

Practice Item Guide

Virginia Standards of Learning

End of Course
Geometry

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 Geometry. 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 Geometry 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 \(Mac Intel\)](#)

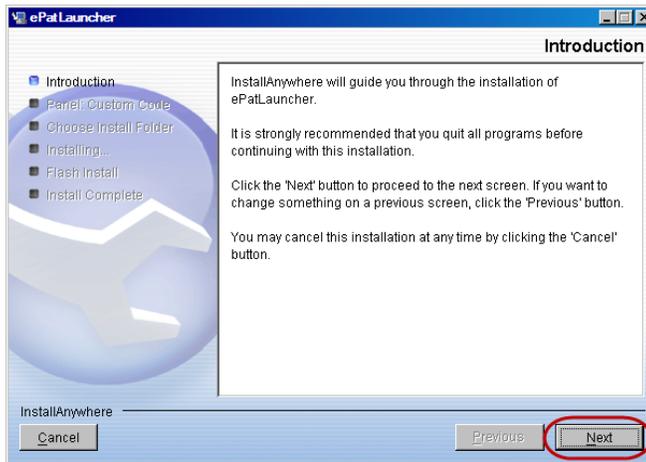
3. Click “Run” to continue. The file will start to download.



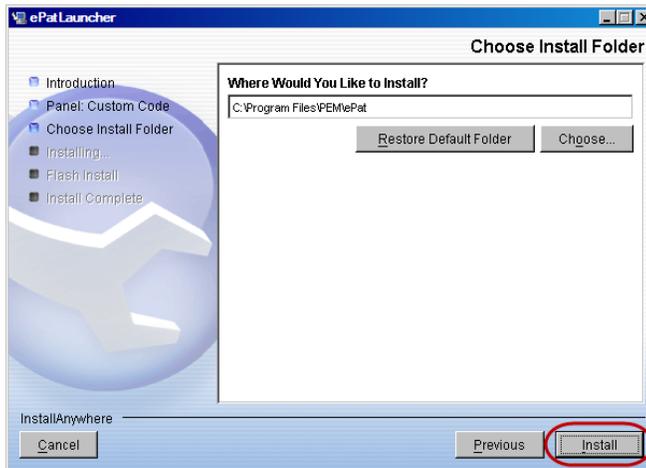
4. When the download is complete, click “Run” to continue.



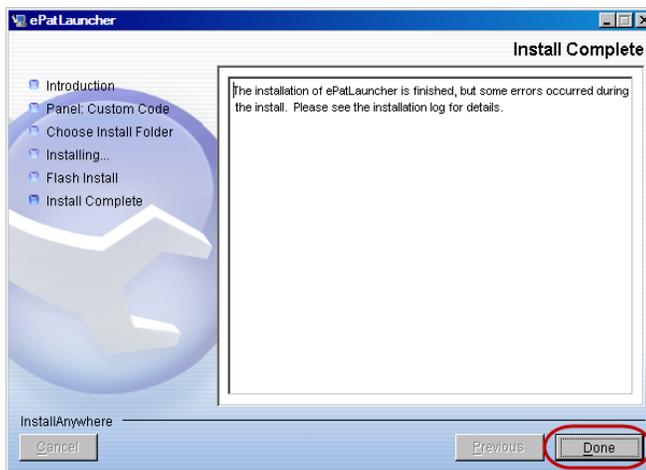
5. The ePAT Launcher installation will begin. Click “Next” to continue.



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.

