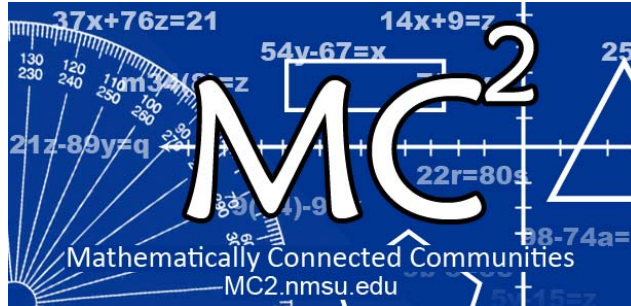


# Mathematically Connected Communities



## PARCC EOY Practice Test Items Geometry - Mathematics

Excerpted 11/2014 from  
PARCC Online Practice Tests  
[www.parcconline.org](http://www.parcconline.org)

## Mathematical Practice Questions for MC<sup>2</sup> Thinking Protocol

Follow the process below in working with the PARCC practice items found in this packet:

1. Choose items from this packet that relate to math concepts studied in the current or previous curriculum units during your math instruction. Each item may be used as a practice item worksheet.
2. Choose a set of **Thinking/Writing Prompts** below based on the math practice the class is working to develop.
3. Add the prompts to the practice item worksheet or display the prompts for the students to respond to.
4. Continue using the same set of prompts for an extended period of time so children develop competence and confidence in describing their mathematical thinking related to the math practice.

The questions below were intentionally not included on each MC<sup>2</sup> PARCC practice item worksheet in this packet. These are intended to help students move beyond “answer getting” to fully making sense of test item questions and their own mathematical thinking.

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### Thinking/Writing Prompts to Promote Mathematical Practices

#### Math Practice 1: Make sense of problems and persevere in solving them.

1. What do you know about the problem?
2. What questions do you have?
3. Explain your reasoning or thinking in solving the problem.

#### Math Practice 3: Construct viable arguments and critique the reasoning of others.

1. What are the assumptions, definitions, and previous knowledge to help in thinking about this problem?
2. What are some possible conjectures that you have about the problem?
3. Explain your mathematical argument so that somebody else can make sense of your thinking.

#### Math Practice 4: Model with mathematics.

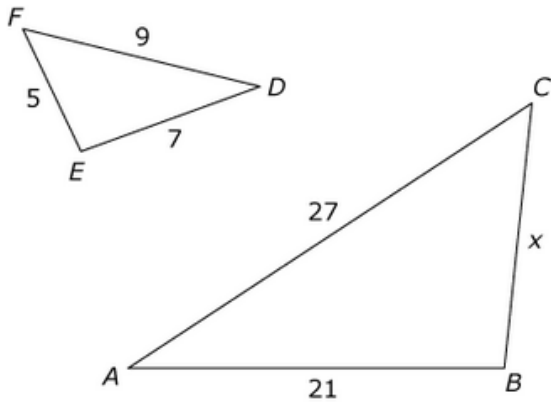
1. What are the important quantities in the problem that are needed to solve it?
2. What mathematical operation(s) or representation(s) will you use to solve the problem?
3. Explain how you know your answer makes sense in the context of the situation.

#### Math Practice 6: Attend to precision.

1. What are the important units in the problem? (What are we measuring or counting?)
2. What relationship between the units/quantities do you need to know in order to solve the problem?
3. Use appropriate and precise mathematical language, units, labels and computations to clearly describe your mathematical reasoning.

Geometry PARCC EOY Practice Assessment Item #1 (non-calculator): Standard G-SRT.5

The figure shows  $\triangle ABC \sim \triangle DEF$  with side lengths as indicated.

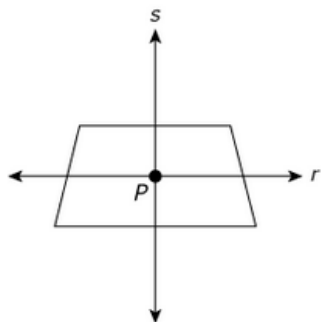


What is the value of  $x$ ?

Enter your answer in the box.

