

Practice Item Guide

Virginia Standards of Learning

End of Course Algebra II

Revised March, 2011
Pearson

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OVERVIEW

Items measuring the new 2009 *Mathematics Standards of Learning* (SOL) will be field-tested in spring 2011 and will become operational in the 2011-2012 school year. In preparation for the implementation of items measuring the content in the 2009 Mathematics SOL, practice items are being provided to school divisions. These practice items provide examples of the new content and increased rigor represented by the 2009 SOL and illustrate the new Technology-Enhanced Item (TEI) types. Technology-Enhanced Items are items which are presented in various formats that allow students to indicate their responses in ways other than multiple-choice format.

Please note that the practice items are not intended to be a complete test and are not intended to cover all mathematics content for the grade level or course. Furthermore, while the practice items provide examples of some TEI, they are not intended to represent all types of functionality associated with these item types.

Students will have the opportunity to practice these items via an online electronic Practice Assessment Tool (ePAT). The ePAT is a stand-alone program that simulates an online SOL assessment without requiring an internet connection. Except for the process of entering appropriate authentication information (login ID, password, test code), the ePAT application will closely simulate the TestNav™ SOL assessment experience. This practice guide may be used by teachers or other adults to guide students through the practice items for End of Course Algebra II. While the use of this guide with the practice items is not required, it is strongly encouraged, as it will help to ensure that students are familiar with the types of items that they may encounter.

Prior to guiding students through the practice items, carefully read this practice item guide and review the practice items to become familiar with them. All directions that must be read aloud to the students are in **bold Arial font** so that they stand out from the rest of the text. All other text is for your information and should not be read to students.

When the student is finished with the practice item set, the student may close it by clicking *Save and Exit* or *Submit* on the bottom of the Item Review screen. Both buttons will produce a series of prompts to close the application. Directions read aloud to the students will tell them to use the *Submit* button. The practice items will not be scored; however, the correct answers are provided in this guide with each question.

NEW TECHNOLOGY-ENHANCED ITEM TYPES

The SOL practice items for End of Course Algebra II will introduce four new Technology-Enhanced Item types: drag and drop, hot spot, short response, and graphs. A brief description of each is provided.

Drag and Drop

Drag and drop items contain draggers and drop zones.

- Draggers are the answer options that are moved to drop zones in response to the question.
- Drop zones are areas of an item where draggers will remain once moved there.

Drag and drop items require a student to respond by moving one or more draggers from one place on the screen into a drop zone(s) elsewhere on the screen.

The student will click on the dragger and keep the button down while moving the dragger to the desired location. Once the button is released, the dragger will be in the new location.

Hot Spot

Hot spot items contain hot spot zones which represent student answer options.

- Hot spot zones are answer options which may be objects, graphic elements, or text labels which are selected in response to a question.
- **Unlike a traditional multiple-choice item where only one answer option is correct, hot spot items will require the student to select one or more hot spot zones (answer options) in order to correctly answer the item.**

The student selects a hot spot by clicking on it. There will be an indication on the screen, such as the zone being outlined in orange or a red star, which confirms that a hot spot zone has been selected.

Short Response

Short response items contain a text entry field. For this item type, the student responds to a question by typing a response into a blank box that is provided in the item.

- Some response boxes may limit the characters that can be entered. For instance, if the response is expected to be numeric, the student will not be able to enter letters.
- A response typically is no more than six characters long.
- Students should carefully follow directions on short response items, such as providing an answer in simplest form, or rounding a number as indicated.

Graphs

Graphing items require students to create or complete some type of graph. The graphs presented will vary by grade or course level. Bar graph items allow students to set the height or length of a bar. The student's response is indicated by the height or length of the bar(s) in relation to the image/graph. If the orientation of the bar is vertical, the student can click above or below a location to change the height of the bar. If the orientation of the bar is horizontal, the student can click to the left or right of a location to shorten or lengthen the bar. The bar will move to the location where the student clicks.

Some items require the student to graph point(s) on a line, grid, or image. The student's response is the location of the point(s) in relation to the line, grid, or image. These types of items may include graphing points on a number line, graphing ordered pairs on a grid, or graphing inequalities.

INSTALLING THE ePAT LAUNCHER

If the computer being used to take the SOL practice item set already has the ePAT Launcher installed, please proceed to page 8. For computers without the ePAT Launcher previously installed or if you are unsure whether the ePAT launcher has been installed, continue with the steps below. Work with your technology staff in your school division if you are unable to install software on a computer in your school. Administrative access to the computer may be needed. Further instructions for installing the ePAT Launcher can be found under the “Resources” tab on the PearsonAccess website listed in step 1.

1. Go to the Virginia PearsonAccess website:
<http://www.pearsonaccess.com/cs/Satellite?c=Page&childpagename=Virginia/vaPALPLLayout&cid=1175826755281&pagename=vaPALPWrapper>
2. Under the “ePAT Launcher” heading, click the “Install Launcher (Windows)” or “Install Launcher (Mac Intel)” link depending on the type of computer workstation being used.

**Practice Assessment Tools**
ePat Launcher
Make sure you download and install the ePat Launcher before using the tools listed below.

- [Install Launcher \(Windows\)](#)

OR

**Practice Assessment Tools**
ePat Launcher
Make sure you download and install the ePat Launcher before using the tools listed below.

- [Install Launcher \(Mac Intel\)](#)

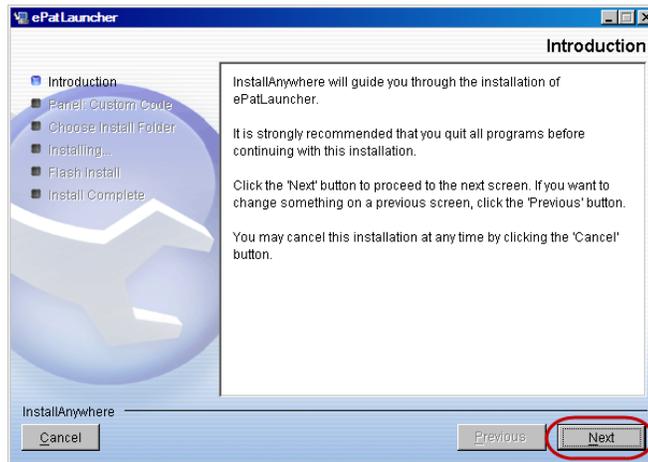
3. Click “Run” to continue. The file will start to download.