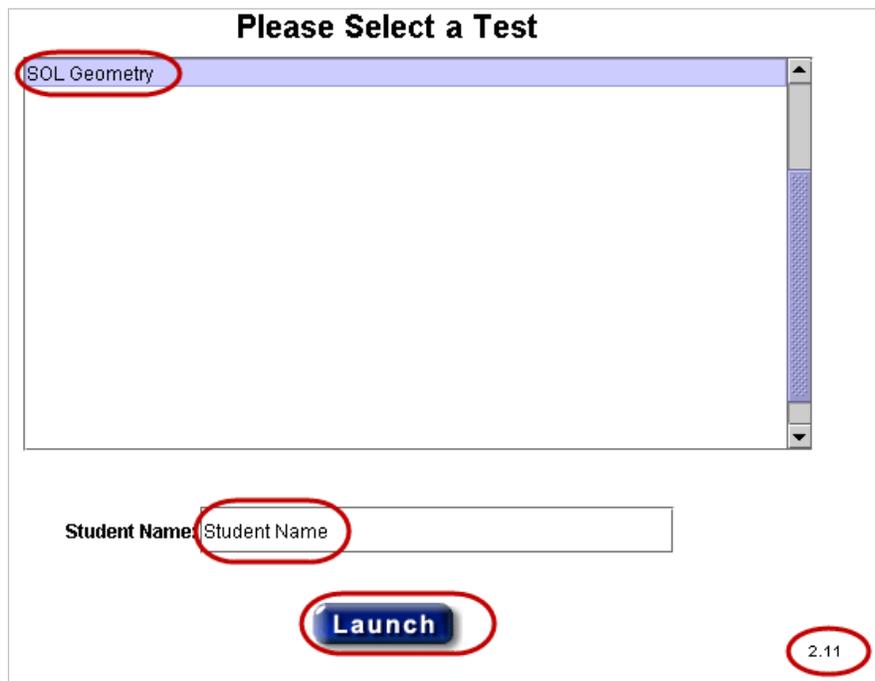
START THE ePAT LAUNCHER

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 Geometry” 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

Mathematics: 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 Geometry formula sheet.

Compass – Use the compass tool to complete constructions.

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 GEOMETRY PRACTICE ITEMS

Introduction

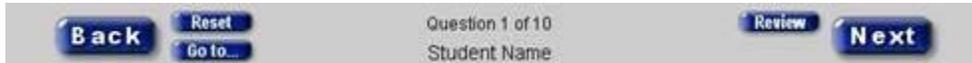
After the practice items are launched, the first practice item will be displayed. Read the following instructions to the students.

SAY Today you will be working on some End of Course Geometry practice items for the Virginia Standards of Learning assessment. There are 10 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 10.”



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.

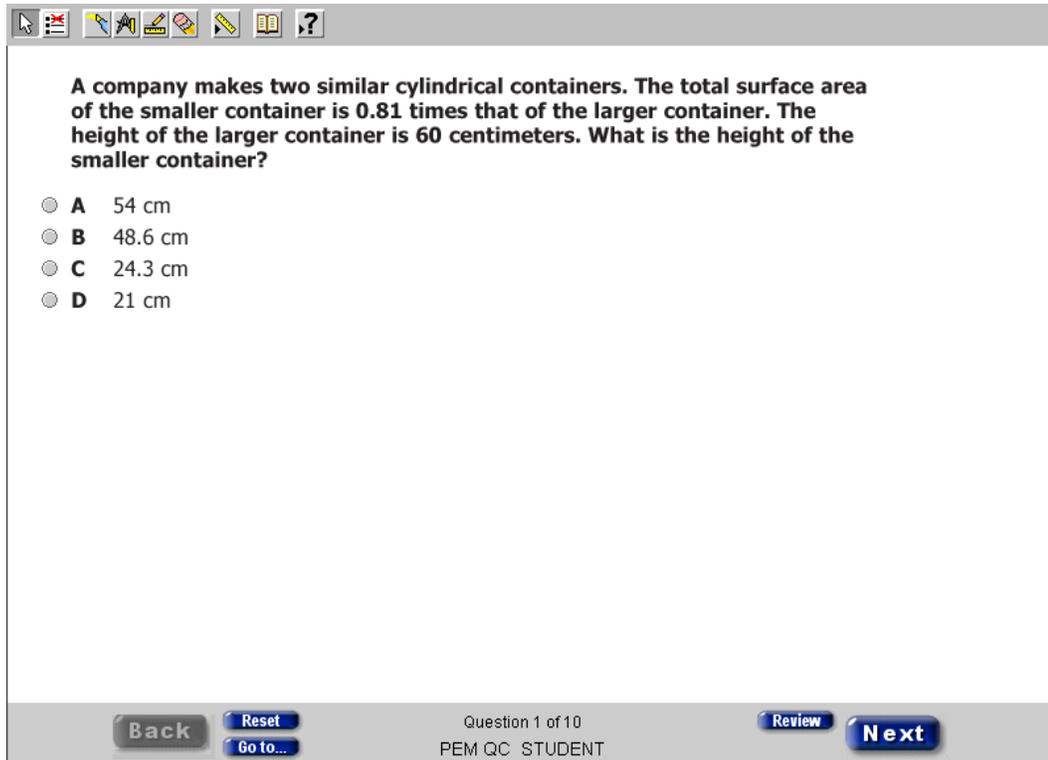
SAY Some of the tools you can use are in the toolbar at the top of the screen. Information about each tool on the toolbar is available by clicking the question mark symbol (). Click on the question mark symbol now. To display help on a specific tool, click the tool name in the drop-down list. Take a 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.



