keratometry Readings

The Keratometer measures the curvature of the patient's cornea and thus, helps determine the amount of corneal cylinder. The K readings are used to predict refractive cylinder and axis as well as the optical benefit and fitting success of contact lenses.

Javal's Rule: accounts for internal astigmatism. If the patient has with-the-rule astigmatism, decrease -0.50×0.90 . If the patient has against-the-rule astigmatism, increase the cylinder by -0.50×0.90 . If the patient is oblique, only a correction factor -1.25 is applied.

Previous Test

Next Test

A

B

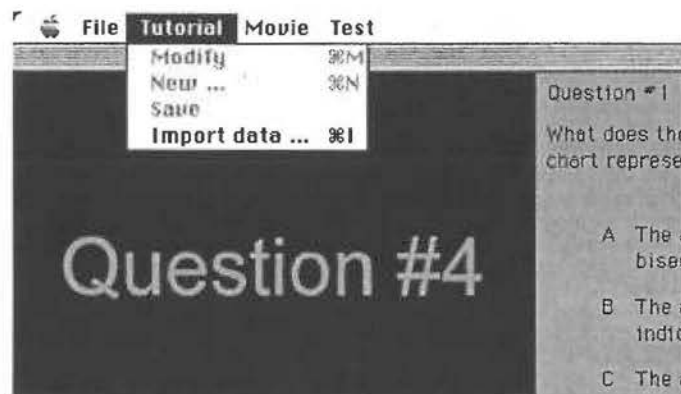
C

>>

Tutorial Menu

On the CT21, most of the Tutorial menu is inaccessible and dimmed out for the user. The tutorial menu can be used for creating new tutorials by a program designer. The Modify command is accessible to the user, therefore please use caution in using this function as it will result in changing the original tutorial program.

<u>Import data</u> <Command I>	Imports questions, titles, descriptions and other desired text to be incorporated into the tutorial.
<u>New</u> <Command N>	Creates a blank tutorial for which the programmer can create an entirely new tutorial.
<u>Save</u>	Saves the data, along with any changes made to a tutorial, existing or newly created.
<u>Modify</u> <Command M>	Allows for modification and selection of individual tests of the existing program. The programmer can control which videos, audio and still photos are designated to each test. This function is accessible to the user.



Movie Menu

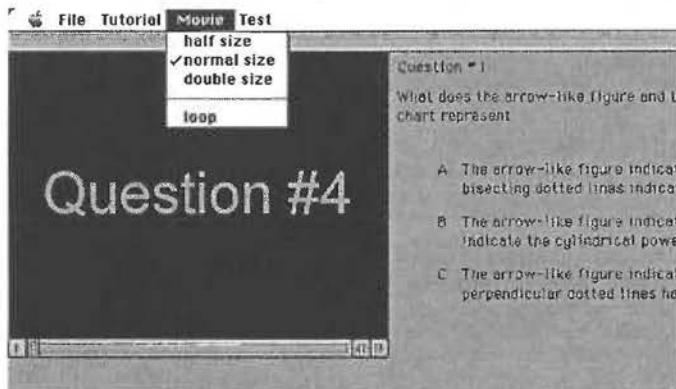
Under the "Movie" heading, the user can select the size of the movie video played with each question.

Loop Allows the user to set the movie to automatically replay again after it is completed for each question.

Double size The movie will appear twice as large as the normal size. Please note that as the size of the movie increases, the image quality and resolution is diminished.

Half size The movie will appear at half its normal size.

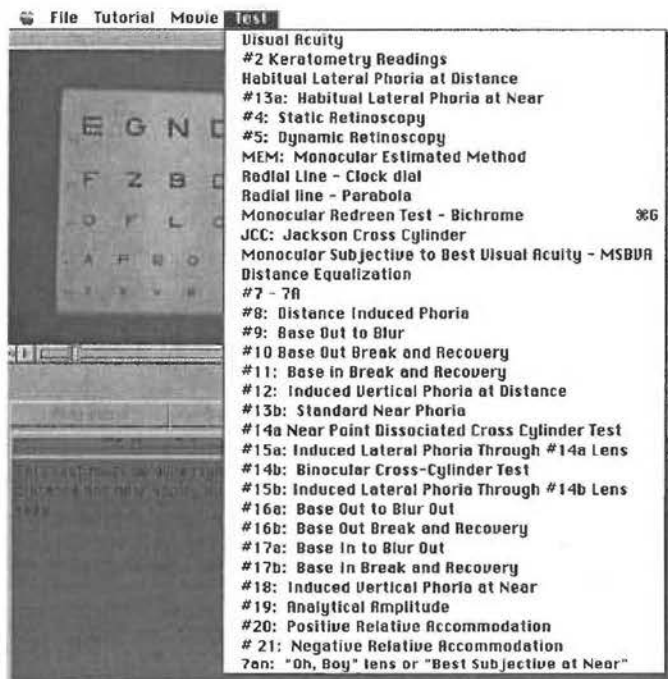
Normal size Allows the movie to appear at its standard size for which it was programmed.



Test Menu

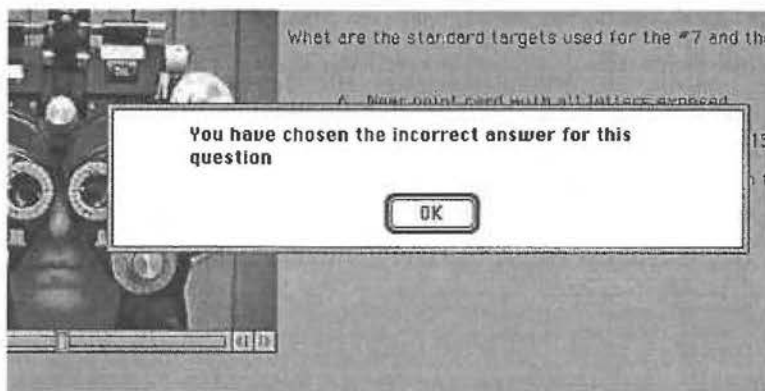
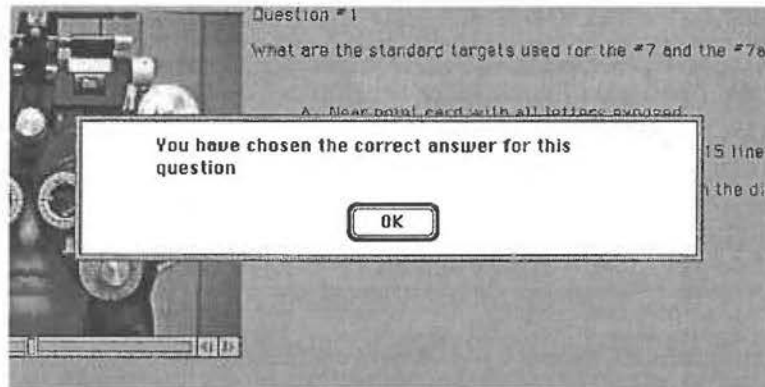
Use the Test menu to select a specific test to run on the tutorial program.

1. To choose a specific test, scroll down until the desired test is highlighted.
2. Click on the highlighted selection.
3. Proceed with the questions assigned for the test selected. The CT21 program will automatically run, presenting the user with a movie clip and a multiple choice question. Note that not all questions have a movie clip that will run with it, in those instances, a blank window box will appear instead of a movie.



Feedback on Responses to Questions

After the user clicks on the appropriate Answer Selection Key, there will be a message display on the screen indicating whether or not the response to the question is correct.



DISCUSSION AND CONCLUSION

The twenty-one point examination is a complex, multi-step process that is essential to a comprehensive visual examination. It is the most standardized modality used by eyecare providers to collect information in order to make an assessment on a patient's refractive condition and binocular status. The CT21 was designed for two primary purposes. The first and most important objective of the CT21 is to reinforce optometry students' knowledge of the twenty-one point exam. The supplemental information gathered from the twenty-one point sequence will only be helpful to the examiner if there is a basic understanding of the theory behind each test. The tutorial tests students on the set up of the

test, how to perform the test, and the interpretation of the findings. Secondly, the CT21 can be used as a teaching tool in courses discussing basic vision examination procedures. The CT21 video can be used as a visual aid to reinforce the descriptions of the various tests discussed in lecture.

Since the CT21 is an original program which incorporates video and text, there are some weaknesses to the program. To design a high tech multimedia system, the application requires expensive equipment and programs, which is the main drawback. The video could have had better resolution if the authors had access to better and more expensive computer hardware and software. If the CT21 program is not run on the appropriate equipment, the video clip and voice may not correlate. This problem can be eliminated by moving the slide button back to its original position and starting the video clip again.