### Geometry PARCC EOY Practice Assessment Item #2 (non-calculator): Standard G-CO.3

The figure shows two perpendicular lines  $s$  and  $r$  intersecting at point  $P$  in the interior of a trapezoid. Line  $r$  is parallel to the bases and bisects both legs of the trapezoid. Line  $s$  bisects both bases of the trapezoid.



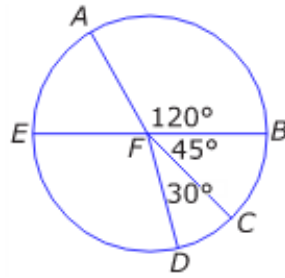
Which transformation will always carry the figure onto itself?

Select **all** that apply.

- A. a reflection across line  $r$
- B. a reflection across line  $s$
- C. a rotation of  $90^\circ$  clockwise about point  $P$
- D. a rotation of  $180^\circ$  clockwise about point  $P$
- E. a rotation of  $270^\circ$  clockwise about point  $P$

Geometry PARCC EOY Practice Assessment Item #3 (non-calculator): Standard G-C.B.Int.1

The circle with center  $F$  is divided into sectors. In circle  $F$ ,  $EB$  is a diameter. The radius of circle  $F$  is 3 units.



Drag and drop each arc length to its subtended central angle.

$\frac{\pi}{2}$	$\pi$	$2\pi$	$\frac{3\pi}{4}$
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Subtended Central Angle	Arc Length
$\angle AFB$	<input type="text"/>
$\angle BFC$	<input type="text"/>
$\angle CFD$	<input type="text"/>
$\angle AFE$	<input type="text"/>

**Geometry PARCC EOY Practice Assessment Item #4 (non-calculator): Standard G-GMD.4**

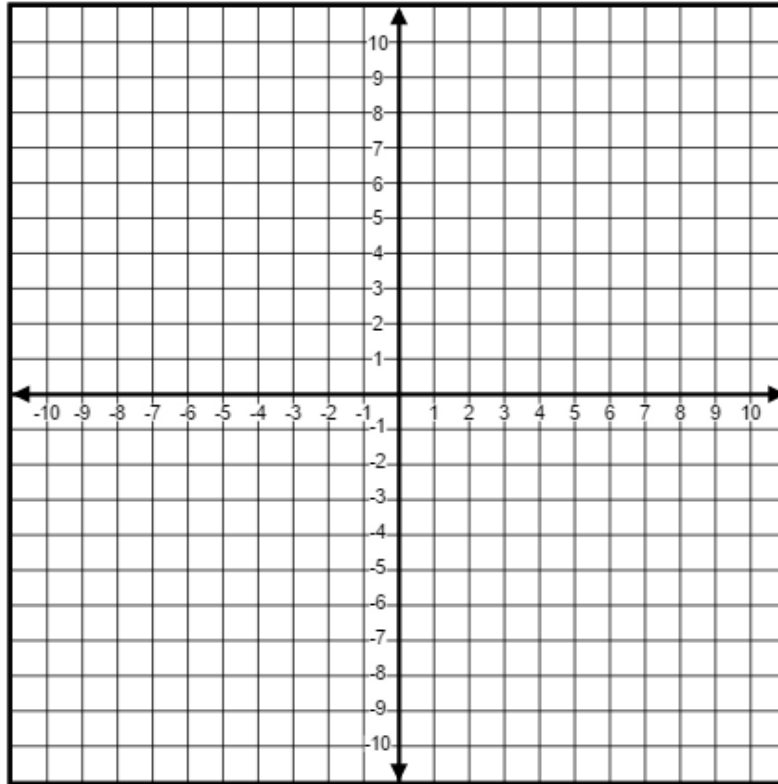
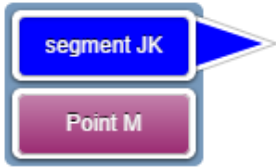
A rectangle will be rotated  $360^\circ$  about a line which contains the point of intersection of its diagonals and is parallel to a side. What three-dimensional shape will be created as a result of the rotation?