A company makes two similar cylindrical containers. The total surface area of the smaller container is 0.81 times that of the larger container. The height of the larger container is 60 centimeters. What is the height of the smaller container?

- A 54 cm
- B 48.6 cm
- C 24.3 cm
- D 21 cm

Question 1 of 10
PEM QC STUDENT

SAY You may need to use formulas to answer this question. Click on the Exhibit tool () on the toolbar. Then click on the tab labeled “Formulas” to see the formula sheet. You can move the formula sheet on the screen by clicking inside the blue bar at the top of the Exhibit window and then dragging the window to the desired location.

Use your scratch paper, the formula sheet, and your calculator to decide which answer is correct.

Pause while students work to find the answer.

A company makes two similar cylindrical containers. The total surface area of the smaller container is 0.81 times that of the larger container. The height of the larger container is 60 centimeters. What is the height of the smaller container?

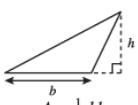
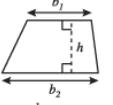
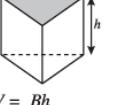
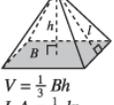
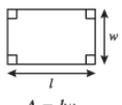
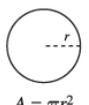
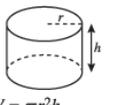
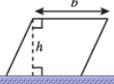
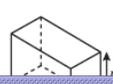
A 54 cm
 B 48.6 cm
 C 24.3 cm
 D 21 cm

Exhibit Window

Copyright Formulas

Geometry Formula Sheet

Geometric Formulas

 $A = \frac{1}{2}bh$	 $A = \frac{1}{2}h(b_1 + b_2)$	 $V = Bh$ $L.A. = hp$ $S.A. = L.A. + 2B$	 $V = \frac{1}{3}Bh$ $L.A. = \frac{1}{2}lp$ $S.A. = L.A. + B$
 $A = lw$ $p = 2(l + w)$	 $A = \pi r^2$ $C = 2\pi r$	 $V = \pi r^2h$ $L.A. = 2\pi rh$ $S.A. = 2\pi r(h + r)$	 $V = \frac{4}{3}\pi r^3$ $S.A. = 4\pi r^2$
			

Review Next

SAY Click the X in the upper right corner of the Exhibit window to put the Geometry formula sheet away.

Pause while students put the tool away.

SAY 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.

A company makes two similar cylindrical containers. The total surface area of the smaller container is 0.81 times that of the larger container. The height of the larger container is 60 centimeters. What is the height of the smaller container?

- A 54 cm
- B ~~40.6 cm~~ X
- C 24.3 cm
- D 21 cm

Question 1 of 10
PEM QC STUDENT

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.

A company makes two similar cylindrical containers. The total surface area of the smaller container is 0.81 times that of the larger container. The height of the larger container is 60 centimeters. What is the height of the smaller container?

- A 54 cm
- B 48.6 cm
- C 24.3 cm
- D 21 cm

Question 1 of 10
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 A, 54 cm. Click on the circle next to choice A to select this as your answer.

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

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.

Which construction represents a correct first step in constructing a line segment perpendicular to \overline{JK} through point P ?

A C

B D

Question 2 of 10
PEM QC STUDENT

Back Reset Go to... Review Next

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. 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 3 to yourself.

Pause while students read the question.

Ben plans to bisect $\angle ABC$ to create the congruent angles ABD and CBD .

Which angle is congruent to $\angle ABD$ and $\angle CBD$?