Despite the weaknesses related to the program, the advantages are great. The most unique feature of the CT21 is in its incorporation of the video and audio modalities. Many existing optometry programs that are used as a learning tool incorporate photographs. The advantage of using video is that students observe the processes in real time and can gather dynamic objective and subjective findings. Also, the CT21 program is designed so that it can be modified for other programs that incorporate text, still image, video and audio. Other advantages include the portability of the program (CD), the ability of the user to work at his or her own pace in a fun, non-threatening environment, and the immediate feedback provided to the user.

This thesis can be expanded in a variety of ways. Since the program has modification capabilities, the program itself can be changed to be used as a learning tool or teaching tool for other areas of optometry. For example, if this program was modified to be used in a case analysis class, the data may be entered into the program to represent a particular patient. The user could then make a diagnosis based on the objective and subjective findings on that particular case. In addition to the modification capabilities, since the program incorporates a video, students can be asked questions that involve dynamic findings in other practical areas such as in contact lens fitting, cover testing, etc.

In conclusion, the CT21 is a versatile, dynamic program. It is a fun and interactive way to learn and reinforce the understanding of the twenty-one point examination. The CT21 is an excellent learning and teaching tool for both students and professors.

GUIDE FOR CT21

TUTORIAL TEST

QUESTIONS

AND

ANSWERS

MANUAL FOR CT21 TUTORIAL TEST QUESTIONS

#1 Visual Acuity This test must be done right after history unless history indicates another emergency that must be taken care of first. Both distance and near acuity must be tested unaided and through any habitual lenses. This test gives the examiner information on how clearly the patient sees.]

1. What is the room illumination required for this test?

- A. Standard room illumination
- B. Scotopic room
- C. Mesopic illumination

<A>

2. What is the room illumination required for the near visual acuity test?

- A. Standard room illumination
- B. Standard room illumination with near point light directed on the target
- C. Dim room illumination

3. Which one of the following lists the correct standard target for the testing distance specified?

- A. Reduced Snellen card at far
- B. Projected Snellen chart at near
- C. Projected Snellen chart at far and reduced Snellen card at near

<C>

4. If a healthy ten year old patient has 20/80 visual acuity at both far and near, what is the most likely diagnosis of the following choices?

- A. Astigmatism
- B. Myopia
- C. Hyperopia

<A>

5. The patient's best corrected acuity is 20/100, what is the first test to be performed which will confirm that the decreased acuity is due to a refractive condition?

- A. Keratometry
- B. Biomicroscopy
- C. Pinhole acuities
- D. Retinoscopy

<C>

6. If a patient came in with a red eye complaint, which order of examination would be most appropriate?

- A. Case history, VA, slit lamp, pupillary reflexes
 - B. Case history, VA, keratometry, 21 points
 - C. Slit lamp, pupillary reflexes, ophthalmoscopy, VA, 21 points
 - D. VA, biomicroscopy, ophthalmoscopy, pupillary reflexes
- <A>

7. According to the video, what is the patient's visual acuity OD?

- A. 20/20
 - B. 20/30
 - C. 20/30+2
 - D. 20/30-2
- <C>

8. According to the video, what is the patient's near visual acuity OS?

- A. 20/200
 - B. 20/40
 - C. 20/80
 - D. 20/30
- <C>

#2 Keratometry Readings The Keratometer measures the curvature of the patient's cornea and thus, helps determine the amount of corneal cylinder. The K readings may be used to predict refractive cylinder and axis as well as the optical benefit and fitting success of contact lenses.]

1. Before taking K readings on a patient's eye, the horizontal and vertical power drums should be preset to the?

- A. Highest power
 - B. Lowest power
 - C. It doesn't matter
 - D. The predicted endpoint
-

2. If the patient wears contact lenses, does the examiner need to ask the patient to remove them in order to obtain accurate K readings?

- A. Yes
 - B. No
 - C. It does not matter
- <A>

3. If the mires never come into clear focus, what should you do?

A. Check to see if the patient's forehead is against the head rest and the chin is in the chin rest

B. Add additional lenses to expand the measuring range of the keratometer because the patient's cornea exceeds the standard range

C. Adjust the power drums to have equal values

<A>

4. While you are taking K readings, the mires become blurry and distorted. A few seconds later, they become clear and crisp again. The grade you would record for distortions on this reading would be?

A. +1 distortion (the degree of distortion you saw briefly)

B. 0 distortion, the distortion is probably due to tear film, and was blinked away

C. No grade, distortion fluctuated, therefore cannot give a grade

D. 4+ distortion since it is variable

5. Which of the following corneas could be classified as WTR (With-the-rule)?

A. 44.50/46.75 @ 085

B. 46.75/43.00 @ 085

C. 42.75/44.25 @ 042

D. 43.37 sphere

<A>

6. Watch the video. Which drum aligns the plus signs of the mires?

A. The focusing drum

B. The vertical drum

C. The horizontal drum

<C>

7. Watch the video. Which drum aligns the minus signs of the mires?

A. The horizontal drum

B. The focusing drum

C. The vertical drum

<C>

8. On the video clip, what is the K reading that would be recorded?

A. 44.50/43.12 @ 075

B. 43.12/44.50 @ 075

C. 44.50/43.12 @ 075

9. On the video clip, what is the K reading that would be recorded?

- A. 41.50/42.75@075
 - B. 41.12/43.75@075
 - C. 42.75/41.50@075
- <A>

#3 Habitual Lateral Phoria at Distance This test indicates the vergence posture at distance through the patient's current prescription. Expected finding is 1/2 exophoria.]

1. The appropriate level of illumination in the examination room for the #3 is?

- A. Dim room illumination
 - B. Dim with near point light aimed at the back wall
 - C. Standard room illumination
- <C>

2. What is the standard prism preset for the #3?

- A. OD: 5 base out OS: 12 base up
 - B. OD: 12 base in OS: 6 base up
 - C. OD: 12 base in OS: 6 base down
 - D. OD: 6 base up OS: 12 base in
-

3. The standard target used for this test is?

- A. Vertical 20/20 line
 - B. Isolated 20/40 letter
 - C. Both A and B are correct
- <A>

4. The endpoint of the test is when the patient reports?

- A. Vertical alignment of the "passing" targets
 - B. Horizontal alignment of the "passing" targets
 - C. Doubling of targets
 - D. Fusion of the targets
- <A>

5. The patient's distance visual acuity findings are as follows: Unaided: 20/400 OU Habitual: 20/30 - OU. The most appropriate of the following targets for the #3 is?

- A. Isolated 20/400 letter
 - B. Isolated 20/20 letter
 - C. Isolated 20/40 letter
 - D. Isolated 20/30 letter
- <C>

6. Which target should the patient be instructed to keep clear?

- A. Bottom
 - B. Top
 - C. The patient doesn't need to keep either target clear for valid endpoints
- <A>

7. The correct recording notation for the patient's phoric posture in the video is?

- A. 1-1 exophoria
 - B. 1-1 esophoria
 - C. -1-3 esophoria
 - D. 1 - -4 exophoria
- <C>

8. Is the above finding reliable?

- A. Yes
 - B. No
-

#13a: Habitual Lateral Phoria at Near This test indicates the vergence posture at near through the patient's current near prescription. Expected finding is 6 exophoria.]

1. The recommended room illumination for this test is?

- A. Dim room illumination
 - B. Dim room illumination with near point light aimed at the back wall
 - C. Standard room illumination with near point light on the target
- <C>

2. The standard target used for this test is?

- A. Reduced Snellen 20/20 vertical line
 - B. Reduced Snellen 20/40 isolated letter
 - C. Reduced Snellen 20/40 vertical line
 - D. Entire reduced Snellen chart
- <A>

3. The preset prism and control lens for the #13a is?

- A. 12 base in OD and 6 base up OS over the near #7a lens
- B. 12 base out OD and 6 base down OS over the near habitual prescription
- C. 12 base in OD and 6 base up OS over the near habitual prescription
- D. 12 base up OD and 6 base in OS over the near habitual prescription

<C>

4. The patient reports seeing only one target at the start of the #13a. Which of the following could reasonable explain this?

- A. The patient fused the targets due to an excessive amount of vertical prism in the phoropter
- B. The target was out of view due to the base in prism on a highly esophoric patient
- C. One of the eyes is not occluded
- D. Only one target is displayed from the projector

5. The patient's near VA results are: Unaided: 20/25 OU Habitual: 20/20 OU. The most appropriate target to use for the #13a is?

- A. 20/20 horizontal letters on a nearpoint card
- B. 20/30 row on the reduced Snellen nearpoint card
- C. 20/20 vertical letters on a near point card
- D. Entire reduced Snellen chart nearpoint card

<C>

6. The correct recording notation for the patient's phoric posture in the video is?

- A. 3-5 esophoria
- B. 3-5 exophoria
- C. 3/5 exophoria
- D. 4 exophoria

7. How many prism diopters apart must the two values obtained when performing the #13a be in order to be considered valid responses?