- A. a cube
- B. a rectangular prism
- C. a cylinder
- D. a sphere

**Geometry PARCC EOY Practice Assessment Item #5 (non-calculator): Standard G-GPE.6**

Line segment  $\overline{JK}$  in the coordinate plane has endpoints with coordinates  $(-4, 11)$  and  $(8, -1)$ . Graph  $\overline{JK}$  and find two possible locations for point  $M$  so that  $M$  divides  $\overline{JK}$  into two parts with lengths in a ratio of 1:3.

To graph a line segment, select segment  $\overline{JK}$  and then plot two points on the coordinate plane. A segment will connect the points. Select Point  $M$  and then plot the two points.



**Geometry PARCC EOY Practice Assessment Item #6 (non-calculator): Standard G-GPE.1-2**

The equation  $x^2 + y^2 - 4x + 2y = b$  describes a circle.

**Part A**

Determine the  $y$ -coordinate of the center of the circle.

Enter your answer in the box.

**Part B**

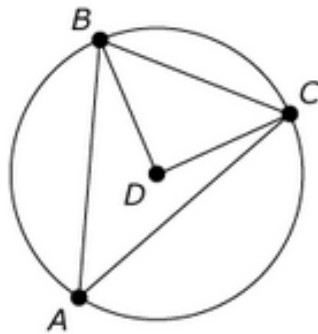
The radius of the circle is 7 units. What is the value of  $b$  in the equation?

Enter your answer in the box.



Geometry PARCC EOY Practice Assessment Item #1 (Calculator Part): Standard G-C.2

The figure shows  $\triangle ABC$  inscribed in circle  $D$ .



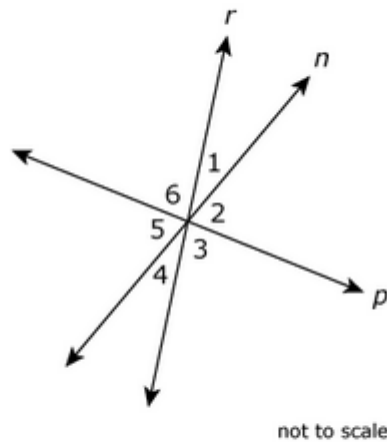
If  $m\angle CBD = 44^\circ$ , find  $m\angle BAC$ .

Enter your answer in the box.

 degrees

Geometry PARCC EOY Practice Assessment Item #2 (Calculator Part): Standard G-CO.1

The figure shows lines  $r$ ,  $n$ , and  $p$  intersecting to form angles numbered 1, 2, 3, 4, 5, and 6. All three lines lie in the same plane.

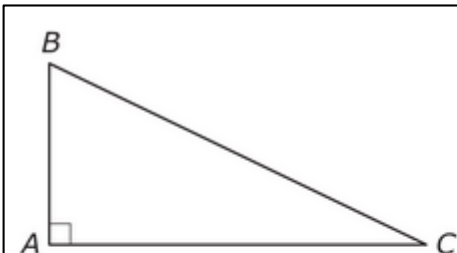


Based on the figure, which of the individual statements would provide enough information to conclude that line  $r$  is perpendicular to line  $p$ ?

Select all that apply.

- A.  $m\angle 2 = 90^\circ$
- B.  $m\angle 6 = 90^\circ$
- C.  $m\angle 3 = m\angle 6$
- D.  $m\angle 1 + m\angle 6 = 90^\circ$
- E.  $m\angle 3 + m\angle 4 = 90^\circ$
- F.  $m\angle 4 + m\angle 5 = 90^\circ$

Geometry PARCC EOY Practice Assessment Item #3 (Calculator Part): Standard G-SRT.7-2

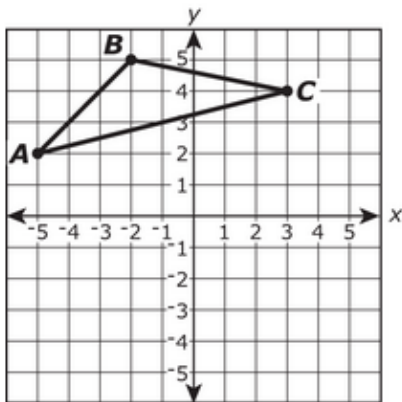


In right triangle  $ABC$ ,  $m\angle B \neq m\angle C$ . Let  $\sin B = r$  and  $\cos B = s$ . What is  $\sin C - \cos C$ ?