A C

B D

Question 3 of 10
PEM QC STUDENT

Back Reset Go to... Review Next

SAY Question 3 requires you to determine a congruent angle after a given angle is bisected. The online compass and straightedge tools may be helpful in determining the correct answer. Click on the compass tool icon () on the tool bar. The size of the compass can be adjusted by clicking and dragging either of the two small circles. Arcs can be drawn by clicking and dragging the large circle at the end of the compass. Practice using the compass to draw arcs.

Pause while students practice using the compass tool.

Ben plans to bisect $\angle ABC$ to create the congruent angles ABD and CBD .

Which angle is congruent to $\angle ABD$ and $\angle CBD$?

A
 C

B
 D

Back Reset Go to... Question 3 of 10 Review Next
 PEM QC STUDENT

SAY Click on the compass tool icon to put the compass away. The straightedge tool can be used to draw lines. Click on the straightedge tool icon () and practice adjusting the placement and length of the straightedge. You can draw lines with the straightedge by dragging the pencil point along the line.

Pause while students practice using the straightedge tool.

Ben plans to bisect $\angle ABC$ to create the congruent angles ABD and CBD .

Which angle is congruent to $\angle ABD$ and $\angle CBD$?

A

B

C

D

Back Reset Go to... Question 3 of 10 PEM QC STUDENT Review Next

SAY When you are done, click on the straightedge tool icon to put the straightedge tool away.

Pause while students put the tool away.

SAY Use the eraser tool to erase any arcs or lines you have drawn, then put the eraser tool away.

Pause while students erase arcs or lines they have drawn on the screen.

SAY Now solve the problem, using the compass or straightedge tools as needed. 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 C. Do you have any questions on how to find the correct answer or how to use the compass tool or the straightedge 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 4 to yourself.

Pause while students read the question.

Given: Three concentric circles with the center O
 $\overline{KL} \cong \overline{LN} \cong \overline{NO}$
 $KP = 42$ inches

Which is closest to the area of the shaded region?

A 231 sq in.
 B 308 sq in.
 C 539 sq in.
 D 616 sq in.

Back Reset Go to... Question 4 of 10 Review Next
 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 question above the answer choices. Click again on the highlighter tool on the toolbar to put the tool away.

Pause while students practice using the highlighter tool.

Given: Three concentric circles with the center O
 $\overline{KL} \cong \overline{LN} \cong \overline{NO}$
 $KP = 42$ inches

Which is closest to the area of the shaded region?

- A 231 sq in.
- B 308 sq in.
- C 539 sq in.
- D 616 sq in.

Back Reset Go to... Question 4 of 10 Review Next
 PEM QC STUDENT

SAY Use your formula sheet, calculator, and scratch paper to 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, 616 sq in. 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 5 to yourself.

Pause while students read the question.

The screenshot shows a digital math test interface. At the top, there is a toolbar with icons for a mouse cursor, a list, a highlighter, an eraser, a compass, a straightedge, a formula sheet, and a help icon. The main content area contains the following text:

A cylinder has a volume of 300π cubic centimeters and a base with a circumference of 10π centimeters. What is the height of the cylinder?

Below the question are four radio button options:

- A 30 cm
- B 15 cm
- C 12 cm
- D 3 cm

At the bottom of the interface, there is a navigation bar with buttons for "Back", "Reset", "Go to...", "Question 5 of 10", "Review", and "Next". The text "PEM QC STUDENT" is also visible in the bottom right corner of the interface.

SAY Determine which is the correct answer. Now click on the answer you have chosen. You may use the tools we have practiced: the eliminate choice, eraser, highlighter, formula sheet, compass, or straightedge.

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, 12 cm. 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. The question is located on the left side of your screen. Part of the question is above the graph, and part of it is below the graph.

Pause while students read the question.

SAY Notice that this is not a multiple-choice item, but one that will require you to select your answer by plotting a point on the grid. The item says to plot a point with integral coordinates.

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. These directions say, “Click on the grid to plot the point you want to select. You must plot a point other than point P.”

Line l contains the points $(-4, 7)$ and $(5, -8)$.

Directions: Click on the grid to plot the point you want to select. You must select a point other than point P .