- A. 1 or 2
- B. 3 or 4
- C. 4 or 5

<A>

#4: Static Retinoscopy Static retinoscopy is performed to obtain an objective estimation of the patient's distance refractive status.]

1. The recommended room illumination for the #4 is?

- A. Dim room illumination
- B. Dim room illumination with near point light at back wall
- C. Standard room illumination

<A>

2. The most appropriate target listed below for the #4 is?

- A. 20/40 line with the red/green filter
- B. 20/400 "E" with the red/green filter
- C. 20/50 line with the red/green filter
- D. 20/20 line with the red/green filter

3. With the preset lens in place, what should the examiner see when using plano mode?

- A. "With" in all meridians
- B. "With" in one meridian, and "against" in the second meridian
- C. "Against" in all meridians
- D. Neutrality

<C>

4. After all meridians have been neutralized, the examiner should?

- A. Add minus equal to working distance power
- B. Add plus equal to working distance power
- C. Leave the lenses as they are

<A>

5. When the retinoscope is set in concave mode, the examiner sees "against" motion. What lenses should be added to neutralize the reflex?

- A. More plus lens power
- B. More minus lens power
- C. No need to add any lenses, this motion indicates neutrality

<A>

6. The #4 cannot be performed on a patient who is color blind?

- A. True
- B. False

7. When performing the #4 on a patient with a dilated pupil vs. a non-dilated pupil, expect to see _____ with a dilated patient?

- A. Less scissoring effect
- B. More distinct endpoint
- C. More aberrations
- D. Less plus

<C>

8. The video shows the lens combination left in the phoropter after the reflexes have been neutralized in both eyes. The examiner's working distance is 67 cm. The correct lens combination for the #4 should be recorded as?

- A. OD: +0.50-0.50x180 OS: +1.25-0.25x180
- B. OD: +0.75-0.50x180 OS: +1.00-0.25x180
- C. OD: +0.75 sphere OS: +1.00 sphere

<A>

9. The video shows the lens combination left in the phoropter after the reflexes have been neutralized in both eyes. The examiner's working distance is 50 cm. The correct lens combination for the #4 should be recorded as?

- A. OD: +1.25-1.00x045 OS: +1.25-0.75x150
- B. OD: -0.50-1.00x045 OS: -0.50-0.75x150
- C. OD: -0.75-1.00x045 OS: -0.75-0.75x150

<C>

#5: Dynamic Retinoscopy This test measures the accommodative response when looking binocularly at a target 50 centimeters away.]

1. What are the preset lenses for the #5?

- A. +1.50 OU over the static retinoscopy results
- B. +2.00 OU over the static retinoscopy results
- C. -2.00 OU over the static retinoscopy results

2. What is the standard illumination for the #5?

- A. Normal room illumination (12 - 15 foot candles)
- B. Dim room and near point light pointed toward the back wall
- C. Bright illumination on the near point target

3. Which target is recommended for the #5?

- A. 20/20 line of letters
- B. 20/80 letters on the hole near point card
- C. 20/100 numbers on the hole near point card
- D. Projected 20/40 letters

4. At what distance should the #5 be performed?

- A. 40 centimeters
- B. 50 centimeters
- C. 1 meter
- D. 6 meters

5. "With motion" is seen after the first sweep across both eyes. The retinoscope is set in plano mode. What do you do?

- A. Add more minus binocularly
- B. Add more plus binocularly
- C. Record these lenses and proceed with the next test

6. The examiner neutralized the reflex in both eyes. The next step is to?

- A. Reduce the plus by 2 diopters (for the working distance) and record
- B. Record the findings as they appear on the phoropter
- C. Continue until "with" motion is seen

7. The examiner's scope is directly behind the hole card. It is difficult to see due to reflections. What should the examiner do?

- A. Increase plus to clear the reflex
- B. Put the near pupillary distance in manually or try to slightly turn the phoropter to try to reduce the reflections
- C. Turn your streak horizontally and sweep the vertical meridian instead

8. What does the #5 finding indicate?

- A. Indicates the plus acceptance of the patient at near
- B. Estimates the lag or lead of accommodation
- C. Suggests the vergence influence on accommodation at near

9. After the +2.00 diopters preset is added for the #5, "with" motion is still seen in plano mode. What does this suggest?

- A. Additional minus is needed before starting the test
- B. The patient is under accommodating
- C. The #4 (static retinoscopy) is over minused

10. The findings for static retinoscopy are:
OD: +1.00-1.00x165 OS: +1.00-0.75x165
The video shows the endpoint of the #5.
What is this patient's plus acceptance?

- A. 0.75 diopters of plus acceptance
- B. None, considering the testing distance
- C. Actually it is 0.75 diopters of rejection of plus (a lead of accommodation is implied)

<C>

11. Static Retinoscopy findings are:
OD: +3.00-2.00 X 180 OS: +2.50-1.00X180
The video shows the endpoint of the #5.
What is this patient's plus acceptance?

- A. 0.50 diopters of plus acceptance
- B. None, considering the testing distance
- C. Actually it is 0.50 diopters of rejection of plus (a lead of accommodation is implied)

MEM: Monocular Estimated MethodThe purpose of this test is to determine the patient's accommodative response under typical viewing conditions.]

1. What is the recommended room illumination for this test?

- A. Standard room illumination
- B. Dim room illumination
- C. Dark room

<A>

2. What standard target is used most for this test?

- A. Any reading material at near
- B. Projected Snellen chart
- C. No target required
- D. The hole card with 20/100 letters around it

<D>

3. How long should the examiner hold the lens in front of the patient while sweeping?

- A. 1 second or less
- B. 3 seconds
- C. 5 seconds
- D. Until the test is completed

<A>

4. This test is typically performed at what distance?

- A. 40 centimeters
- B. 33 centimeters
- C. 6 meters
- D. 50 centimeters

<A>

5. The eyes are tested?

- A. Monocularly, but both of the patient's eyes are unoccluded
- B. Binocularly
- C. Monocularly, the eye not being tested is occluded

<A>

6. The examiner places a lens in front of the patient's eye to neutralize the reflex. The lens is left in place long enough for the patient to refocus through the lens. Is this a proper technique?

- A. Yes
- B. No
- C. No, but has no effect on the results

7. What kind of lens is placed in front of the patient if the examiner sees "with" motion in plano mode?

- A. Minus
- B. Plus
- C. Cylinder

8. What other tests can determine accommodative posture?

- A. Bell retinoscopy
- B. Book retinoscopy
- C. All of the above

<C>

9. Watch the video. The examiner uses a +1.25 diopters lens to neutralize the reflex, what kind of accommodative posture does this patient have?

- A. +1.25 lag
- B. +1.25 lead
- C. +1.50 lag

<A>

Radial Line - Clock dial This test subjectively determines the cylindrical component of an individual's distance prescription.]

1. The radial line tests are performed?

- A. Monocularly
- B. Binocularly
- C. Monocularly and then binocularly

<A>

2. What is the visual acuity preset for the radial line test?

- A. Establish a 20/40 fog
- B. Establish a 20/50 fog
- C. Establish a 20/60 fog

<A>

3. The proper room illumination to perform this test should be?

- A. Standard room illumination
- B. Dim room illumination
- C. Complete darkness

<A>

4. The patient is instructed to look at the center of the clock dial chart. The patient responds that the 2 - 8 lines seem darker. What is the minus cylinder axis based on this response alone?

- A. 240 degrees
- B. 40 degrees
- C. 60 degrees
- D. 150 degrees

<C>

5. Watch the video. To refine the axis found in question #4, the examiner asks the patient which line seems darker, the 1 or 3 line. The patient reports the 3 line looks darker. The axis placement should be?

- A. 180 degrees
- B. 75 degrees
- C. 90 degrees
- D. 45 degrees

Radial line - Paraboline This test subjectively refines the cylindrical component of a patient's distance prescription.]

1. How is the arrow-like figure and the bisecting dotted lines on the paraboline chart utilized?

- A. The arrow-like figure helps refine the cylindrical power and the bisecting dotted lines help refine the axis
- B. The arrow-like figure helps refine the axis and the bisecting dotted lines help refine the cylindrical power
- C. The arrow-like figure helps refine both cylinder power and the axis. The perpendicular dotted lines only serve as stability cues for consistent results

2. Which numbers are read for the minus cylinder axis?

- A. The numbers indicated by the side pointer
- B. The numbers indicated by the top pointer
- C. Either of the numbers can be read; they are the same

<A>

3. The patient reports that both lines of the arrow-like figure are equally dark. What is this patient's minus cylinder axis as shown in the video?