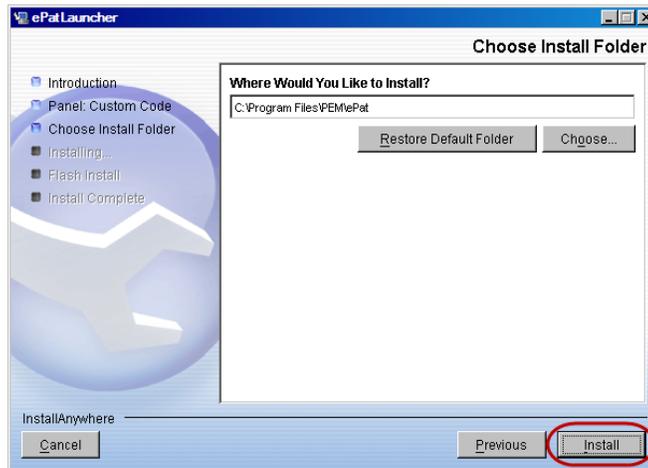
4. When the download is complete, click “Run” to continue.



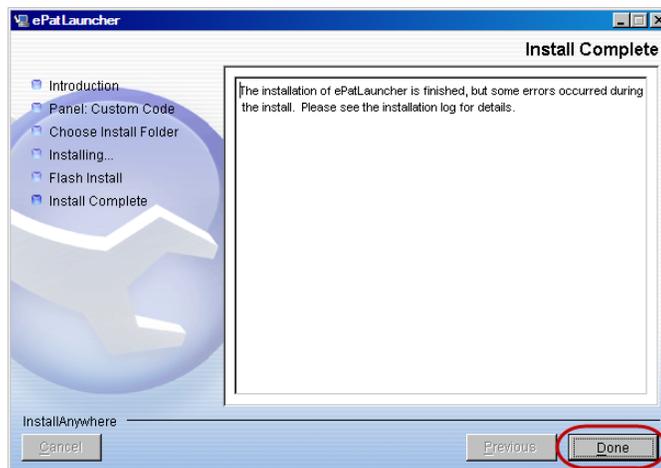
5. The ePAT Launcher installation will begin. Click “Next” to continue.



6. Choose an install folder and then click “Install” to continue.



7. The installation begins. When the install is complete, click “Done.”



DOWNLOADING VASOL MATH PRACTICE ITEMS

1. Go to the Virginia Department of Education website:
<http://www.doe.virginia.gov/instruction/mathematics/resources.shtml>
2. Under the heading “Standards of Learning Assessment Resources” click on “SOL Practice Items and Practice Item Guides.”
3. Click on the specific practice item set you wish to download. Download the items compatible with your computer’s operating system.
4. Click “Run” to continue. The file will start to download.
5. When the download is complete, click “Run” to continue.
6. The ePAT installation will begin. Click “Next” to continue.
7. Choose an install folder and then click “Install” to continue.
8. The installation will begin. When the install is complete, click “Done.”
9. If you wish to download additional practice items, return to step 2 above.

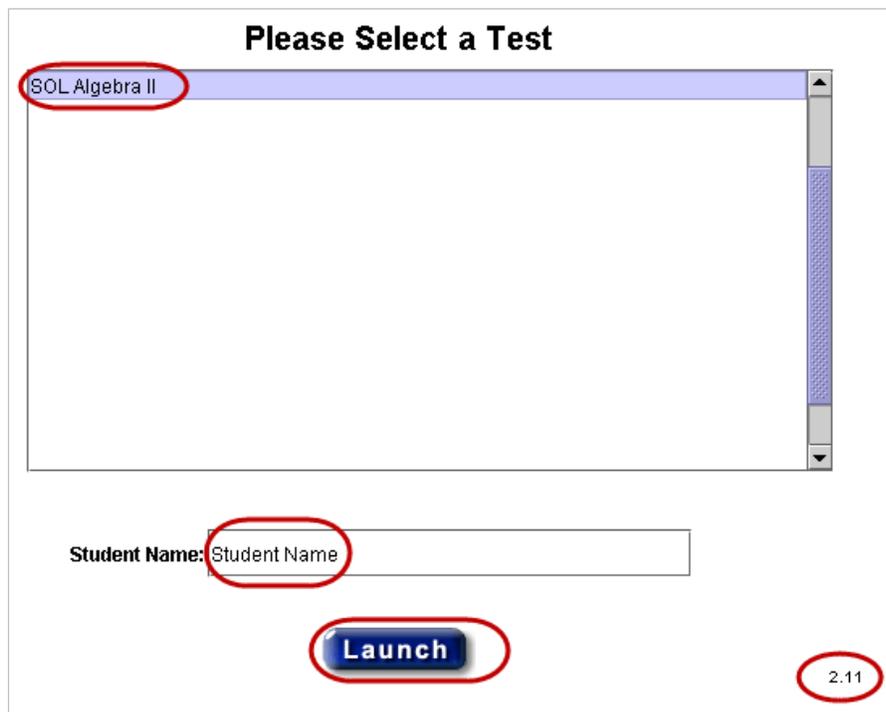
START THE ePAT LAUNCHER

Desktop Icon

1. Double-click the ePAT Launcher icon on the workstation desktop to start the program.



2. Check the version number in the bottom right corner of the screen. If the version number is anything other than 2.11, you will need to install the latest version of the ePAT Launcher. Refer to the “INSTALLING THE ePAT LAUNCHER” section on page 5 for instructions on how to do this.
3. Click the “SOL Algebra II” practice item set to highlight it.
4. Complete the Student Name field.
5. Click the “Launch” button.
6. Go to the appropriate section in this guide for the practice item set directions.



MATERIALS NEEDED FOR COMPLETING VASOL PRACTICE ITEMS

End of Course Algebra II: Scratch paper, pencil and hand-held graphing calculator.

ONLINE TOOLS AVAILABLE FOR COMPLETING ITEMS

Eliminate Choice – Use the eliminate choice tool to mark choices that you do not wish to consider.

Highlighter – Use the highlighter tool to highlight text or graphics.

Straightedge – Use the straightedge tool to draw straight lines.

Eraser – Use the eraser to remove lines or highlights.

Ruler – Use the ruler tool to measure something on screen.

Exhibits – Use the Exhibits tool to access the Algebra II Formula Sheet and the z-table.

Additional information and demonstrations of each tool on the toolbar can be found by clicking the  question mark symbol located at the top of the ePAT screen. To display help on a specific tool, click the tool name in the drop-down list.

SPECIFIC DIRECTIONS FOR THE SOL END OF COURSE ALGEBRA II PRACTICE ITEMS

Introduction

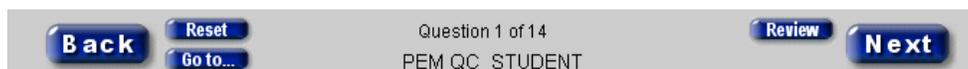
After the practice items are launched, the first practice item will be displayed. Read the following instructions to the students.

SAY Today you will be working on some End of Course Algebra II practice items for the Virginia Standards of Learning assessment. There are 14 questions that will show you some of the types of test items that will be administered as part of the new mathematics assessments. Listen carefully as I read the directions for these practice items. I will guide you through each item one at a time. Some questions will be multiple choice and some questions will require you to show your answer in another way, such as typing your answer in a box or clicking and dragging your answer to a specific location. Please remember that the questions you will see are practice questions. They will not be scored, but I will tell you the answer for each question.