Plot a point other than point P with integral coordinates that lies on a line that is parallel to l and passes through point P .

Question 6 of 10
PEM QC STUDENT

SAY Use the tools available to you and decide which point you would like to plot on the grid. To plot a point, place your cursor over the location you wish to select and then click once. A red point will appear where you have clicked.

If you change your mind about the location of your point, you can erase the point by clicking *Reset* at the bottom of your screen or by using the eraser tool on the tool bar.

Pause while students solve the problem and plot the point.

Line l contains the points $(-4, 7)$ and $(5, -8)$.

Directions: Click on the grid to plot the point you want to select. You must select a point other than point P .

Plot a point other than point P with integral coordinates that lies on a line that is parallel to l and passes through point P .

Question 6 of 10
PEM QC STUDENT

SAY Since the item only asks for one point, you will only be able to plot one point on the grid. Try clicking on another location on the grid to see that only one point can be plotted.

Pause while students try to plot another point.

SAY Remember that you must plot a point on the grid or this item will be considered unanswered.

What are the coordinates of the point you plotted?

Pause for replies. There is more than one correct response so solicit all correct responses. The correct responses are located at $(0, 9)$, $(6, -1)$, and $(9, -6)$.

SAY The correct responses are located at $(0, 9)$, $(6, -1)$, and $(9, -6)$. You have to plot one of those points to be scored correctly. Do you have any questions on how to plot a point or how to change your answer?

Answer all questions.

SAY In order to see the entire Navigation bar at the bottom of the screen, you will need to use the vertical scroll bar on the right side of the screen. Use the up and down arrows on the scroll bar to scroll vertically.

Now 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. Notice that question 7 is not a multiple-choice item, but one that will require you to type in your answer.

The question is located on the left side of your screen. Part of the question is above the diagram, and part of it is below the diagram.

The directions box is on the right side of your screen.

The empty box below the question is where you will type in your answer.

Pause while students read the question.

In circle O , $m\angle SOT = 68^\circ$.

Directions: Type your answer in the box.

What is $m\angle SRT$?

$m\angle SRT =$ $^\circ$

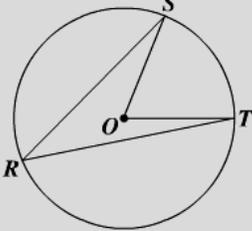
Back Reset Go to... Question 7 of 10 Review Next

PEM QC STUDENT

SAY Find the measure of angle SRT. Then place your cursor inside the box and type your answer. You do not need to type a degree symbol because it is provided outside the empty box.

Pause while students find the answer to the problem.

In circle O , $m\angle SOT = 68^\circ$.



Directions: Type your answer in the box.

What is $m\angle SRT$?

$m\angle SRT =$ $^\circ$

Back Reset Go to... Question 7 of 10 Review Next
PEM QC STUDENT

SAY What is the measure of angle SRT?

Pause for replies.

SAY The correct answer is 34 degrees, so you should have typed the number 34 inside the box. Notice that your answer does not have to be the same length as the box.

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

Answer all questions.

In circle O , $m\angle SOT = 68^\circ$.

Directions: Type your answer in the box.

What is $m\angle SRT$?

$m\angle SRT =$ $^\circ$

Back Reset Go to... Question 7 of 10 Review Next

PEM QC STUDENT

SAY 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 and a decimal point. 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.

The decimal point is an allowable character in case a student makes an error and wants to enter a decimal number.

SAY 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 34, which is the correct answer to this problem.

Pause while students clear the answer box and retype 34.

SAY Do you have any questions about how to change your answer?

Answer any 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 8 to yourself. Notice that this is not a multiple-choice item, but one that will require you to plot a point on the grid. Remember to read the directions on the right side of the screen.