- A. 180 degrees
- B. 90 degrees
- C. 75 degrees

<A>

4. According to the video, what is this patient's minus cylinder axis?

- A. 175 degrees
- B. 180 degrees
- C. 60 degrees

5. According to the video, what is this patient's plus cylinder axis?

- A. 180 degrees
- B. 165 degrees
- C. 75 degrees

6. In the video, the patient reports the dotted line bisecting the arrow is darkest. What is the examiner's next step?

- A. Add plus cylinder power
- B. Change the axis
- C. Add minus cylinder power

<C>

7. According to the video, what is this patient's minus cylinder axis?

- A. 45 degrees
- B. 90 degrees
- C. 60 degrees

<A>

Monocular Red-Green Test - Bichrome The primary purpose of this test is to provide a refractive endpoint or to establish the control lens for the Jackson Cross Cylinder (JCC) Test. The monocular results can also be used to help judge the anisometropia between the two eyes.]

1. The proper room illumination to perform this test should be?

- A. Standard room illumination
- B. Dim room illumination
- C. Dark room illumination

<C>

2. Although a wide variety of targets may be used, the most common target size used is?

- A. 20/200 to 20/400
- B. 20/20 in an isolated line
- C. 20/60 to 20/25

<C>

3. The standard preset for this test is?

- A. Monocular 20/40 blur
- B. No 20/40 blur needed as long as the endpoint of radial line is in place
- C. Monocular 20/80 blur
- D. #4

<A>

4. The endpoint of the Bichrome Test is?

- A. Last red response
- B. First green response
- C. First equal response if there is more than one equal

5. What should the examiner do when the patient is first presented with the chart and responds by saying the green side is more clearer and distinct?

- A. Records this finding and moves on to the next test
- B. Adds enough plus sphere until the response is "red" and proceeds with the test as usual
- C. Goes back and repeats the radial line test because the cylinder is probably grossly inaccurate

6. The expected findings of this test should approximate the?

- A. #7a and #4
- B. #5 and #14a
- C. #20 and #21

<A>

7. If the patient is unable to respond to this test, which test should be substituted?

- A. #7a
- B. MSBVA
- C. #4

8. When watching the video clip, what should the examiner leave in the phoropter?

- A. -2.50 diopters (first Green response)
- B. -2.00 diopters (last Red response)
- C. -2.25 diopters (Equal response)

<A>

9. What should be recorded on the exam form?

- A. -2.00 diopters (last Red response)
- B. -2.50 diopters (first Green response)
- C. -2.25 diopters (Equal response)

<C>

JCC: Jackson Cross Cylinder This test subjectively refines or verifies the cylinder amount and axis location.

1. The recommended room illumination for this test is?

- A. Dim room illumination
- B. Dim room illumination with near point light at back wall
- C. Standard room illumination

<C>

2. The control lens is typically?

- A. MSBVA combined with the cylinder finding from the #4
- B. Red/Green combined with Radial Line
- C. Both a and b

<A>

3. The target standardly used in this test is?

- A. Isolated 20/40 letter
- B. Isolated 20/40 line
- C. Isolated 20/50 line
- D. Isolated 20/20 line

4. The target distance is?

- A. 40 cm
- B. 50 cm
- C. 6 meters
- D. 1 meter

<C>

5. If the examiner added 0.50 diopter of minus cylinder power, what is the sphere power change needed to place the circle of least confusion on the retina?

- A. +0.25 diopters
- B. +0.50 diopters
- C. -0.25 diopters

<A>

6. What do the red and white dots on the cross-cylinder lens indicate?

- A. Minus cylinder axis and plus cylinder power respectively
- B. Plus cylinder power and plus cylinder axis respectively
- C. Plus cylinder power and minus sphere power respectively
- D. Minus cylinder axis and plus cylinder axis respectively

<D>

7. While doing a power check, the patient chooses the orientation with the white dots aligned with the phoropter axis. The next step is to?

- A. Add 0.25 D of minus cylinder power in the lens bank
- B. Remove 0.25 D of minus sphere power from the lens bank
- C. Remove 0.25 D of minus cylinder power from the lens bank

<C>

8. [During the axis check, the JCC lens should?

- A. Have the red dots aligned with the axis of the phoropter
- B. Have the white dots aligned with the axis of the phoropter
- C. Have the dots 45 degrees away from the axis of the phoropter

<C>

9. The video shows a JCC power-axis-power sequence. After the first power check, what is the most appropriate lens to use as the preset for the axis refinement check?

- A. +2.25-1.75x180
- B. +2.00-2.00x180
- C. +2.25-2.00x180

<C>

10. According to the video during the axis check, which direction should the examiner turn the axis wheel?

- A. Clockwise - in the direction of the red dots
- B. Counter-clockwise - in the direction of the white dots
- C. Counter-clockwise - in the opposite direction of the red dots

<A>

11. Was the spherical equivalent maintained properly during all lens changes, and what is the final endpoint of the JCC?

- A. Yes, +2.25-1.75x170
- B. No, +2.25-1.75x170
- C. Yes, +2.00-1.50x170
- D. No, +2.00-1.75x170

<D>

Monocular Subjective to Best Visual Acuity - MSBVA This test subjectively determines the maximum amount of plus sphere power (or least minus power) monocularly for the patient to achieve the best visual acuity.]

1. What is the standard target used for the MSBVA?

- A. Full chart exposed at near
- B. 20/20 line of letters at near
- C. 20/40 to 20/15 lines in the distance
- D. 20/400 "E"

<C>

2. What illumination is standard for the MSBVA test?

- A. Standard room illumination with near point light pointed at the target
- B. Standard room illumination
- C. Dim illumination for distance

3. What is the standard preset for the MSBVA?

- A. 20/40 blur
- B. The endpoint from dynamic retinoscopy
- C. Any lens that allows the patients to see the 20/20 line clearly

<A>

4. What is the purpose of the MSBVA when it is performed as part of a typical refraction?

- A. To establish the best monocular near correction possible
- B. To establish the best monocular distance correction possible
- C. To establish the best binocular correction possible
- D. To preset radial line testing

5. What can the MSBVA be a substitute for early in the testing sequence?

- A. Radial line
- B. Bichrome
- C. Jackson Cross Cylinder

6. What is the purpose of the MSBVA when it is used as a substitute for the Red/Green test?

- A. To help give the best sphere and cylinder finding.
 - B. To help refine the #4 cylinder finding and to be used as the preset for the JCC
 - C. To help refine the #4 sphere finding and to be used as a preset for the JCC
- <C>

7. According to the video, how would this patient's MSBVA be recorded?

- A. -1.25-1.25 X 180
 - B. +1.25-1.25 X 180
 - C. -0.25-1.25 X 180
 - D. +0.62 equivalent sphere
-

Distance Equalization The purpose of this test is to establish equally blurred images for each eye, thereby quantifying any dioptric difference between the two eyes.

1. What is the standard testing distance and illumination for this test?

- A. 40 centimeters and dim room illumination
 - B. 6 meters and standard room illumination
 - C. 6 meters and dim room illumination
-

2. Which of the following is TRUE?

- A. The entire test is performed monocularly
 - B. The entire test is performed binocularly
 - C. The test may be performed either monocularly or binocularly
 - D. The 20/40 fog is established monocularly, the balance is established biocularly
- <D>

3. What is the most typical target?

- A. Isolated 20/20 line
 - B. Isolated 20/40 line
 - C. Isolated 20/15 line
 - D. A full chart of letters with the 20/40 line at the top
-

4. Why is plus fog required for this test?

A. So the patient must concentrate harder, thereby increasing the precision of the test

B. To attempt to keep accommodation at zero

C. It isn't required, it just helps preset the next test

D. To keep from ending the balance with too much minus power

5. In a refractive sequence, what function does this test serve?

A. To double check the validity of the anisometric balance on an amblyopic patient.

B. To equalize the accommodative effort and clarity so the sequence can change from a monocular refraction to a binocular refraction

C. It serves primarily to relax accommodation prior to establishing the final refractive endpoint

6. Which method below is most typically used to allow the patient to compare the two images?

A. Alternate occlusion

B. Using 6 prism diopters base up OS or split this into 3 base down OD and 3 base up OS

C. This is unnecessary. The balance may be established one eye at a time

7. Using a standard set up, the patient indicates that the top image is more readable. What lens change is indicated?

A. Add plus OS by 0.25 diopters

B. Add plus OD by 0.25 diopters

C. Reduce plus OD by 0.25 diopters

8. How is the final endpoint of this test established?

A. When both eyes clearly see the full 20/40 line

B. When the patient reports equality you may quit without bracketing the response

C. When the patient reports equality you must bracket the response

<C>

9. If perfect equality is never established (the patient reversed responses with only 0.25 change to one eye), which of the following is the least appropriate action?