Do you have any questions before we start?

Pause to answer questions.

SAY Navigation buttons appear at the bottom of the screen for each question. If you do not see the navigation buttons, you need to scroll down to reveal them. A scroll bar will appear on the right side of the window. Notice that the question numbers are also located at the bottom of the screen. For example, the screen with the first question reads “Question 1 of 14.”



SAY Notice the buttons located at the bottom of the screen.

Pause to review the buttons in the chart below with the students.

Button	Purpose
<i>Next</i>	Goes to the next screen
<i>Back</i>	Goes back a screen
<i>Reset</i>	Clears your answer choice
<i>Review</i>	Marks the question so you can go back and look at it again
<i>Go To</i>	Goes to a review screen

SAY At any time during the administration of the practice items, you may click on the **Review** button located at the bottom of the screen to select that question to review later. When you reach the end of the practice items, there will be a review screen. It will show you which questions you have not answered and which questions you have marked for review.

Look at question 1 on your screen.

Check to see that the students are looking at the first question.

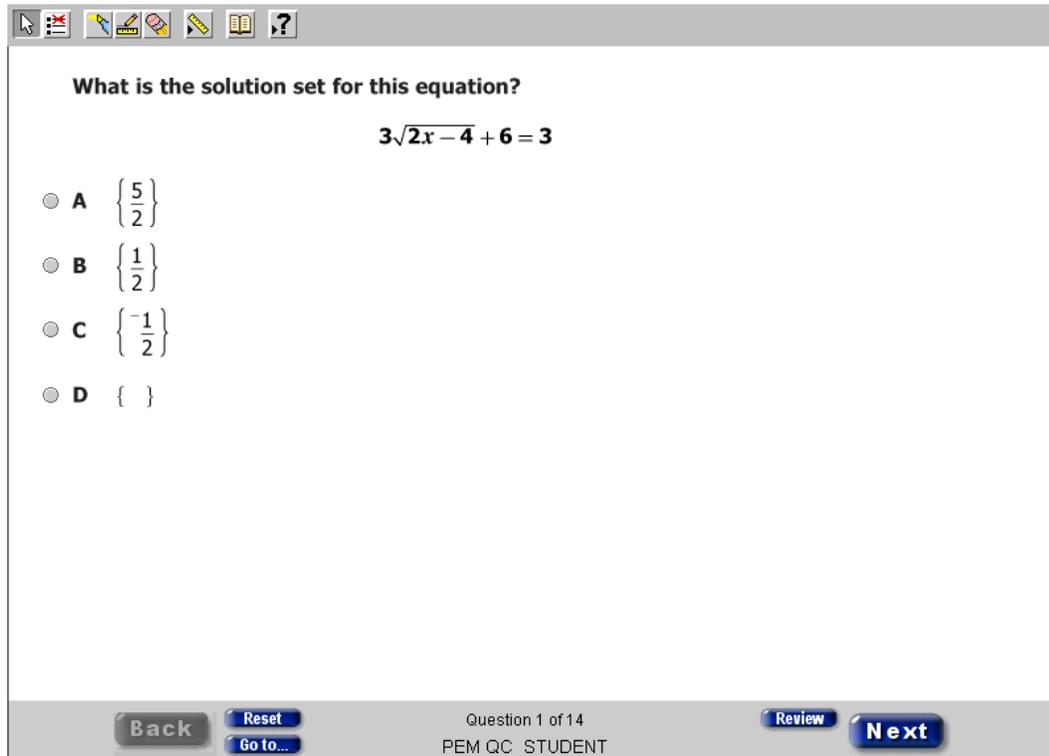
SAY Some of the tools you can use are in the toolbar at the top of the screen. Information about each tool on the toolbar is available by clicking the question mark symbol (). Click on the question mark symbol now. To display help on a specific tool, click the tool name in the drop-down list. Take a moment to click on the different tools. You will have an opportunity to use these tools while you work through the practice items.

Pause while students explore the tools on the toolbar. Offer assistance, as needed.

SAY Read question 1 to yourself.

If a student’s IEP provides for a read-aloud accommodation, then all questions should be read to the student.

Pause while students read the question.



What is the solution set for this equation?

$$3\sqrt{2x-4} + 6 = 3$$

A $\left\{ \frac{5}{2} \right\}$
 B $\left\{ \frac{1}{2} \right\}$
 C $\left\{ -\frac{1}{2} \right\}$
 D $\{ \}$

Question 1 of 14
PEM QC STUDENT

SAY Decide which answer is correct. At the top of the toolbar, click on the second button, the one with the red X (). This is called the eliminate choice tool. Selecting this tool will change your cursor to an arrow with a red X next to it. You can use this tool to eliminate as many choices as you want. To eliminate an answer, click the choice you believe is not correct.

Pause while students practice using this tool.

The screenshot shows a digital math test interface. At the top, there is a toolbar with icons for navigation and editing. The main question asks for the solution set of the equation $3\sqrt{2x-4} + 6 = 3$. Four multiple-choice options are listed: A: $\left\{\frac{5}{2}\right\}$, B: $\left\{\frac{1}{2}\right\}$, C: $\left\{-\frac{1}{2}\right\}$, and D: $\{\}$. Option A is circled in red with a large red 'X' over it, indicating it has been eliminated. A mouse cursor is positioned over the 'X'. At the bottom, there are navigation buttons: 'Back', 'Reset', 'Go to...', 'Review', and 'Next'. The text 'Question 1 of 14' and 'PEM QC STUDENT' is also visible.

SAY Click the eliminate choice tool icon again to put the tool away.

Wait for students to put the tool away.

SAY If you eliminate a choice and then change your mind, use the eraser tool () on the toolbar to erase a red X. Click on the eraser tool and practice using it to remove a red X.

Pause while students practice using this tool.

What is the solution set for this equation?

$$3\sqrt{2x-4} + 6 = 3$$

A $\left\{\frac{5}{2}\right\}$
 B $\left\{\frac{1}{2}\right\}$
 C $\left\{-\frac{1}{2}\right\}$
 D $\{\}$

Question 1 of 14
PEM QC STUDENT

SAY Click on the eraser tool icon to put it away. Now click on the answer you have chosen.

Pause while students work to find the answer to the question.

SAY Which answer did you choose?

Pause for replies.

SAY The correct answer is D, the empty set. Click on the circle next to choice D to select this as your answer.

Do you have any questions about how to select an answer, use the eliminate choice tool, or use the eraser?

Answer questions about how to click to select an answer or use the tools. Since these are practice items, it is acceptable to give assistance or discuss how to find the correct answer to any question.

SAY Click *Next* at the bottom of the screen to continue to the next question.