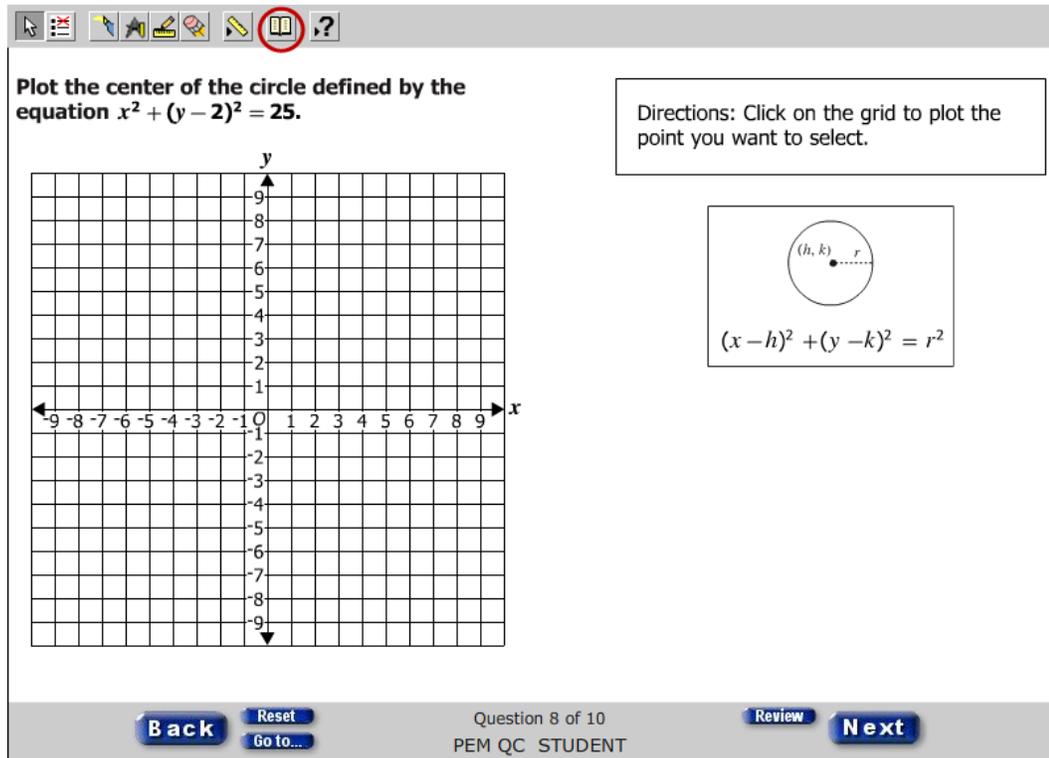
Pause while students read the question and directions.

SAY Notice that question 8 contains a formula box. 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 1, 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.



The screenshot shows a software interface for a math problem. At the top, there is a toolbar with several icons, including a red circle around the 'Exhibit' icon (a book with a magnifying glass). Below the toolbar, the question text reads: "Plot the center of the circle defined by the equation $x^2 + (y - 2)^2 = 25$." To the right of the question is a box with directions: "Directions: Click on the grid to plot the point you want to select." Below the directions is a diagram of a circle with center (h, k) and radius r , and the formula $(x - h)^2 + (y - k)^2 = r^2$. The main area of the interface is a coordinate grid with x and y axes ranging from -9 to 9. At the bottom, there are navigation buttons: "Back", "Reset", "Go to...", "Question 8 of 10", "Review", and "Next". The text "PEM QC STUDENT" is visible at the bottom center.

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

Geometry Formula Sheet

Geometric Formulas

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

Back Reset Go to... Question 8 of 10 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.

Geometry Formula Sheet

Geometric Formulas

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

Back Reset Go to... Question 8 of 10 Review Next

PEM QC STUDENT

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

Exhibit Window

Formula Sheet

Directions: Click on the grid to plot the point you want to select.

Geometry Formula Shee

Geometric Formulas

$A = \frac{1}{2}bh$
 $A = \frac{1}{2}h(b_1 + b_2)$
 $V = Bh$
 $L.A. = hp$
 $S.A. = L.A. + 2B$

$(x-h)^2 + (y-k)^2 = r^2$

Back Reset Go to... Question 8 of 10 PEM QC STUDENT Review Next

SAY Now you can move the formula sheet by placing your cursor on the 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.

Plot the center of the circle defined by the equation $x^2 + (y - 2)^2 = 25$.

Directions: Click on the grid to plot the point you want to select.