- A.  $r + s$
- B.  $r - s$
- C.  $s - r$
- D.  $\frac{r}{s}$

**Geometry PARCC EOY Practice Assessment Item #4 (Calculator Part): Standard G-CO.6**

Triangle  $ABC$  is shown in the  $xy$ -coordinate plane.

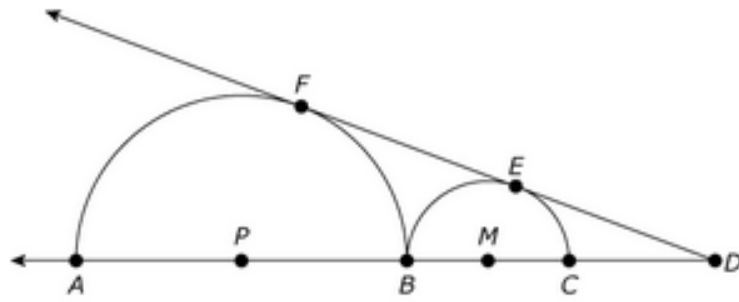


The triangle will be rotated  $180^\circ$  clockwise around the point  $(3, 4)$  to create triangle  $A'B'C'$ . Indicate whether each of the listed features of the image will or will not be the same as the corresponding feature in the original triangle by selecting the appropriate box in the table.

	The coordinates of $A'$	The coordinates of $C'$	The perimeter of $\triangle A'B'C'$	The area of $\triangle A'B'C'$	The measure of $\angle B'$	The slope of $\overline{A'C'}$
Will be the Same	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Will Not be the Same	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Geometry PARCC EOY Practice Assessment Item #5 (Calculator Part): Standard G-SRT.5

The figure shows two semicircles with centers  $P$  and  $M$ . The semicircles are tangent to each other at point  $B$ , and  $\overrightarrow{DE}$  is tangent to both semicircles at  $F$  and  $E$ .

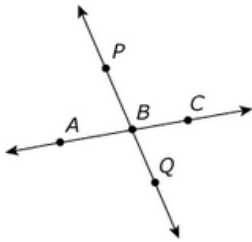


If  $PB = BC = 6$ , what is  $ED$ ?

- A. 6
- B.  $\sqrt{48}$
- C. 8
- D.  $\sqrt{72}$

**Geometry PARCC EOY Practice Assessment Item #6 (Calculator Part): Standard G-SRT.1a**

The figure shows  $\overleftrightarrow{AC}$  and  $\overleftrightarrow{PQ}$  intersecting at point  $B$ .  $\overleftrightarrow{A'C'}$  and  $\overleftrightarrow{P'Q'}$  will be the images of lines  $AC$  and  $PQ$ , respectively, under a dilation with center  $P$  and scale factor 2.



Use the choices in the drop-down menus to complete the sentence.

Line  $A'C'$  will be   $\overleftrightarrow{AC}$  and line  $P'Q'$  will be   $\overleftrightarrow{PQ}$ .

- Choose...
- parallel to
- perpendicular to
- the same line as

**Geometry PARCC EOY Practice Assessment Item #8 (Calculator Part): Standard G-GMD.3**

The table shows the approximate measurements of the Great Pyramid of Giza in Egypt and the Pyramid of Kukulcan in Mexico.

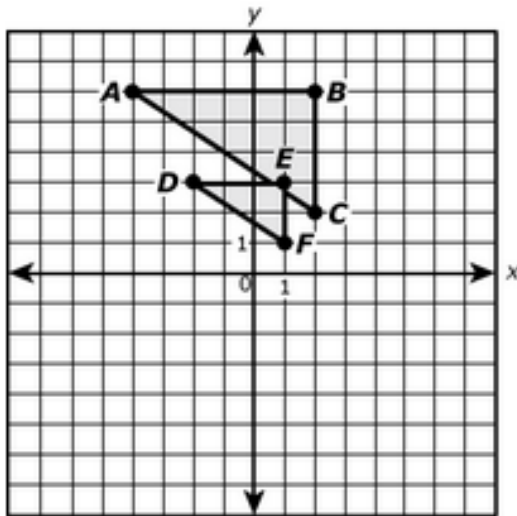
Pyramid	Height (meters)	Area of Base (square meters)
Great Pyramid of Giza	147	52,900
Pyramid of Kukulcan	30	3,025

Approximately what is the difference between the volume of the Great Pyramid of Giza and the volume of the Pyramid of Kukulcan?