Wait for students to click *Next*. Check to see that the students are looking at the correct question.

SAY Read question 2 to yourself.

Pause while students read the question.

The screenshot shows a digital math practice interface. At the top, there is a toolbar with icons for a mouse cursor, a list, a highlighter, an eraser, a pencil, a calculator, a document, and a help icon. Below the toolbar, the question text reads: "What are the y-coordinates for the solutions to this system of equations?". The system of equations is displayed as:

$$\begin{cases} x^2 + 6x + 3y + 6 = 0 \\ x + y + 20 = 0 \end{cases}$$

Below the equations are four multiple-choice options, each with a radio button:

- A $y = -9$ and $y = 6$
- B $y = -20$ and $y = -2$
- C $y = -26$ and $y = -11$
- D $y = -27$ and $y = -18$

At the bottom of the interface, there are navigation buttons: "Back", "Reset", "Go to...", "Review", and "Next". In the center, it says "Question 2 of 14" and "PEM QC STUDENT".

SAY You can use the highlighter tool on the toolbar to highlight text. To select this tool, click the icon that looks like a yellow highlighter (). Selecting the highlighter tool will change your cursor to an arrow with a highlighter next to it. Practice using the highlighter by highlighting the key word “y-coordinates” in the question. Click again on the highlighter tool on the toolbar to put the tool away.

Determine which graph is the best answer. Then click on the answer you have chosen.

Pause while students practice using the highlighter tool and work to find the answer to the question.

The screenshot shows a digital test interface. At the top, there is a toolbar with various icons, including a highlighter icon that is circled in red. Below the toolbar, the question text reads: "What are the **y-coordinates** for the solutions to this system of equations?". The word "y-coordinates" is highlighted in yellow. To the right of the text is a blue highlighter icon. Below the text is a system of equations:
$$\begin{cases} x^2 + 6x + 3y + 6 = 0 \\ x + y + 20 = 0 \end{cases}$$
 Below the equations are four multiple-choice options, each with a radio button:

- A $y = -9$ and $y = 6$
- B $y = -20$ and $y = -2$
- C $y = -26$ and $y = -11$
- D $y = -27$ and $y = -18$

 At the bottom of the interface, there are navigation buttons: "Back", "Reset", "Go to...", "Question 2 of 14", "PEM QC STUDENT", "Review", and "Next".

SAY Which answer did you choose?

Pause for replies.

SAY The correct answer is C, $y = -26$ and $y = -11$. Do you have any questions about selecting the correct answer or using the highlighter tool?

Answer all questions.

SAY Click *Next* at the bottom of the screen to continue to the next question.

Wait for students to click *Next*. Check to see that the students are looking at the correct question.

SAY Read question 3 to yourself.

Pause while students read the question.

Which function is best represented by this graph?

A $f(x) = \frac{8}{x+3}$
 B $f(x) = \frac{8}{x-3}$
 C $f(x) = \frac{x+1}{x+3}$
 D $f(x) = \frac{x+1}{x-3}$

[Back](#) [Reset](#) [Go to...](#) Question 3 of 14 [Review](#) [Next](#)
 PEM QC STUDENT

SAY Determine which answer is correct. Click on the answer you have chosen.

Pause while students work to find the answer to the question and click on their response.

SAY Which answer did you choose?

Pause for replies.

SAY The correct answer is B, $f(x) = \frac{8}{x-3}$. Do you have any questions?

Answer all questions.

SAY Click *Next* at the bottom of the screen to continue to the next question.

Wait for students to click *Next*. Check to see that the students are looking at the correct question.

SAY Read question 4 to yourself.

Pause while students read the question.

The graph of $g(x) = \frac{x+1}{x}$ has —

- A two x -intercepts and no y -intercept
- B two x -intercepts and one y -intercept
- C one x -intercept and no y -intercept
- D one x -intercept and one y -intercept

Question 4 of 14
PEM QC STUDENT

Buttons: Back, Reset, Go to..., Review, Next

SAY Determine which answer is correct. Click on the answer you have chosen. You may use the tools we have practiced: the eliminate choice, eraser, and highlighter.

Pause while students work to find the answer to the question.

SAY Which answer did you choose?

Pause for replies.

SAY The correct answer is C, one x -intercept and no y -intercept. Do you have any questions?

Answer all questions.

SAY Click *Next* at the bottom of the screen to continue to the next question.

Wait for students to click *Next*. Check to see that the students are looking at the correct question.

SAY Read question 5 to yourself.

Pause while students read the question.

Which of the following describes the end behavior of $h(x) = \frac{x-6}{x^2}$ as x approaches negative infinity?

- A y approaches negative infinity
- B y approaches -6
- C y approaches -1
- D y approaches 0

Question 5 of 14
PEM QC STUDENT

SAY Determine which answer is correct. Click on the answer you have chosen.

Pause while students work to find the answer to the question.

SAY Which answer did you choose?

Pause for replies.

SAY The correct answer is D, y approaches 0. Do you have any questions?

Answer all questions.

SAY Click *Next* at the bottom of the screen to continue to the next question.

Wait for students to click *Next*. Check to see that the students are looking at the correct question.

SAY Read question 6 to yourself.

Pause while students read the question.

The amount of lost revenue from tickets not sold for a concert is shown in the table. The ticket prices include tax.

Lost Revenue From Tickets Not Sold

Price per Ticket (x)	\$25	\$35	\$55	\$125
Number of Tickets Not Sold	84	80	92	323
Amount of Lost Revenue (y)	\$2,100	\$2,800	\$5,060	\$40,325

Which equation best models the relationship between y , the amount of lost revenue, and x , the price per ticket?

A $y = 1,218(1.01)^x$
 B $y = 997(1.03)^x$
 C $y = 400x - 11,570$
 D $y = 156x - 10,000$

Back Reset Go to... Question 6 of 14 Review Next
 PEM QC STUDENT

SAY Determine which answer is correct. Click on the answer you have chosen.

Pause while students work to find the answer to the question.

SAY Which answer did you choose?

Pause for replies.

SAY The correct answer is B, $y = 997(1.03)^x$. Do you have any questions?

Answer all questions.

SAY Click *Next* at the bottom of the screen to continue to the next question.

Wait for students to click *Next*. Check to see that the students are looking at the correct question.

SAY Read question 7 to yourself. As you are reading question 7, notice that it contains a formula box. Click on the Exhibit tool () on the tool bar to see the Algebra II formula sheet, which is found on the tab labeled “Formulas.”

The formula in the box is not on this formula sheet. Any formulas that you may need to solve a problem, which are not on the formula sheet, will be provided in a formula box. Some items will be presented this way in the new mathematics tests.

This particular formula box gives you one formula, while other items may have a box that contains more than one formula. Sometimes you will not need all of the information or formulas provided within the box, and will have to choose which information is useful in order to solve a problem.