Geometry Formula Sheet

Geometric Formulas

$A = \frac{1}{2}bh$
 $A = \frac{1}{2}h(b_1 + b_2)$
 $V = Bh$
 $L.A. = hp$
 $S.A. = L.A. + 2h$

$(x - h)^2 + (y - k)^2 = r^2$

Question 8 of 10
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 one formula. Other items may have a formula box that contains more than one formula. Sometimes you will need to choose which formula or formulas are useful in order to solve a problem.

Pause while students read the question.

SAY Decide which point represents the center of the circle and plot that point on the grid.

Pause while students plot the point.

SAY Which answer did you choose?

Pause for replies.

SAY The coordinates of the correct point are (0, 2). Do you have any questions?

Answer all questions.

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

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

SAY Read item 9 to yourself, including the directions. Notice that this item is not a traditional multiple-choice question, but will require you to click on your answer choices.

Pause while students read the question and directions.

The screenshot shows a digital interface for a math problem. At the top, there is a toolbar with icons for a mouse, eraser, highlighter, pencil, and question mark. The main area contains the following text and diagrams:

Two cylinders, a sphere, and a cone are shown. Select the two objects with the same volume.

Directions: Click on the two objects you want to select.

The four objects are:

- A cylinder with a height of 4 cm and a radius of 3 cm.
- A cone with a height of 2 cm and a radius of 4 cm.
- A sphere with a diameter of 4 cm.
- A cylinder with a height of 2 cm and a length of 6 cm.

At the bottom of the interface, there are buttons for "Back", "Reset", "Go to...", "Question 9 of 10", "PEM QC STUDENT", "Review", and "Next".

SAY Use the formula sheet, your calculator, and scratch paper to decide which two objects have the same volume. Notice that both the item and the directions tell you to select only two of the objects. To select an object, place the cursor over the object and then click once. An orange outline will appear around the objects you selected.

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.

Pause while students solve the problem.

SAY Which answers did you choose?

Pause for replies.

SAY The correct objects are the sphere and the cone. Do you have any questions?

Pause to answer all questions.

Two cylinders, a sphere, and a cone are shown. Select the two objects with the same volume.

Directions: Click on the two objects you want to select.

4 cm
3 cm

2 cm
4 cm

4 cm

2 cm
6 cm

Back Reset Go to... Question 9 of 10 Review Next
PEM QC STUDENT

SAY Sometimes, for these types of items where you have to select one or more answers, the directions will specifically tell you how many answer choices to select. Other times, the directions will say, “You must select all correct answers.” This means there may be one correct answer or multiple correct answers to the item.

For all of these types of items, you must choose all correct answers, and only those answers, in order for the item to be considered correct.

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 to yourself, including the directions. Notice this item is not a multiple-choice question, but requires you to click and drag the correct numbers to the empty boxes to create a ratio.

Pause while students read the question.

The ratio of the volume of two spheres is 8:27. What is the ratio of the lengths of the radii of these two spheres?

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

1 2 3 4 6 8 9 13 19 27

Back Reset Go to... Question 10 of 10 PEM QC STUDENT Review Next

SAY Notice that there are two boxes which require numbers to make a ratio. This ratio will be your answer to the question. You will need to click and drag one number into each box.

If you do not click and drag numbers into the boxes, the question will not be answered. If you only drag one number into a box, 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.

If you change your mind about a number, you can click the *Reset* button on the bottom of the screen, or drag the number back to the dark gray box and select another number to drag into the empty box.

Determine which numbers you want to select for your ratio and then drag them into the boxes.

Pause for students to work.

The ratio of the volume of two spheres is 8:27. What is the ratio of the lengths of the radii of these two spheres?

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

Ratio box: $\square : \square$ (The first square contains the number 2, and the second square is empty. A red arrow points from the number 2 in the menu below to the first square.)

Number menu: 1, 2, 3, 4, 6, 8, 9, 13, 19, 27

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

Question Info: Question 10 of 10, PEM QC STUDENT

SAY Which ratio did you create?

Pause for replies.

SAY The correct answers are either 3:2 or 2:3 since the question does not specify which sphere must be represented first in the ratio. Do you have any questions?

Pause to answer all questions.

The ratio of the volume of two spheres is 8:27. What is the ratio of the lengths of the radii of these two spheres?