- A. Let the patient choose which combination makes the images "match the best"
- B. Leave the set of lenses with the lesser difference dioptrically
- C. Use the 1/8th diopter sphere setting to establish the "equal" point
- D. Leave the image of the non-dominant eye clearer

<D>

10. According to the video clip what degree of anisometropia is indicated?

- A. +0.25 diopters greater OS
- B. +0.50 diopters greater OS
- C. +0.75 diopters greater OS

<A>

11. What is the actual anisometropia of this patient (based on the same video clip)?

- A. +0.25 diopters greater OS
- B. +0.37 diopters greater OS
- C. +0.50 diopters greater OS

#7 - 7A The #7 is a test that subjectively determines the maximum amount of plus (or least amount of minus) to at least two-thirds of the 20/20 line. The #7A is a test that subjectively determines the maximum amount of plus (or least amount of minus) sphere power to achieve best visual acuity.]

1. What is the preset lenses for the #7-7a sequence?

- A. The end of the distance equalization (about 20/40 acuity) or about +1.25 over the MSBVA results if the potential acuity of the two eyes is more than one line different
- B. The MSBVA results with no other changes
- C. The result of the distance equalization less 1.00 diopter of plus

<A>

2. What are the standard targets used for the #7 and the #7a tests?

- A. Near point card with all letters exposed
- B. Snellen chart in the distance, often starting with an isolated 20/20 row
- C. 20/40 horizontal line of letters exposed in the distance

3. What is the recommended illumination for the #7 and #7a tests?

- A. Standard room illumination with near point light pointed at target
- B. Standard room illumination
- C. Dim room illumination

4. What happens on the #7 when the patient only has the potential to see the 20/25 line?

- A. There is no finding for the #7, but there will be a finding for the #7a
- B. Add more minus lenses until the patient can see the 20/20 line
- C. Record the results of the MSBVA and move on to the near testing

<A>

5. What is the preset lens for the #7a?

- A. MSBVA
- B. #7
- C. Distance Equalization

6. What would the patient's #7a be if the patient reported that 0.75 more minus than the #7 makes the letters darker and smaller as compared to only 0.50 more minus?

- A. Leave the more minus lens in the phoropter
- B. Leave the more plus lens in the phoropter
- C. None of the above

7. Based on the patient's response in the video, what is the most appropriate #7 sphere finding?

- A. +1.25 diopters OU
- B. +1.00 diopters OU
- C. +0.75 diopters OU

8. Watch the video. What is the patient's #7a finding?

- A. OU: -0.25-1.00x165 OS: -0.25-0.75x170
- B. OD: +0.25-1.00x165 OS: +0.25-0.75x170
- C. OU: +0.25-0.50x165 OS: +0.25-0.0.50x170

9. Watch the video. What is the patient's #7a finding?

- A. OD: -1.00-2.00 X 045 OS: -1.50-3.00 X 045
 - B. OD: -1.50-3.00 X 045 OS: -1.00-2.00 X 120
 - C. OD: -1.00-2.00 X 120 OS: -1.00-2.00 X 045
-

#8: Distance Induced Phoria This test determines the vergence posture at distance through the distance refraction.]

1. What is the standard Risley prism preset for the distance induced phoria test?

- A. 6 prism base down OD; 12 to 15 prism base in OS
 - B. 12 to 15 prism base in OD; 6 prism base down OS
 - C. 12 to 15 prism base in OD; 6 prism base up OS
- <C>

2. The standard illumination for the #8 is?

- A. Standard room illumination
 - B. Standard room illumination with the near point light pointed on the distance target
 - C. Dim illumination
- <A>

3. The most appropriate target listed below for the distance induced phoria test is?

- A. Single vertical row of 20/20 letters or larger depending on the patient's best distance acuity
 - B. 20/40 to 20/20 chart
 - C. Single horizontal row of 20/20 letters or larger depending on the patient's best distance acuity
- <A>

4. How is the patient's accommodation controlled during this test?

- A. By using the distance refraction lenses
 - B. By using very small letters and instructing the patient to keep the letters clear
 - C. Accommodative control is unnecessary. The impact of accommodation on the distance phoria is negligible
 - D. By using a 20/40 blur
-

5. With the standard Risley prism preset in front of each eye, which prism serves as the measuring prism and which serves as the dissociating prism?

- A. The 6 prism base up OS serves as the dissociating prism; 12 prism OD base in serves as the measuring prism
 - B. The 12 prism OD base in serves as the dissociating prism; 6 prism OS base up serves as the measuring prism
 - C. It depends upon which on the examiner is more comfortable using
- <A>

6. Watch the video. What is this patient's phoria?

- A. 3 - 2 exophoria
 - B. 3 - 2 esophoria
 - C. 0 - 0 orthophoria
-

7. Watch the video. What is this patient's phoria?

- A. 3 - 4 exophoria
 - B. 4 - -3 exophoria
 - C. 4 - 4 esophoria
- <A>

8. Is the phoria obtained in Question #7 reliable?

- A. Yes, because it is what the patient responded
 - B. No, because the findings are more than 3 prism diopters different
 - C. Yes, you can take the middle point of the two findings and record your answer
-

#9: Base Out to First Blur This test identifies the amount of relative convergence the patient can exert without significantly influencing accommodation at distance.]

1. The room illumination for this test is?

- A. Standard room illumination
 - B. Dim room illumination
 - C. Dark illumination
- <A>

2. When performing this test, the recommended rate at which the Risley prisms should be turned is?

- A. Quickly enough to ensure prompt patient response
 - B. 7 to 8 prism diopters per second
 - C. 2 to 3 prism diopters per second
 - D. Very slowly...about 0.5 prism diopters per second
- <C>

3. The preferred target size for this test is?

- A. 20/20 Snellen letter or an isolated vertical line of 20/20 letters
 - B. 20/80 Snellen letter
 - C. It does not matter what size, as long as the patient can focus it clearly
- <A>

4. The endpoint of this test is?

- A. Blur out of the distance target
 - B. First blur noticed by the patient
 - C. When diplopic images first become noticeably blurred
-

5. If the patient does not report a blur, but says the target "broke into two", the examiner should record?

- A. X (no blur) in the #9 recording form space
 - B. The break value in the #9 recording form space
 - C. Leave the #9 recording form space blank
- <A>

6. Based on the patient's response in the video clip, what should the examiner record for the #9 finding?

- A. 2 base out
 - B. 6 base out
 - C. No blur
-

#10 Base Out Break and Recovery This test identifies the total amount of convergence which can be used to keep an image fused and the ease with which a doubled image can be brought back into a single image at distance.]

1. What is the preset prism for the #10?

- A. Neutralizing prism of the #8
 - B. Endpoint of the #9, although the prism change is continuous from the #9
 - C. Prisms are reset at zero after the #9
-

2. The endpoint of the #10 should be?

- A. The prism amount when the patient reports diplopia and when the patient reports fusion again
 - B. Only the prism amount when the patient reports diplopia is recorded
 - C. The prism amount when the patient sees two clear images and when the patient reports one blurry image as the prism is reduced
- <A>

3. The OEP expected value for the #10 test is?

- A. 25/15
 - B. 10/5
 - C. 19/10
- <C>

4. If the patient does not report a break in the target, what should the examiner do?

- A. Repeats the test until the patient responds with break and recovery points
 - B. Checks for suppression, centration of the lenses, phoropter settings and attempts the test again
 - C. Records "X" in the #10 space
-

5. The patient reports that a single target is moving to one side. This indicates?

- A. The patient has base out ranges greater than 40 prism diopters
 - B. The patient's phoric posture makes the target move
 - C. The patient is suppressing
- <C>

6. Watching the video clip, what would the examiner record as the #10 findings?

- A. 5/10
 - B. 10/5
 - C. 20/5
- <C>

7. Watching the video clip, what would the examiner record for #10 findings?

- A. 18/-4
 - B. 18/2
 - C. 20/0
 - D. 9/1
-

#11: Base in Break and Recovery This test identifies the total amount of divergence which can be used to keep an image fused and the ease with which a doubled image can be brought back into a single image at distance.]