The “Given” defines some variables that are not used in this particular formula.

SAY Now click on the two tabs that say “Table.” These tabs show page 1 and page 2 of a z-table that is available for your use. You may leave this tool open if you need to use the z-table to solve this problem, or you may click on the X in the upper right corner of the Exhibit window to put the tool away.

Now decide which is the correct answer for this problem, and click on your answer.

Pause while students work to find the answer to the question.

A normally distributed set of 968 values has a mean of 108 and a standard deviation of 11. Which is closest to the number of values expected to be above 125 ?

Given:

- x represents an element of the data set,
- x_i represents the i^{th} element of the data set,
- n represents the number of elements in the data set,
- μ represents the mean of the data set, and
- σ represents the standard deviation of the data set.

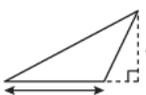
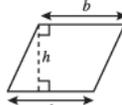
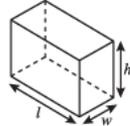
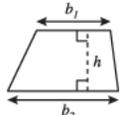
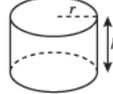
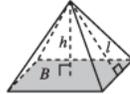
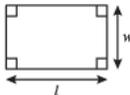
$$\text{z-score } (z) = \frac{x - \mu}{\sigma}$$

910 Exhibit Window

Formulas Table Table

Algebra II Formula Sheet

Geometric Formulas

 $A = \frac{1}{2}bh$	 $A = bh$	 $V = lwh$ $S.A. = 2(lw + lh + wh)$	 $V = \frac{1}{3}\pi r^2h$ $S.A. = \pi r(l + r)$
 $p = 4s$ $A = s^2$	 $A = \frac{1}{2}h(b_1 + b_2)$	 $V = \pi r^2h$ $S.A. = 2\pi r(h + r)$	 $V = \frac{1}{3}Bh$ $S.A. = \frac{1}{2}lp + B$
 $p = 2(l + w)$ $A = lw$	 $C = 2\pi r$ $A = \pi r^2$	 $c^2 = a^2 + b^2$	

Abbreviations Pi

SAY Which answer did you choose?

Pause for replies.

SAY The correct answer is D, 59. Do you have any questions on how to use the Exhibit tool?

Answer all questions.

SAY Click *Next* at the bottom of the screen to continue to the next question.

Wait for students to click *Next*. Check to see that the students are looking at the correct question.

SAY Let's read question 8 together. The question is located on the left side of your screen. Question 8 states, "The steps used to simplify an expression are shown. Identify the missing property that justifies each step."

Notice that question 8 is not a traditional multiple-choice item, but one that will require you to click and drag your answer choices to the empty boxes to justify the steps used to simplify the expression.

A directions box is on the right side of your screen. The directions box contains information on how to answer the question and may give you specific information on how to represent your answer. Always read the directions in the directions box before solving the problem.

The answer choices are located inside the dark gray box on the right side of the screen.

The screenshot shows a digital math interface. At the top left, there is a toolbar with icons for a mouse, a list, a pencil, an eraser, a highlighter, a text box, and a question mark. The main content area is divided into two sections. On the left, there is a table with two columns: "Steps" and "Justification". The table contains five rows of algebraic expressions and their corresponding justifications. The first row is "5i + 4(6 + 3i)" with "Given Expression". The second row is "5i + 24 + 12i" with an empty box. The third row is "24 + 5i + 12i" with an empty box. The fourth row is "24 + (5i + 12i)" with an empty box. The fifth row is "24 + 17i" with "Substitution Property". To the right of the table is a directions box that says "Directions: Click and drag each selected property to the correct box." Below the directions box is a dark gray box containing six property choices: "Associative Property of Addition", "Distributive Property", "Closure Property of Addition", "Identity Property of Addition", "Commutative Property of Addition", and "Inverse Property of Addition". At the bottom of the interface, there is a navigation bar with buttons for "Back", "Reset", "Go to...", "Question 8 of 14", "Review", and "Next". The text "PEM QC STUDENT" is also visible in the bottom right corner of the navigation bar.

Steps	Justification
$5i + 4(6 + 3i)$	Given Expression
$5i + 24 + 12i$	
$24 + 5i + 12i$	
$24 + (5i + 12i)$	
$24 + 17i$	Substitution Property

Directions: Click and drag each selected property to the correct box.

- Associative Property of Addition
- Distributive Property
- Closure Property of Addition
- Identity Property of Addition
- Commutative Property of Addition
- Inverse Property of Addition

Back Reset Go to... Question 8 of 14 Review Next

PEM QC STUDENT

SAY The directions say, “Click and drag each selected property to the correct box.” In order to get the item correct, you must choose the correct property for each step, and place it in the correct box.

If you do not drag one property into each box, then the question will not be answered. If you only drag one or two properties into the boxes, the question will be considered answered on the review screen, even though you did not completely answer the question, and it will be considered incorrect.

Look at each property in the dark gray box and determine which ones you want to select. Then click and drag the correct property to the correct empty box.

Pause while students solve the problem.

The steps used to simplify an expression are shown. Identify the missing property that justifies each step.

Directions: Click and drag each selected property to the correct box.

Steps	Justification
$5i + 4(6 + 3i)$	Given Expression
$5i + 24 + 12i$	
$24 + 5i + 12i$	
$24 + (5i + 12i)$	
$24 + 17i$	Substitution Property

Properties available for selection:

- Associative Property of Addition
- Distributive Property
- Closure Property of Addition
- Identity Property of Addition
- Commutative Property of Addition
- Inverse Property of Addition

Navigation: Back, Reset, Go to..., Question 8 of 14, PEM QC STUDENT, Review, Next

SAY Which three properties did you choose?

Pause for replies. The first empty box is the “Distributive Property,” the second empty box is the “Commutative Property of Addition,” and the third empty box is the “Associative Property of Addition.”

SAY The correct properties are the “Distributive Property” for the first empty box, the “Commutative Property of Addition” for the second empty box and the “Associative Property of Addition” for the third empty box.

The steps used to simplify an expression are shown. Identify the missing property that justifies each step.

Directions: Click and drag each selected property to the correct box.

Steps	Justification
$5i + 4(6 + 3i)$	Given Expression
$5i + 24 + 12i$	Distributive Property
$24 + 5i + 12i$	Commutative Property of Addition
$24 + (5i + 12i)$	Associative Property of Addition
$24 + 17i$	Substitution Property

Closure Property of Addition

Identity Property of Addition

Inverse Property of Addition

Back Reset Go to... Question 8 of 14 Review Next
 PEM QC STUDENT

SAY Do you have any questions on how to click and drag answer choices into the boxes?

Answer all questions.

SAY If you change your mind about an answer, you can click the *Reset* button on the bottom of the screen to unselect your choices all at once. You can also drag each property back to the dark gray box one at a time and select another property to drag into the empty box. Practice changing your answer. When you are done, make sure the correct properties are in the correct boxes.