- A. 1,945,000 cubic meters
- B. 2,562,000 cubic meters
- C. 5,835,000 cubic meters
- D. 7,686,000 cubic meters

Geometry PARCC EOY Practice Assessment Item #9 (Calculator Part): Standard G-SRT.1b

In the coordinate plane shown,  $\triangle ABC$  has vertices  $A(-4, 6)$ ,  $B(2, 6)$ , and  $C(2, 2)$ .



What is the scale factor and the center of dilation that will carry  $\triangle ABC$  onto  $\triangle DEF$ ?

Enter your answers in the boxes to complete the sentence.

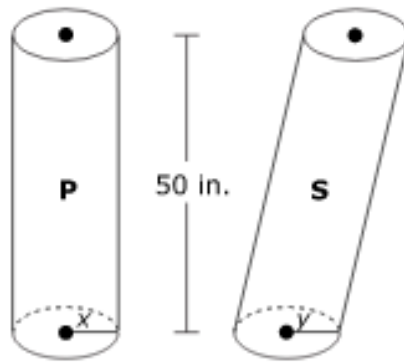
The scale factor is  and the center of dilation is at

( ,  ).



Geometry PARCC EOY Practice Assessment Item #11 (Calculator Part): Standard G-GMD.1

Two cylinders each with a height of 50 inches are shown.



Which statements about cylinders P and S are true?

Select all that apply.

- A. If  $x = y$ , the volume of cylinder P is greater than the volume of cylinder S, because cylinder P is a right cylinder.
- B. If  $x = y$ , the volume of cylinder P is equal to the volume of cylinder S, because the cylinders are the same height.
- C. If  $x = y$ , the volume of cylinder P is less than the volume of cylinder S, because cylinder S is slanted.
- D. If  $x < y$ , the area of a horizontal cross section of cylinder P is greater than the area of a horizontal cross section of cylinder S.
- E. If  $x < y$ , the area of a horizontal cross section of cylinder P is equal to the area of a horizontal cross section of cylinder S.
- F. If  $x < y$ , the area of a horizontal cross section of cylinder P is less than the area of a horizontal cross section of cylinder S.

**Geometry PARCC EOY Practice Assessment Item #12 (Calculator Part): Standard G-CO.6**

Triangle  $ABC$  has vertices at  $A(1, 2)$ ,  $B(4, 6)$ , and  $C(4, 2)$  in the coordinate plane. The triangle will be reflected over the  $x$ -axis and then rotated  $180^\circ$  about the origin to form  $\triangle A'B'C'$ . What are the vertices of  $\triangle A'B'C'$ ?

- A.  $A'(1, -2)$ ,  $B'(4, -6)$ ,  $C'(4, -2)$
- B.  $A'(-1, -2)$ ,  $B'(-4, -6)$ ,  $C'(-4, -2)$
- C.  $A'(-1, 2)$ ,  $B'(-4, 6)$ ,  $C'(-4, 2)$
- D.  $A'(1, 2)$ ,  $B'(4, 6)$ ,  $C'(4, 2)$

**Geometry PARCC EOY Practice Assessment Item #13 (Calculator Part): Standard G-Int.1**

A steel pipe in the shape of a right circular cylinder is used for drainage under a road. The length of the pipe is 12 feet and its diameter is 36 inches. The pipe is open at both ends.