1. The OEP expected finding for the #11 is?

- A. 15/14
 - B. 3/6
 - C. 9/5
- <C>

2. The preset prisms for the #11 are?

- A. Risley prisms set at zero OD and OS
 - B. Risley prisms set at 12 base in OD and 6 base up OS
 - C. The #8 "neutralizing" prism
- <A>

3. The endpoints for the #11 should be?

- A. The prism amount when the first blur is noticed by the patient and the prism amount when the image is clear again
 - B. The prism amount when the patient sees diplopia and the prism amount when the patient sees the diplopic image fuse again
 - C. The average prism value of the break and recovery
-

4. If the patient reports a blur on this test?

- A. The #7a is over minused - record the blur along with the break and recovery
 - B. The patient has such a sensitive vergence system, it can pick up a blur
 - C. This is insignificant - no recording is necessary
- <A>

5. Watching the video clip, the examiner should record the #11 finding as?

- A. 12/18
 - B. 6/4
 - C. 3/8
-

#12: Induced Vertical Phoria at Distance and Vertical Fusional Ranges This test measures vertical aiming tendencies and vertical fusional ranges at distance.]

1. What control lenses are typically used for this test?

- A. The distance refraction results
 - B. No lenses at all. If the patient is at all off center, invalid vertical measures may result
 - C. The distance spherical equivalent (remove all cylinder)
- <A>

2. What is the recommended illumination is used?

- A. Standard room illumination with near point light directed at the target
 - B. Standard distance room illumination
 - C. Completely dark room
-

3. Which of these tests will NOT detect a vertical phoria in free space?

- A. Cover test
 - B. Maddox rod
 - C. Motilities
 - D. Vectographic chart
- <C>

4. What is the most appropriate target listed below to perform ALL of the #12?

- A. Isolated 20/30 letter
 - B. Full distance chart including a 20/20 row
 - C. 20/400 "E"
- <A>

5. What is the standard preset prism of this test ?

- A. 12 base in OD and 6 base up OS for the phoria; zero prism set in front of OS with the Risley removed from OD for the vertical fusional range
 - B. 6 base in OD and 12 base up OS for the phoria and vertical fusional range test
 - C. 12 base out OD and 6 base up OS for the phoria; zero prism set in front of OS and 12 base in front of OD for the vertical fusional range
- <A>

6. What is the endpoint and expected value of the phoria?

- A. Vertical alignment and hypophoria respectively
 - B. Horizontal alignment and orthophoria respectively
 - C. Horizontal alignment and hypophoria respectively
-

7. What are the main differences between #12 and #18?

- A. Testing distance, possibly the control lenses
 - B. Target size and testing distance
 - C. The biggest difference is the instruction set
-

8. According to the video clip what is the result for #12?

- A. 1-1 OS hypo with 1-(-2) supraduction and 1-(-2) infraduction
 - B. 0-0 OS ortho with 2-0 supraduction and 2-0 infraduction
 - C. 2-(-1) OS hypo with 3-1 supraduction and 2-0 infraduction
-

9. If the #12 indicated a vertical deviation, but Maddox rod or red lens does not indicate any vertical, what would be the most likely cause of the vertical in the phoropter?

- A. The patient is suppressing
 - B. The patient is not looking through the center of the control lenses
 - C. The patient has an intermittent vertical deviation
-

#13b: Induced Phoria at Near This test indicates the vergence posture at near through the #7a.]

1. What three items should be adjusted when changing from far to near tests?

- A. Pupillary distance, illumination, reading rod
 - B. Pupillary distance, prisms, illumination
 - C. Illumination, reading rod, phoropter height
- <A>

2. What is the #13b control lens for a pre-presbyope?

- A. #4 (static retinoscopy)
 - B. Distance refraction (clinically it is usually the #7a)
 - C. MSBVA results
-

3. What is the standard illumination setting for the induced lateral phoria at near test?

- A. Dim room illumination
- B. Standard room illumination and the near point lighting directed on the target
- C. Near point lighting pointing toward the back wall

4. What preset prisms are in place for the #13b?

- A. The neutralizing prisms indicated by the #8 (the distance correlate of the #13b)
- B. 12 prism base in OD; 6 prism base up OS
- C. 6 prism base in OD; 12 prism base up OS

5. What is the standard #13b target?

- A. Vertical line of 20/20 letters at near
- B. Horizontal line of 20/20 letters at near
- C. 20/30 "o" at near

<A>

6. If a patient cannot clear the target, what should the examiner do?

- A. Record an "X" in the #13b blank.
- B. Add plus binocularly from the #7a until the patient can just clear the letters. Record the lens used.
- C. Tell the patient to just look at the dark blob and indicate when the dark blobs line up.

7. Watch the video. What is this patient's #13b result?

- A. 3-3 esophoria
- B. 3-3 exophoria
- C. 0-0 orthophoria
- D. No result is obtained as shown on the video

<C>

8. Watch the video. What is this patient's #13b result?

- A. 2-2 eso
- B. 2- -2 eso
- C. 2-2 exo
- D. 2- -2 exo

<D>

9. According to the video, what is this patient's #13b result?

- A. 3 - 4 exophoria
- B. 4 - 2 esophoria
- C. 2 - 0 esophoria

<A>

#14a Dissociated Cross Cylinder at Near This test indicates the monocular accommodative posture, showing where each eye naturally tends to focus when attending a near target in the absence of a vergence demand.]

1. The recommended room illumination for the #14a is?

- A. Dim room illumination
- B. Dim room illumination with the near point light aimed at back wall
- C. Standard room illumination with the near point light aimed at back wall

2. The standard target used in the #14a is?

- A. 20/25 diamond acuity card
- B. Horizontal or vertical 20/20 line
- C. 90°/180° cross grid

<C>

3. The control lenses for the #14a are?

- A. The minimum plus to 20/20 lens with 6 base up OS (the prism may be evenly split between OD and OS Risley prisms)
- B. Cross-cylinder lenses with 6 base up OS (the prism may be evenly split between OD and OS Risley prisms)
- C. The #7a lens with 9 base up OS (the prism may be evenly split between OD and OS Risley prisms)

4. The standard preset lens for the #14a is?

- A. +2.00 diopters over the #7
- B. Midpoint of the #20 and #21 recoveries
- C. +2.00 diopters over the #4

<A>

5. How does the test proceed?

- A. Increase plus power while the patient reports which lines appear darker or more distinct
- B. Decrease prism power until alignment is achieved
- C. Decrease plus power while the patient reports which lines appear darker or more distinct

<C>

6. The endpoint of the #14a is?

- A. Alignment of targets
 - B. Last "equal" or first "horizontal" response if no "equals" were reported
 - C. First "equal" or last "vertical" response if no "equals" were reported
- <C>

7. With the cross grid card oriented 90°/180° at 40 cm, the first response of the patient is expected to be...?

- A. "Vertical"
 - B. "Horizontal"
 - C. It cannot be predicted. The test proceeds based on the patient's response
- <A>

8. The examiner in the video should record the #14a as ?

- A. OD and OS: +0.25 w/JCC
 - B. OD and OS: +0.50 w/JCC
 - C. OD and OS: +0.75 w/ JCC
-

9. The examiner in the video should record the #14a as?

- A. OD: -1.00 DS OS: -0.75 DS
 - B. OD: -1.00 DS OS: -1.00 DS
 - C. OD: -0.75 DS OS: -1.00 DS
- <A>

#15a: Lateral Phoria Through #14a Lens This test indicates the near vergence posture of the patient while accommodation is at its "natural" focusing posture for a near target.]

1. Before performing the #15a, the examiner needs to?

- A. Change the target to a single vertical 20/20 line on a reduced Snellen card
 - B. Shine the overhead light directly on the cross grid card
 - C. None of the above. Setup for the #15a is the same as the #14a regarding the illumination and target
- <C>

2. Instruction to the patient for the #15a includes?

A. "Look at the bottom target, tell me when the top grid lines up with the bottom grid."

B. "Look at the bottom target, try to keep it clear. Tell me when the top grid lines up with the

bottom grid."

C. "Look at the bottom target, try to keep the vertical lines clear. Tell me when the top grid lines up with the bottom grid."

<A>

#14b: Binocular Cross-Cylinder Test The purpose of this test is to measure the natural accommodative response when a near target is fused.]

1. What is the distance and illumination of the #14b test?

A. 6 meters and standard room illumination

B. 40 centimeters and bright illumination

C. 40 centimeters and dim illumination (overhead light toward the back wall)

<C>

2. What changes from the 14a will need to be made for the 14b?

A. None. The #14b uses the same lighting, target, etc.

B. Remove all prism

C. Remove the prisms and place the overhead light on the nearpoint card

3. What target is used for the #14b?

A. 20/20 line at near

B. 90°/180° cross grid

C. Diamond chart

4. What is the preset lens for the #14b test?

A. #14a endpoint

B. #7a

C. +1.00 diopters over the #7

<A>

5. What is the endpoint of the #14b?

A. First "equal" response or last "vertical" if no "equals" were reported

B. Last "equal" or first "horizontal" if no "equals" were reported

C. Last "vertical" response

6. What is the expected result of #14b?

- A. +2.25 diopters over the #7
 - B. +0.75 diopters over the #7
 - C. About +1.25 diopters over the #7
- <C>

7. Of the following choices, what is the most likely reason for a patient to initially indicate the horizontal lines are darker than the vertical lines?