Pause while students practice changing their answers.

The steps used to simplify an expression are shown. Identify the missing property that justifies each step.

Directions: Click and drag each selected property to the correct box.

Steps	Justification
$5i + 4(6 + 3i)$	Given Expression
$5i + 24 + 12i$	
$24 + 5i + 12i$	
$24 + (5i + 12i)$	
$24 + 17i$	Substitution Property

Associative Property of Addition	Distributive Property
Closure Property of Addition	Identity Property of Addition
Commutative Property of Addition	Inverse Property of Addition

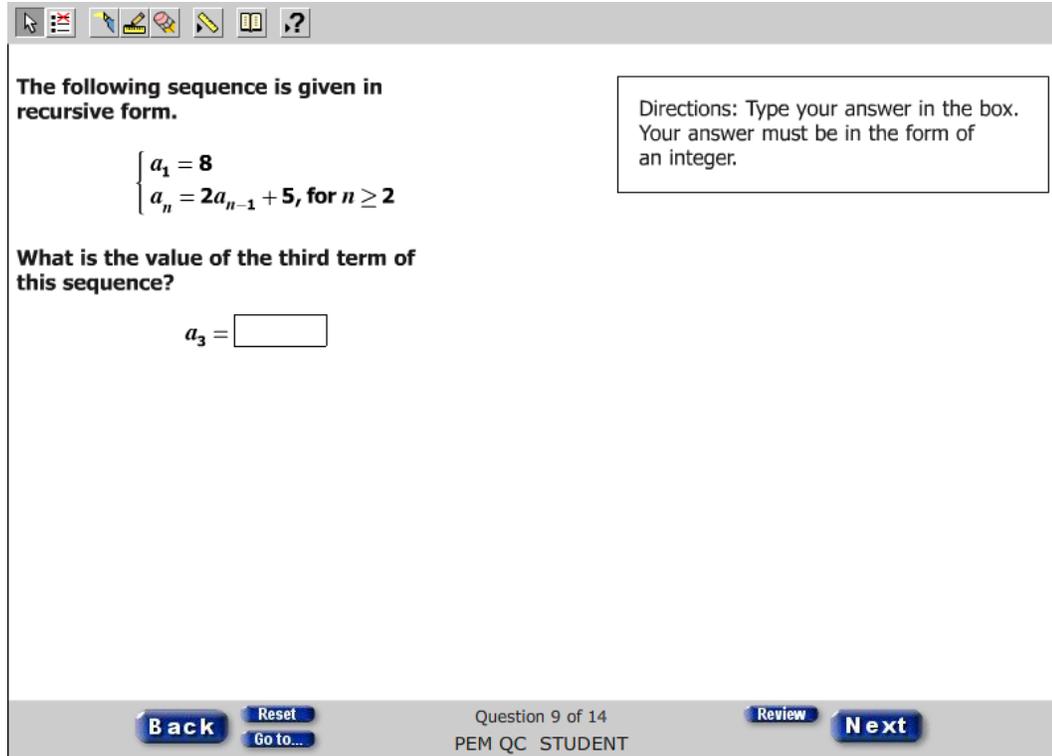
Back **Reset** Go to... Question 8 of 14 Review Next
 PEM QC STUDENT

SAY Click *Next* at the bottom of the screen to continue to the next question.

Wait for students to click *Next*. Check to see that the students are looking at the correct question.

SAY Read question 9 to yourself. Notice that question 9 is not a multiple-choice item. This item will require you to type your answer in the empty box located below the question.

Pause while students read the question.



The following sequence is given in recursive form.

$$\begin{cases} a_1 = 8 \\ a_n = 2a_{n-1} + 5, \text{ for } n \geq 2 \end{cases}$$

What is the value of the third term of this sequence?

$a_3 =$

Directions: Type your answer in the box. Your answer must be in the form of an integer.

Back Reset Go to... Question 9 of 14 Review Next PEM QC STUDENT

SAY The directions say, “Type your answer in the box. Your answer must be in the form of an integer.”

Solve the problem and then place your cursor inside the empty box and type your answer.

Pause while students work to find the answer and type it in the empty box.

The following sequence is given in recursive form.

$$\begin{cases} a_1 = 8 \\ a_n = 2a_{n-1} + 5, \text{ for } n \geq 2 \end{cases}$$

What is the value of the third term of this sequence?

$a_3 =$

Directions: Type your answer in the box. Your answer must be in the form of an integer.

Question 9 of 14
PEM QC STUDENT

Back Reset Go to... Review Next

SAY What is the correct answer?

Pause for replies.

SAY The correct answer is 47. Notice that the answer you entered does not need to be the same length as the box.

Do you have any questions about how to type your answer in the box?

Answer all questions.

The following sequence is given in recursive form.

$$\begin{cases} a_1 = 8 \\ a_n = 2a_{n-1} + 5, \text{ for } n \geq 2 \end{cases}$$

What is the value of the third term of this sequence?

$a_3 =$

Directions: Type your answer in the box. Your answer must be in the form of an integer.

Question 9 of 14
PEM QC STUDENT

Buttons: Back, Reset, Go to..., Review, Next

SAY Now try entering other characters into the box, such as letters, or symbols.

Pause while students try to enter other characters.

SAY Notice that the box will only accept numbers. For any item that requires you to type your answer in a box, if a letter, number or symbol does not appear in the answer box after you've tried to enter it, then you cannot use that symbol in your answer. Make sure you pressed the correct key before deciding the symbol cannot be used.

You can use either the backspace key on the keyboard or the *Reset* button at the bottom of the screen to clear your answer. Clear the answer box now and reenter 47, which is the correct answer to this problem.

Pause while students clear the answer box using the backspace and the *Reset* button and retype their answers.

SAY Click *Next* at the bottom of the screen to continue to the next question.

Wait for students to click *Next*. Check to see that the students are looking at the correct question.

SAY Read question 10. Notice that question 10 is not a traditional multiple-choice item, but one that will require you to select one or more answers.

Pause while students read the directions.

Identify each function with the same range as $f(x) = |x| - 4$.

Directions: Click on a box to choose each function you want to select. You must select all correct functions.

$g(x) = x^2 + 2x - 3$

$h(x) = x^3 - 4$

$j(x) = 2^x - 5$

$k(x) = \sqrt{x} - 4$

$m(x) = (x - 4)^2$

Back Reset Go to... Question 10 of 14 Review Next

PEM QC STUDENT

SAY The directions say, “Click on the box to choose each function you want to select. You must select all correct functions.”

There may be one correct answer or multiple correct answers to this item. In order to get the item correct, you must choose all correct answers, and only those answers.

The item asks you to identify each function that has the same range as a given function. Look at each function in the dark gray box and be sure to select each answer that you want to be considered as correct. To select a function, place the cursor over the white box and then click once.