**Part A**

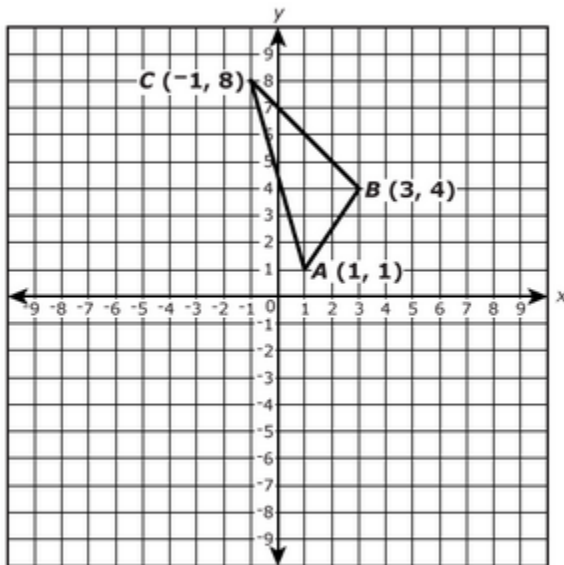
The outer surface of the pipe is coated with protective material. How many square feet is the outer surface of the pipe?

Give your answer to the nearest integer. Enter your answer in the box.

square feet

Geometry PARCC EOY Practice Assessment Item #14 (Calculator Part): Standard G-CO.5

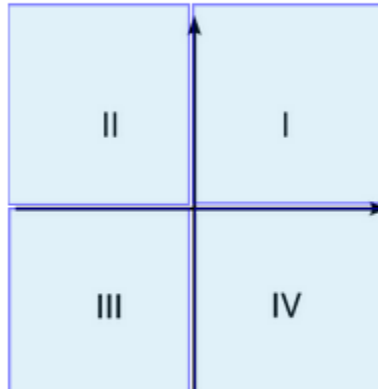
Triangle  $ABC$  is graphed in the coordinate plane with vertices  $A(1, 1)$ ,  $B(3, 4)$ , and  $C(-1, 8)$  as shown in the figure.



Part A

Triangle  $ABC$  will be reflected across the line  $y = 1$  to form  $\triangle A'B'C'$ .

Select all quadrants of the  $xy$ -coordinate plane that will contain at least one vertex of  $\triangle A'B'C'$ .



Part B

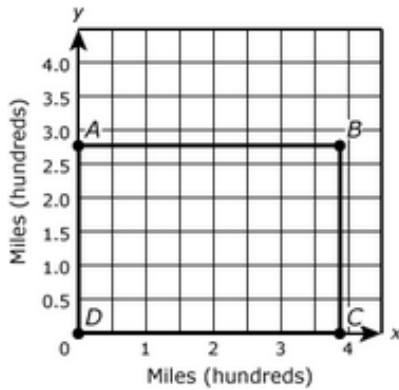
What are the coordinates of  $B'$ ?

Enter your answers in the boxes.

(  ,  )

### Geometry PARCC EOY Practice Assessment Item #15 (Calculator Part): Standard G-Int.1

The figure shows rectangle  $ABCD$  in the coordinate plane with point  $A$  at  $(0, 2.76)$ ,  $B$  at  $(3.87, 2.76)$ ,  $C$  at  $(3.87, 0)$ , and  $D$  at the origin. Rectangle  $ABCD$  can be used to approximate the size of the state of Colorado with the  $x$  and  $y$  scales representing hundreds of miles.



#### Part A

Based on the information given, how many miles is the perimeter of Colorado?

Enter your answer in the box.

 miles

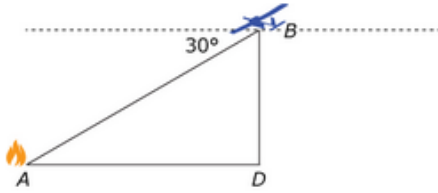
#### Part B

At the end of 2010, the population of Colorado was 5,029,196 people. Based on the information given, what was the population density at the end of 2010?

- A. 25 people per square mile
- B. 47 people per square mile
- C. 2,269 people per square mile
- D. 7,586 people per square mile

**Geometry PARCC EOY Practice Assessment Item #16 (Calculator Part): Standard G-SRT.8**

An unmanned aerial vehicle (UAV) is equipped with cameras used to monitor forest fires. The figure represents a moment in time at which a UAV, at point  $B$ , flying at an altitude of 1,000 meters (m) is directly above point  $D$  on the forest floor. Point  $A$  represents the location of a small fire on the forest floor.



At the moment in time represented by the figure, the angle of depression from the UAV to the fire has a measure of  $30^\circ$ .