- A. The patient does not understand the difference between horizontal and vertical
 - B. The patient is over minused in the #14a
 - C. The endpoint of the #14b may be equal to the #14a. You must increase plus until "vertical" is reported, then proceed with the test as usual
- <C>

8. If patient's #14b is more minus than the #7, what does this imply?

- A. The patient has a tendency to have an accommodative lead when attending a near target
 - B. The patient has a tendency to have an accommodative lag when attending a near target
 - C. The patient has a tendency toward esophoria at near
- <A>

9. Which of the following is NOT an accommodative posture test?

- A. Donders
 - B. MEM
 - C. #5
- <A>

10. According to the video clip, what should be recorded as the #14b?

- A. -0.50 diopter
 - B. -0.75 diopter
 - C. -1.00 diopter
- <C>

11. According to the video clip, what should be recorded for #14b?

- A. +1.50 diopter
 - B. +1.25 diopter
 - C. +1.00 diopter
-

#15b: Induced Lateral Phoria Through #14b Lens This test indicates the vergence posture of the patient when accommodation is at its' natural posture for a fused near target.]

1. What is the distance and illumination of the #15b?

- A. 33 centimeters and dim illumination
 - B. 40 centimeters and standard room illumination with the near point light directed on the target
 - C. 6 meters and standard room illumination
-

2. What are the necessary set up changes from the #14b to the #15b?

- A. Remove the ± 0.50 lenses, change the target, change the light, set up standard prism settings for a phoria
 - B. Change the target, change the light, set up standard prism settings for a phoria
 - C. Simply set standard prism setting for a phoria
- <A>

3. What is the standard target for the #15b?

- A. Vertical 20/20 line at near
 - B. Diamond card
 - C. Cross grid card
- <A>

4. What control lens is used for the #15b?

- A. #14b without the 0.50 diopter cross cylinder lens
 - B. #14b with the 0.50 diopter cross cylinder lens
 - C. #7 +2.00 diopters without the 0.50 diopter cross cylinder lens
- <A>

5. What prism preset is needed for the #15b?

- A. 12 base in OD with 6 base up OS
 - B. 12 base out OD with 6 base down OS
 - C. 6 base in OD with 12 base up OS
- <A>

6. What is the endpoint for the #15b?

- A. Horizontal alignment
 - B. Vertical alignment
 - C. No alignment necessary
-

7. What is the OEP expected for the #15b?

- A. 3 exophoria
 - B. 6 exophoria
 - C. 3 esophoria
-

8. Is the #15b expected to be more esophoric than the #13b?

- A. Yes
 - B. No
-

#16a: Base Out to Blur Out This test measures the amount of convergence a patient can exert before accommodation is influenced enough to blur out a near 20/20 target.]

1. The standard target size for the #16a test is?

- A. Horizontal row of 20/20 letters
 - B. Vertical row of 20/20 letters
 - C. The entire reduced Snellen chart, but the patient concentrates on the 20/20 line
-

2. The room illumination for the #16a test is?

- A. Dim room illumination
 - B. Standard room illumination
 - C. Standard room illumination with a near point lamp aimed at the target
- <C>

3. What is the most common control lens for this test for pre-presbyopic patients?

- A. #7a
 - B. 20/40 blur
 - C. MSBVA
- <A>

4. The OEP expected value for the #16a is?

- A. 10 prism diopters
 - B. 15 prism diopters
 - C. 23 prism diopters
-

5. For a presbyopic patient, which of the following is the most likely to be the control lens for this test?

- A. #7a
- B. #14b
- C. MSBVA

6. The #16a endpoint is recorded when?

- A. The patient can no longer resolve any of the 20/20 letters
- B. The patient can read only two-thirds of the 20/20 line
- C. The patient first notices any blur of the letters

<1>

7. The #16a test measures?

- A. Negative Relative Convergence
- B. Positive Fusional Reserve
- C. Positive Relative Convergence

<C>

8. In the video clip, the examiner would record the #16a finding as?

- A. 10
- B. 14
- C. 18

<A>

#16b: Base Out to Break and Recovery This test measures the total amount of convergence which the patient can exert to keep an image fused and the ease with which a doubled image is brought back into a single image at near.]

1. The preset prisms for this test are?

- A. The #13b neutralizing prism value
- B. The #16a endpoint prisms, although the prism change is continuous from the #16a into the #16b
- C. The Risley prisms reset at zero

2. The OEP expected finding for the #16b is?

- A. 21/15
- B. 10/30
- C. 15/10

<A>

3. The _____ is the difference between the #16a and the #16b?

- A. Negative Fusional Reserve
- B. Positive Fusional Reserve
- C. Positive Relative Convergence

4. How is accommodation changed by vergence as the base out prism is increasing during this test?

- A. It is increasing
- B. It is decreasing
- C. No real change for most patients

<A>

5. The recovery of #16b is the amount of prism that is recorded when the patient sees?

- A. Single
- B. Single AND clear
- C. Alignment

<A>

6. Viewing the video clip for the #16b, the examiner would record?

- A. 10/20
- B. 16/20
- C. 12/24

<C>

#17a: Base In to Blur Out This test measures the amount of divergence a patient can exert before accommodation is influenced enough to blur out a near 20/20 target.]

1. The preset prisms for this test are?

- A. The #13b neutralizing prism value
- B. The #16a endpoint
- C. The Risley prisms set at zero

<C>

2. The expected OEP value for this test is?

- A. 14
- B. 10
- C. 22

<A>

3. If the patient does not report a blur, what should you record?

- A. Leave it blank. No blur is expected unless the #7a is over minused
 - B. Repeat the test using a higher plus control lens
 - C. Record an "X" (no blur) in the #17a space
- <C>

4. The #17a test measures?

- A. Negative Relative Convergence
 - B. Negative Fusional Reserve
 - C. Positive Relative Convergence
- <A>

5. The #17a finding indicates the amount the patient can diverge at 40 centimeters and still be able to clear some 20/20 letters.

- A. True
 - B. False
 - C. This test measures vergence change, not clarity.
-

6. Watching the video, what should the patient record as the #17a finding?

- A. 10
 - B. 16
 - C. 20
- <A>

#17b: Base In to Break and Recovery This test measures the total amount of divergence which the patient can exert to keep an image fused and the ease with which a doubled image is brought back into a single image at near.]

1. The preset prism for the #17b is?

- A. The #13b neutralizing prism value
 - B. The #17a endpoint prisms, although the prism change is continuous from the #17a into the #17b
 - C. The Risley prisms reset at zero
-

2. The OEP expected values for the #17b are?

- A. 22/18
 - B. 18/22
 - C. 10/16
- <A>

3. The endpoints for the #17b are?

- A. The prism when the first blur noticed by the patient and the prism when the image is clear again
 - B. The prism when the patient see diplopia and the prism when the patient sees the diplopic image fuse again
 - C. The average prism value of the break and recovery
-

4. The difference between the #17a and #17b findings give the?

- A. Negative Fusional Reserve
 - B. Positive Fusional Reserve
 - C. Negative Relative Convergence
- <A>

5. How is accommodation changed by vergence as the base in prism is increasing during this test?

- A. It is increasing
 - B. It is decreasing
 - C. No real change for most patients
-

6. For the #17b finding in the video clip, the examiner would record?

- A. 18/12
 - B. 20/10
 - C. 22/30
- <A>

#18: Vertical Phoria and Vertical Fusional Ranges at Near This test measures the vertical aiming tendencies at near and the fusional ranges around this tendency.]

1. At what distance is this test performed?

- A. 40 centimeters
 - B. 6 meters
 - C. 33 centimeters
- <A>

2. What is the recommended illumination used?

- A. Standard room illumination with near point light directed on target
 - B. Standard room illumination for distance
 - C. Dark room
- <A>

3. What is the standard target for this test?

- A. Horizontal 20/20 line at near
- B. Vertical 20/20 line at near
- C. Reduced Snellen 20/40 line
- D. Isolated 20/30 letter at near

<A>

4. What are typical preset lenses and prisms for these tests on a pre-presbyopic patient?

- A. #7a with 12 base in OD and 6 base up OS
- B. #7a with 6 base in OD and 12 base down OS
- C. #7a with 6 base in OD and 12 base down OS

<A>

5. What is the endpoint for this test?

- A. Horizontal alignment
- B. Vertical alignment
- C. No alignment necessary

<A>

6. If a vertical phoria is noticed in the phoropter, what should the examiner do?

- A. Confirm its presence with supra- and infraduction tests
- B. Confirm its presence with the #12 results
- C. Confirm its presence with free space tests while the patient has NO lenses in place

<C>

7. What is expected of the vertical fusional range values compared to the vertical phoria measure?

- A. They typically show greater values on supraduction than on infraduction
- B. They should evenly bracket the vertical phoria measure
- C. They are not typically related to the vertical phoria

8. According to the video clip what is the result of #18?

- A. 2-(-1) OS hypo with 3-1 supraduction and 2-0 infraduction
- B. Ortho and 0-0 supraduction and 0-0 infraduction
- C. Ortho and 2-2 supraduction and 0-0 infraduction

<A>

#19: Analytical Amplitude This test determines the accommodative amplitude by using minus lenses at near.]