An orange outline will appear around the box to show that you have selected the function in that box as an answer.

Pause while students select the correct answer.

Identify each function with the same range as $f(x) = |x| - 4$.

Directions: Click on a box to choose each function you want to select. You must select all correct functions.

$g(x) = x^2 + 2x - 3$

$h(x) = x^3 - 4$

$j(x) = 2^x - 5$

$k(x) = \sqrt{x} - 4$

$m(x) = (x - 4)^2$

Back Reset Go to... Question 10 of 14 Review Next

PEM QC STUDENT

SAY If you change your mind about an answer, you can click the eraser tool at the top of the screen, then click the answer you want to unselect. Or, you can click the *Reset* button at the bottom of the screen to unselect all of your answer choices at one time.

Encourage students to practice using the *Reset* button.

SAY Which answer or answers did you choose?

Pause for replies. There are two answers: $g(x) = x^2 + 2x - 3$ and $k(x) = \sqrt{x} - 4$.

SAY The correct answers are $g(x) = x^2 + 2x - 3$ and $k(x) = \sqrt{x} - 4$. Do you have any questions on how to select your answers or how to change your answer choices?

Answer questions about how to click to select an answer or use the tools.

SAY Click *Next* at the bottom of the screen to continue to the next question.

Wait for students to click *Next*. Check to see that the students are looking at the correct question.

SAY Read question 11. Notice that question 11 is not a traditional multiple-choice item, but one that will require you to select one or more answers.

Pause while students read the question.

Indicate the intervals where the graph of $f(x) = 2x^3 - 3x^2 - 12x + 20$ is only increasing throughout the interval.

Directions: Click on a box to choose each interval you want to select. You must select all correct intervals.

$-\infty < x < \infty$
 $-\infty < x < -1$
 $-2.5 < x < \infty$
 $-1 < x < 2$
 $0 < x < \infty$
 $2 < x < \infty$

[Back](#) [Reset](#) [Go to...](#) Question 11 of 14 [Review](#) [Next](#)
 PEM QC STUDENT

SAY The directions say, “Click on a box to choose each interval you want to select. You must select all correct intervals.”

There may be one correct answer or multiple correct answers to this item. In order to get the item correct, you must choose all correct answers, and only those answers.

Determine which interval or intervals are correct. Place the cursor over the box or boxes and then click once. An orange outline will appear around the box to show that you have selected the interval in that box as an answer.

Pause while students select the correct answers.

SAY Which answer or answers did you choose?

Pause for replies. There are two answers: $-\infty < -1$ and $2 < x < \infty$

SAY The correct answers are $-\infty < -1$ and $2 < x < \infty$. Do you have any questions?

Answer questions.

SAY Click *Next* at the bottom of the screen to continue to the next question.

Wait for students to click *Next*. Check to see that the students are looking at the correct question.

SAY Read question 12, including the directions. Notice that question 12 is not a multiple-choice item, but one that will require you click and drag your answer choices to the correct location in the table.

Pause while students read the question and directions.

Identify the equation of the horizontal asymptote and the equation of the vertical asymptote of $g(x) = \frac{4x + 1}{x - 3}$.

Horizontal Asymptote	Vertical Asymptote

$x = 0$	$x = \frac{1}{4}$	$x = 3$
$y = -\frac{1}{3}$	$y = 0$	$y = 4$

Directions: Click and drag each selected equation to the correct box.

Back Reset Go to... Question 12 of 14 Review Next
PEM QC STUDENT

SAY Determine which answer choices are correct. Click and drag each selected equation to the correct location in the table.

Pause while students answer the question.

SAY Which equation is the horizontal asymptote?

Pause for replies.

SAY The correct answer is $y = 4$. What is the equation for the vertical asymptote?

Pause for replies.

SAY The correct answer is $x = 3$. Do you have any questions?

Answer questions.

SAY Click *Next* at the bottom of the screen to continue to the next question.

Wait for students to click *Next*. Check to see that the students are looking at the correct question.

SAY Read question 13 and the directions to yourself. Notice that question 13 is not a multiple-choice item. This item will require you to type your answer in the empty box located below the question.

Pause while students read the question and directions.

The earned-run-average for a baseball pitcher varies directly with the number of earned runs allowed and inversely with the number of innings pitched.

Directions: Type your answer in the box.

- The earned-run-average for a pitcher allowing 45 runs in 108 innings is 3.75.
- Sam is a pitcher. He allowed 112 runs and had an earned-run-average of 4.50.

What is the total number of innings that Sam pitched?

Back Reset Go to... Question 13 of 14 Review Next
PEM QC STUDENT

SAY Determine the correct answer. Place your cursor inside the empty box and type your answer.

Pause while students answer the question.

SAY What is the correct answer?

Pause for replies.

SAY The correct answer is 224. Are there any questions?

Answer questions.

SAY Try entering other characters into the box, such as letters or symbols.

Pause while students try to enter other characters into the box.

SAY Notice that the box will only accept numbers and a decimal point. For this question, 224.0 is also considered a correct answer. Type 224.0 into the answer box.

Pause while students enter this answer into the box.

SAY Click *Next* at the bottom of the screen to continue to the next question.

Wait for students to click *Next*. Check to see that the students are looking at the correct question.

SAY Read question 14 and the directions to yourself. As you are reading, notice that the directions tell you that your answer must be entered as a whole number.

Pause while students read the question and directions.

A store owner employs a total of 3 cashiers and 7 clerks. The owner plans to select a committee of 1 cashier and 2 clerks. What is the number of different committees the owner could choose?

Directions: Type your answer in the box. Enter your answer as a whole number.

If n and r are positive integers and $n \geq r$,

$${}^n P_r = \frac{n!}{(n-r)!}$$

$${}^n C_r = \frac{n!}{r!(n-r)!}$$

Question 14 of 14
PEM QC STUDENT

Back Reset Go to... Review Next

SAY Question 14 contains a formula box underneath the directions. Since this formula is provided in a formula box, it is not on the formula sheet provided in the Exhibit window. However, as you did in question 7, click on the Exhibit tool () on the toolbar to see the formula sheet. The formula sheet is presented differently and I want you to practice manipulating the formula sheet on the screen.

Pause for students to click on the Exhibit tool icon.

The Exhibit tool for a Technology Enhanced Item (TEI) is slightly different than the Exhibit tool for a traditional multiple choice item.

SAY After clicking on the formula sheet icon on the toolbar, you will notice the formula sheet now covers the question.