**Part A**

At the moment in time represented by the figure, what is the distance from the UAV to the fire?

Enter your answer in the box.

 meters

**Part B**

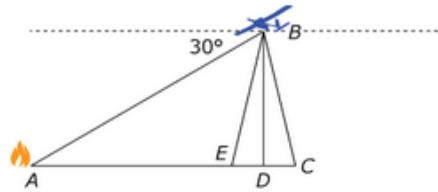
What is the distance, to the nearest meter, from the fire to point  $D$ ?

Enter your answer in the box.

 meters

**Part C**

Points  $C$  and  $E$  represent the linear range of view of the camera when it is pointed directly down at point  $D$ .

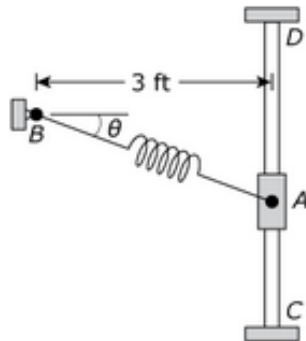


The field of view of the camera is  $20^\circ$  and is represented in the figure by  $\angle CBE$ . If the camera takes a picture directly over point  $D$ , what is the approximate width of the forest floor that will be captured in the picture?

- A. 170 meters
- B. 353 meters
- C. 364 meters
- D. 728 meters

Geometry PARCC EOY Practice Assessment Item #20 (Calculator Part): Standard G-SRT.8

A spring is attached at one end to support  $B$  and at the other end to collar  $A$ , as represented in the figure. Collar  $A$  slides along the vertical bar between points  $C$  and  $D$ . In the figure, the angle  $\theta$  is the angle created as the collar moves between points  $C$  and  $D$ .



Part A

When  $\theta = 28^\circ$ , what is the distance from point  $A$  to point  $B$  to the nearest tenth of a foot?

Enter a number in the answer box.

feet

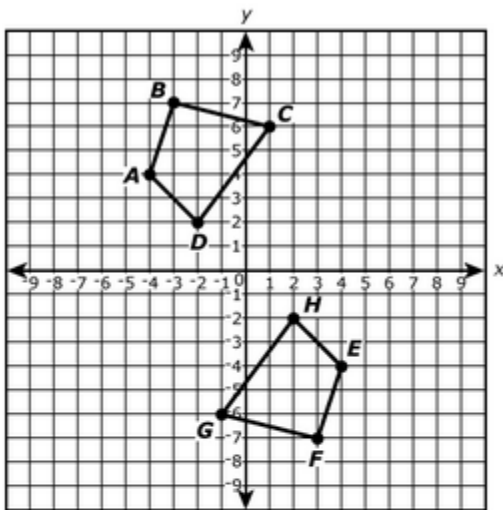
Part B

When the spring is stretched and the distance from point  $A$  to point  $B$  is 5.2 feet, what is the value of  $\theta$  to the nearest tenth of a degree?

- A.  $35.2^\circ$
- B.  $45.1^\circ$
- C.  $54.8^\circ$
- D.  $60.0^\circ$

Geometry PARCC EOY Practice Assessment Item #21 (Calculator Part): Standard G-CO.5

Quadrilaterals  $ABCD$  and  $EFGH$  are shown in the coordinate plane.



**Part A**

Quadrilateral  $EFGH$  is the image of  $ABCD$  after a transformation or sequence of transformations.

Which could be the transformation or sequence of transformations?

Select all that apply.

- A. a translation of 3 units to the right, followed by a reflection across the  $x$ -axis
- B. a rotation of  $180^\circ$  about the origin
- C. a translation of 12 units downward, followed by a reflection across the  $y$ -axis
- D. a reflection across the  $y$ -axis, followed by a reflection across the  $x$ -axis
- E. a reflection across the line with equation  $y = x$

**Part B**

Quadrilateral  $ABCD$  will be reflected across the  $x$ -axis and then rotated  $90^\circ$  clockwise about the origin to create quadrilateral  $A'B'C'D'$ . What will be the  $y$ -coordinate of  $B'$ ?

Enter your answer in the box.