1. The standard test distance is?

- A. 33 cm
 - B. 40 cm
 - C. 50 cm
- <A>

2. What is the target for this test?

- A. 0.40M paragraph
 - B. 0.62M paragraph
 - C. 0.52M paragraph
 - D. 1.0M paragraph
-

3. A typical convenient preset lens is?

- A. #7a lens
 - B. Habitual near prescription
 - C. Maximum plus to 20/20
- <A>

4. The endpoint of the test is when the patient reports?

- A. The words are getting smaller in size
 - B. The words are completely unreadable
 - C. First sustained blur or discomfort
- <C>

5. The paragraph the patient reads is from...?

- A. Jane Austin's "Sense and Sensibility"
 - B. Mr. Toad's Wild Ride
 - C. Benjamin Franklin's autobiography
 - D. A student thesis project
- <C>

6. The video shows the lens left in the phoropter at the endpoint of the #19. According to the video, how should the gross #19 OU findings be recorded?

- A. -4.25 diopters
 - B. -3.75 diopters
 - C. -4.25 / -3.75
- <A>

7. The video shows the lens left in the phoropter at the endpoint of the #19.

Given the following information:

#7: OU sphere:-0.25 diopters

#7a: OU sphere:-0.75 diopters

Near control: #7

Dominate eye: right eye

The net #19 OU is?

A. 2.50 diopters

B. 1.50 diopters

C. 6.00 diopters

<C>

8. The video shows the lens left in the phoropter at the endpoint of the #19.

Given the following information:

#7: OD sphere: plano

OS sphere: +1.25 diopters

#7a: OD sphere:-0.50 diopters

OS sphere: +0.75 diopters

Near control #7a

Dominate eye: right eye

The net #19 OU is:?

A. 1.50 diopters

B. 1.00 diopters

C. 3.50 diopters

<A>

#20: Positive Relative Accommodation The purpose of this test is to find the amount of accommodation the patient can exert in order to keep a 20/20 line at 40 centimeters clear.]

1. What is the distance and illumination for this test?

A. 33 centimeters and standard illumination with near point light directed on the target

B. 40 centimeters and standard illumination with near point light directed on the target

C. 6 meters and dim illumination

2. Which of the following is MOST true?

A. This test is to be performed monocularly

B. This test is to be performed binocularly

C. This test is to be performed both monocularly and binocularly

<C>

3. What is the standard target for this test?

- A. Diamond card
- B. 20/20 reduced Snellen line
- C. Cross grid

4. What is the preset lens for this test?

- A. #14b
- B. #7a
- C. Either a or b are acceptable

<C>

5. What are the endpoints of this test?

- A. First blur and recovery of the 20/20 line
- B. Blur out and recovery of the 20/20 line
- C. 2.00 diopters more plus than the preset lens

6. What is the expected result for this test?

- A. -2.50D from #7a
- B. -2.00D net from #7a
- C. +2.00D net from #7a

7. If the patient reports diplopia during this test, what should the examiner do?

- A. Continue until the doubled images are both blurry
- B Stop and record this lens value and write "diplopia" next to the finding
- C. Record the last lens power that did NOT result in diplopia

8. Given the following information: #7a: OD: +0.50 - 1.75 X 180
OS: +0.25 - 3.00 X 002

what is the #20 net relative to the #7a?

- A. -1.50
- B. -2.00
- C. -1.75
- D. +2.00

21: Negative Relative Accommodation The purpose of this test is to find the amount of accommodation the patient can relax in order to keep a 20/20 line at 40 centimeters clear.]

1. The recommended room illumination for this test is?

- A. Standard room illumination with near point light aimed at back wall
- B. Standard room illumination with near point light aimed at target
- C. Dim room illumination with near point light aimed at target

2. Standard target used is?

- A. Horizontal 20/30 reduced Snellen line
- B. Vertical 20/25 reduced Snellen line
- C. Horizontal 20/20 reduced Snellen line

<C>

3. A typical preset lens for this test is?

- A. #7a lens
- B. #20 recovery lens
- C. Maximum plus to 20/20 lens

<A>

4. While plus is increasing, what is required of vergence to keep the image single?

- A. Increasing convergence effort
- B. Increasing divergence effort
- C. Vergence should not be significantly involved in this test.

<A>

5. If the #21 binocular is limited compared to the monocular results, which of the following is most likely also reduced?

- A. #11 finding
- B. #17b finding
- C. #16b finding

<C>

6. If the endpoints of this test are 3.50 diopters more plus than the #7a, what can be said?

- A. Divergence training is indicated.
- B. Distance refraction results have incorrect cylinder.
- C. The #7a is overminused.

<C>

7. According to the video, the examiner should record results for OU as?

- A. -1.50 - -1.75
 - B. -1.50 / -1.75
 - C. -1.50, -1.75
-

8. Given the following information:

#4: OD and OS:-4.00-0.25x180

#7: OD and OS:-3.50 diopters sphere

#7a: OD and OS:-4.25 diopters sphere

Near control :#7a

The OU net #21 finding for the patient in question #7 is?

- A. +2.50 diopters
 - B. +2.25 diopters
 - C. +1.75 diopters
- <C>

7an: "Oh, Boy" lens or "Best Subjective at Near" This test subjectively determines the lens which provides the most "comfortable and/or clear" vision at 40 centimeters.]

1. The recommended room illumination for this test is?

- A. Dim room illumination with the near point light aimed at target
 - B. Standard room illumination with the near point light aimed at back wall
 - C. Standard room illumination with the near point light aimed at target
- <C>

2. In choosing the starting lens to begin a forced choice bracketing process, a reasonable starting lens could be?

- A. # 14b
 - B. Midpoint of #20 and #21 recoveries
 - C. #7
 - D. All of the above could be reasonable lenses
- <D.>

3. The endpoint of the test is?

- A. When the patient notes first sustained blur
 - B. When the patient consistently "brackets" forced choices to a single lens or a small range of lenses
 - C. When the patient first indicates that the letters are clear
-

4. If the patient wants more minus on the forced choice, the examiner should stop at the _____ finding?

- A. # 7
 - B. # 4
 - C. # 7a
- <C>

5. The target generally used is?

- A. 62M Type
 - B. Horizontal 20/20 line
 - C. 70M Type
-

6. The test distance is typically...?

- A. The patient's reading distance
 - B. 40 centimeters
 - C. 33 centimeters
-

7. The near subjective is only useful on presbyopes. True or False?

- A. True
 - B. False
-

8. The patient is a 85 year old male. What lens combination would you expect this patient to most likely prefer?

- A. 1.50 more plus than the #7a
 - B. 2.00 more plus than the #7a
 - C. 2.50 more plus than the #7a
- <C>

9. Given the following information:

38 year old female, unremarkable ocular health

#7: OD and OS: 1.00-0.50x180

#7a OD and OS: -1.50-0.50x180

If the patient chooses the lens combination as shown in the video to be the most "comfortable" for viewing the target at 40 centimeters, what would the patient's add power be?

- A. +0.50 add
 - B. +1.00 add
 - C. +1.50 add
-

10. Is this amount of add typical for this patient in question #9?

A. Yes

B. No

<A>

11. Given the following information:

35 year old male, unremarkable ocular health

#7: OD and OS: +0.75-0.50x160

#7a: OD and OS: +0.50-0.50x160

If the patient chooses the lens combination as shown in the video to be the most "comfortable" for viewing the target at 40 centimeters, what would the patient's add power be?

A. +3.00 add

B. +2.75 add

C. +2.00 add

12. Is this amount of add typical for patient in question #11?

A. Yes

B. No

13. Given the following information:

70 year old female, unremarkable ocular health

#7: OD and OS: +1.50-0.50x090

#7a OD and OS: +1.00-0.50x090

If the patient chooses the lens combination as shown in the video to be the most "comfortable" for viewing the target at 40 centimeters, what would the patient's add power be?

A. +3.50 add

B. +3.00 add

C. +2.50 add

D. +4.00 add

<C>

14. Is this amount reasonable for patient in question #13?

A. Yes

B. No

<A>