Exhibit Window

Formula Table Table

Algebra II Formula Sheet

Geometric Formulas

 $A = \frac{1}{2}bh$	 $A = bh$	 $V = lwh$ $S.A. = 2(lw + lh + wh)$	 $V = \frac{1}{3}\pi r^2h$ $S.A. = \pi r(l + r)$
 $p = 4s$ $A = s^2$	 $A = \frac{1}{2}h(b_1 + b_2)$	 $V = \pi r^2h$ $S.A. = 2\pi r(h + r)$	 $V = \frac{1}{3}Bh$ $S.A. = \frac{1}{2}lp + B$

Back Reset Go to... Question 14 of 14 Review Next
PEM QC STUDENT

SAY The formula sheet can be re-sized and moved on your screen so you can view both the question and the formula sheet. To do this, place your cursor near the lower right corner of the Exhibit window until your cursor changes to a double ended arrow.

Exhibit Window

Formula Table Table

Algebra II Formula Sheet

Geometric Formulas

 $A = \frac{1}{2}bh$	 $A = bh$	 $V = lwh$ $S.A. = 2(lw + lh + wh)$	 $V = \frac{1}{3}\pi r^2h$ $S.A. = \pi r(l + r)$
 $p = 4s$ $A = s^2$	 $A = \frac{1}{2}h(b_1 + b_2)$	 $V = \pi r^2h$ $S.A. = 2\pi r(h + r)$	 $V = \frac{1}{3}Bh$ $S.A. = \frac{1}{2}lp + B$

Back Reset Go to... Question 14 of 14 Review Next
PEM QC STUDENT

SAY Drag your cursor towards the center of the exhibit window until the formula sheet is the desired size.

The screenshot shows a software interface titled "Exhibit Window". Inside the window, there are tabs for "Formula", "Table", and "Table". The main content is an "Algebra II Formula Sheet" titled "Geometric Formulas". It includes several diagrams and formulas:

- A right triangle with base b and height h , with the formula $A = \frac{1}{2}bh$.
- A parallelogram with base b and height h , with the formula $A = bh$.
- A rectangular prism with length l , width w , and height h , with formulas $V = lwh$ and $S.A. = 2(lw + lh)$.
- A square with side length s .
- A trapezoid with top base b_1 , bottom base b_2 , and height h .
- A cylinder with radius r and height h .

Below the diagrams are the formulas for the area of a triangle, a parallelogram, the volume and surface area of a rectangular prism, and the area of a square. To the right of the formula sheet, there is a text box with directions: "Directions: Type your answer in the box. Enter your answer as a whole number." Below this are two empty input boxes. Further down, there is a text box containing the text: " n and r are positive integers and $n \geq r$," followed by the formulas for permutations and combinations: $n^P r = \frac{n!}{(n-r)!}$ and $n^C r = \frac{n!}{r!(n-r)!}$.

At the bottom of the window, there are buttons for "Back", "Reset", "Go to...", "Question 14 of 14", "Review", and "Next". A red arrow points to the bottom-right corner of the window's task bar.

SAY Now you can move the formula sheet by placing your cursor on the gray Exhibit window task bar. Your cursor will change to a hand. Drag the formula sheet to the desired location on the screen. Notice the two scrollbars on the right and the bottom of the formula sheet that can be used to scroll the formula sheet up and down or to the left and right.

Pause while students practice using this tool.

A store owner employs a total of 3 cashiers and 7 clerks. The owner plans to select a committee of 1 cashier and 2 clerks. What is the number of different committees the owner could choose?

Directions: Type your answer in the box.
Enter your answer as a whole number.

If n and r are positive integers and $n \geq r$,

$$n^P r = \frac{n!}{(n-r)!}$$

$$n^C r = \frac{n!}{r!(n-r)!}$$

Algebra II Formula Sheet
Geometric Formulas

$A = \frac{1}{2}bh$
 $A = bh$
 $V = lwh$
 $S.A. = 2(lw + lh)$

Question 14 of 14
PEM QC STUDENT

SAY Since you do not need the formula sheet, but will instead use the formula box, click the X in the upper right corner of the Exhibit window to put the tool away.

Wait for students to put the tool away.

SAY This particular formula box gives you two formulas. You will need to decide whether you will use one or both of the formulas to help you solve this problem.

Now determine the correct answer. Then place your cursor inside the empty box and type your answer.

Pause while students work to find the answer to the question.

SAY What is the correct answer?

Pause for replies.

SAY The correct answer is 63. Are there any questions?

Answer questions.

SAY Click *Next* at the bottom of the screen to continue to the *Review* screen.

Wait for students to click *Next* and check to be sure all students are looking at the *Review* screen.

SAY The *Review* screen shows which questions have not been answered and which questions have been checked for review. To return to a question, click on the question number.

Once the practice items are reviewed and completed, click the **Submit** button. Then click “**Yes, submit my test.**” Then you will see the question, “**Do you wish to end the test and submit your answers?**” Click “**Yes.**” This will exit the practice items.

You may now practice navigating between the *Review* screen and the practice items. Then exit the practice items to end this practice session.

Wait for students to practice navigating from the *Review* screen to practice items, and then for them to submit their test.

Note that each student’s review screen may vary, depending upon whether a question was left unanswered or marked for review.

Section ↓

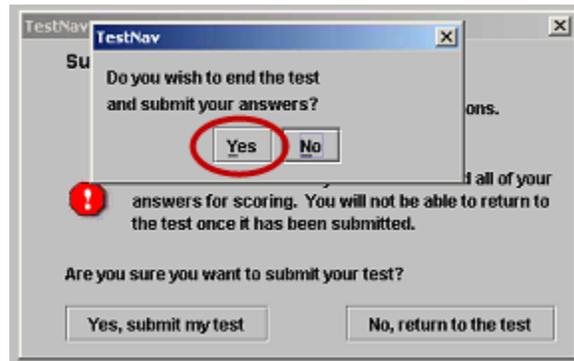
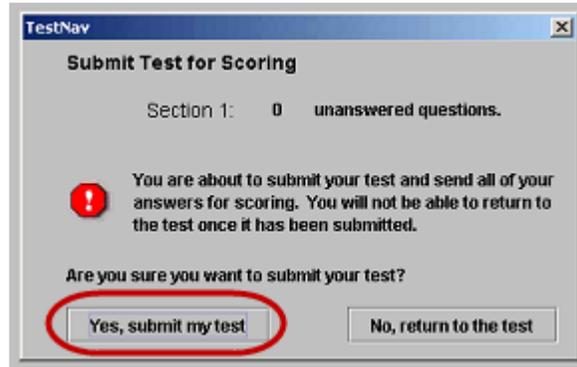
To go to a specific question, click on the question name.

Question Name	Answered?	Review?
Question 1		
Question 2		
Question 3		✓ Review
Question 4		
Question 5		
Question 6		
Question 7		
Question 8		
Question 9		
Question 10		
Question 11		
Question 12	Not Answered	✓ Review
Question 13		
Question 14		

Save and Exit

To end the test and submit your answers for final scoring, click on the Submit button.

Submit



To start the practice items again, return to the “START THE ePAT LAUNCHER” section on page 9 for directions if needed.