**Geometry PARCC EOY Practice Assessment Item #22 (Calculator Part): Standard G-C.2**

Point  $B$  is the center of a circle, and  $\overline{AC}$  is a diameter of the circle. Point  $D$  is a point on the circle different from  $A$  and  $C$ .

**Part A**

Drag and drop the following choices into the boxes to indicate which statements are always true, sometimes true or never true.

Always True

Sometimes True

Never True

Statements	
$AD > CD$	<input type="text"/>
$m\angle CBD = \frac{1}{2}(m\angle CAD)$	<input type="text"/>
$m\angle CBD = 90^\circ$	<input type="text"/>
$m\angle ABD = 2(m\angle CBD)$	<input type="text"/>

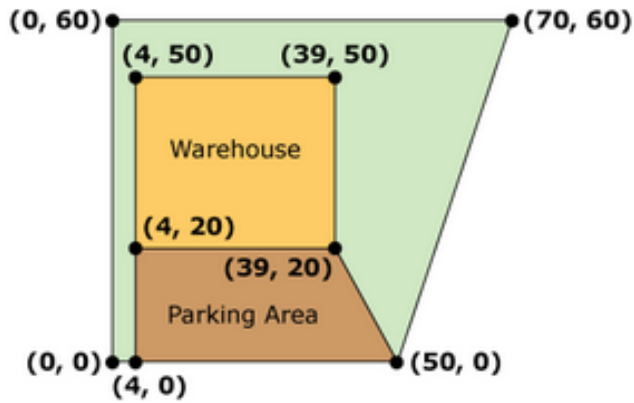
**Part B**

If  $m\angle BDA = 20^\circ$ , what is  $m\angle CBD$ ?

- A.  $20^\circ$
- B.  $40^\circ$
- C.  $70^\circ$
- D.  $140^\circ$

Geometry PARCC EOY Practice Assessment Item #24 (Calculator Part): Standard G-Int.1

Luke purchased a warehouse on a plot of land for his business. The figure represents a plan of the land showing the location of the warehouse and parking area. The coordinates represent points on a rectangular grid with units in feet.



**Part A**

What is the perimeter of the plot of land?

Express your answer to the nearest tenth of a foot.

Enter your answer in the box.

 feet

**Part B**

What is the area of the plot of land that does not include the warehouse and the parking area?

Enter your answer in the box.

 square feet

**Part C**

Luke is planning to put a fence along two interior sides of the parking area. The sides are represented in the plan by the legs of the trapezoid. What is the total length of fence needed?

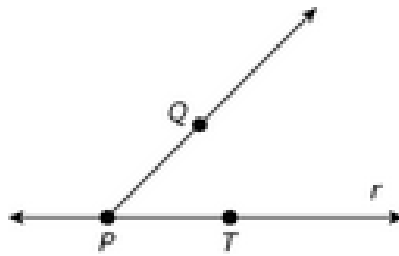
Express your answer to the nearest tenth of a foot.

Enter your answer in the box.

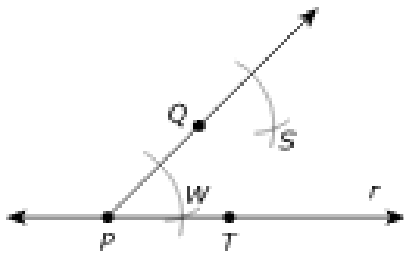
 feet

Geometry PARCC EOY Practice Assessment Item #25 (Calculator Part): Standard G-CO.D

The figure shows line  $r$ , points  $P$  and  $T$  on line  $r$ , and point  $Q$  not on line  $r$ . Also shown is ray  $PQ$ .



Part A



Consider the partial construction of a line parallel to  $r$  through point  $Q$ . What would be the final step in the construction?

- A. draw a line through  $P$  and  $S$
- B. draw a line through  $Q$  and  $S$
- C. draw a line through  $T$  and  $S$
- D. draw a line through  $W$  and  $S$

Part B

Once the construction is complete, which of the reasons listed contribute to proving the validity of the construction?

- A. When two lines are cut by a transversal and the corresponding angles are congruent, the lines are parallel.
- B. When two lines are cut by a transversal and the vertical angles are congruent, the lines are parallel.
- C. Definition of segment bisector
- D. Definition of an angle bisector