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

2 : 3

1 4 6 8 9 13 19 27

Back Reset Go to... Question 10 of 10 PEM QC STUDENT Review Next

SAY Practice changing the order of the two correct numbers. Either use the *Reset* button to reset the numbers back into the dark gray box at the same time, or drag them back to the dark gray box individually. Then click and drag the two numbers into the empty box in the other order.

Pause while the students practice changing the order of the two numbers.

SAY Do you have any questions about how to click and drag an answer choice or how to change your answer?

Pause to answer all questions.

On the actual End of Course Geometry *Standards of Learning* test, students may need to access the online compass tool for some Technology-Enhanced Items. Since this tool is different than the tool for the traditional multiple-choice items, allow students to practice using it so they can become familiar with it.

SAY Some questions on the actual *Standards of Learning* test may require you to use the compass tool for a Technology-Enhanced Item. The compass tool for a Technology-Enhanced Item is slightly different than the compass tool for a traditional multiple-choice item. Although this item does not assess content that uses an online compass, let's practice using the compass tool.

Click on the compass tool icon () on the tool bar. You will notice the compass tool for this question looks different than the compass tool used in question 3, a traditional multiple-choice question.

The ratio of the volume of two spheres is 8:27. What is the ratio of the lengths of the radii of these two spheres?

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

1 2 3 4 6 8 9 13 19 27

Back Reset Go to... Question 10 of 10 PEM QC STUDENT Review Next

SAY To move the compass, click on the small circle with the red crosshair and drag the compass to the desired location.

The ratio of the volume of two spheres is 8:27. What is the ratio of the lengths of the radii of these two spheres?

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

1 2 3 4 6 8 9 13 19 27

Back Reset Go to... Question 10 of 10 PEM QC STUDENT Review Next

Detailed description: The screenshot shows a software interface for a geometry problem. At the top, there is a toolbar with various icons, including a compass icon circled in red. Below the toolbar, the problem text asks for the ratio of radii given a volume ratio of 8:27. A box contains two empty square boxes separated by a colon. Below this is a row of ten numbered boxes: 1, 2, 3, 4, 6, 8, 9, 13, 19, and 27. In the center, a compass tool is shown with its base circled in red and a hand cursor over it. A padlock icon is also visible on the compass tool. At the bottom, there are navigation buttons: 'Back', 'Reset', 'Go to...', 'Question 10 of 10', 'PEM QC STUDENT', 'Review', and 'Next'.

SAY The size of the compass can be adjusted by clicking and dragging the base of the compass point. To lock the size of the compass, click the padlock icon in the center of the compass. Click the padlock icon again to unlock the compass.

The ratio of the volume of two spheres is 8:27. What is the ratio of the lengths of the radii of these two spheres?

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

1 2 3 4 6 8 9 13 19 27

Question 10 of 10
PEM QC STUDENT

Back Reset Go to... Review Next

SAY Arcs or circles can be drawn by clicking and dragging the tip of the compass point. A pencil icon will appear when you roll your cursor over this control. Practice using the compass to draw arcs.

Pause while students practice using the compass tool.

The ratio of the volume of two spheres is 8:27. What is the ratio of the lengths of the radii of these two spheres?

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

1 2 3 4 6 8 9 13 19 27

Back Reset Go to... Question 10 of 10 Review Next
PEM QC STUDENT

SAY When you are done practicing, click on the compass tool icon to put the compass away.

Wait for students to put the tool away.

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.

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

Question Name	Answered?	Review?
Question 1		
Question 2		
Question 3		Review
Question 4		
Question 5		
Question 6		
Question 7		
Question 8	Not Answered	Review
Question 9		
Question 10		

[Save and Exit](#)
To end the test and submit your answers for final scoring, click on the Submit button.
[Submit](#)

TestNav

Submit Test for Scoring

Section 1: 0 unanswered questions.

 You are about to submit your test and send all of your answers for scoring. You will not be able to return to the test once it has been submitted.

Are you sure you want to submit your test?

TestNav

TestNav

Do you wish to end the test and submit your answers?

 You are about to submit your test and send all of your answers for scoring. You will not be able to return to the test once it has been submitted.

Are you sure you want to submit your test?

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