

# Florida

## Predictive Assessment

*See what they know. Teach what they need.*

### Practice Example:

Which of the following could be the side lengths of a right triangle?

- A. 1 unit, 2 units, 3 units
- B. 2 units, 3 units, 4 units
- C. 3 units, 4 units, 5 units
- D. 4 units, 5 units, 6 units

(A) (B) (C) (D)

## Test B

### Geometry

### Items 1-32



\*FLRC-GEHSBG-201\*

# Florida High School Math

## Area

Triangle	$A = \frac{1}{2}bh$
Trapezoid	$A = \frac{1}{2}h(b_1 + b_2)$
Parallelogram	$A = bh$
Circle	$A = \pi r^2$
Regular Polygon	$A = \frac{1}{2}aP$

KEY	
$b$ = base	$A$ = area
$h$ = height	$C$ = circumference
$w$ = width	$V$ = volume
$\ell$ = slant height	$B$ = area of base
$d$ = diameter	$P$ = perimeter of base
$r$ = radius	$S.A.$ = surface area
$a$ = apothem	
Use 3.14 or $\frac{22}{7}$ for $\pi$ .	

## Circumference

$$C = \pi d \text{ or } C = 2\pi r$$

## Volume/Capacity

## Total Surface Area

	Right Circular Cone	$V = \frac{1}{3}\pi r^2 h$ or $V = \frac{1}{3}Bh$	$S.A. = \frac{1}{2}(2\pi r)\ell + B$
	Right Square Pyramid	$V = \frac{1}{3}Bh$	$S.A. = \frac{1}{2}P\ell + B$
	Sphere	$V = \frac{4}{3}\pi r^3$	$S.A. = 4\pi r^2$
	Right Circular Cylinder	$V = \pi r^2 h$ or $V = Bh$	$S.A. = 2\pi r h + 2\pi r^2$ or $S.A. = 2\pi r h + 2B$
	Rectangular Prism	$V = Bh$ or $V = bwh$	$S.A. = 2bh + 2bw + 2hw$ or $S.A. = Ph + 2B$

Sum of the measures of the interior angles of a polygon =  $180(n - 2)$

Measures of an interior angle of a regular polygon =  $\frac{180(n - 2)}{n}$

where:  $n$  represents the number of sides

### Slope formula

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

where  $m$  = slope and  $(x_1, y_1)$  and  $(x_2, y_2)$  are points on the line

### Distance between two points

$$P_1(x_1, y_1) \text{ and } P_2(x_2, y_2)$$

$$\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

### Slope-intercept form of a linear equation

$$y = mx + b$$

where  $m$  = slope and  $b$  = the  $y$ -intercept

### Midpoint between two points

$$P_1(x_1, y_1) \text{ and } P_2(x_2, y_2)$$

$$\left( \frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$$

### Point-slope form of a linear equation

$$y - y_1 = m(x - x_1)$$

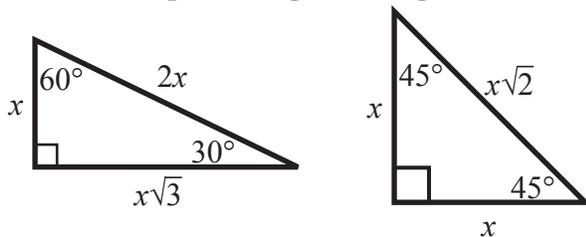
where  $m$  = slope and  $(x_1, y_1)$  is a point on the line

### Quadratic formula

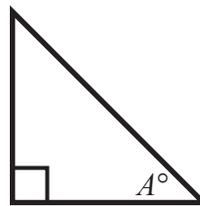
$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

where  $a$ ,  $b$ , and  $c$  are coefficients in an equation of the form  $ax^2 + bx + c = 0$

### Special Right Triangles



### Trigonometric Ratios



$$\sin A^\circ = \frac{\text{opposite}}{\text{hypotenuse}}$$

$$\cos A^\circ = \frac{\text{adjacent}}{\text{hypotenuse}}$$

$$\tan A^\circ = \frac{\text{opposite}}{\text{adjacent}}$$

### Conversions

1 yard = 3 feet = 36 inches

1 mile = 1,760 yards = 5,280 feet

1 acre = 43,560 square feet

1 hour = 60 minutes

1 minute = 60 seconds

1 cup = 8 fluid ounces

1 pint = 2 cups

1 quart = 2 pints

1 gallon = 4 quarts

1 pound = 16 ounces

1 ton = 2,000 pounds

1 liter = 1000 milliliters = 1000 cubic centimeters

1 meter = 100 centimeters = 1000 millimeters

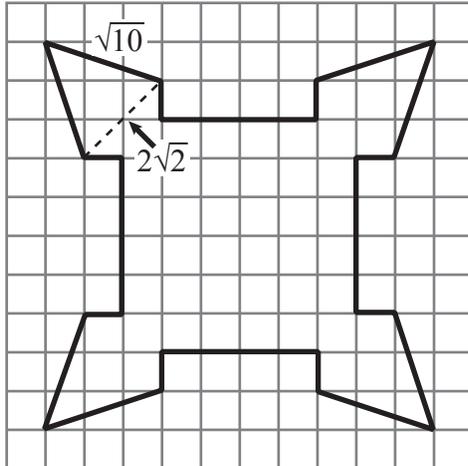
1 kilometer = 1000 meters

1 gram = 1000 milligrams

1 kilogram = 1000 grams

Questions 1 through 32 are math questions. Read each question carefully. Choose the best answer and then go on to the next question. Do not skip any questions.

1. The Castillo de San Marcos is a fort in St. Augustine built by Spain in the 17<sup>th</sup> century. Here is a figure showing the plan of its exterior wall.



What is the total area enclosed by the fort's wall?

- A. 52 square units
- B. 54 square units
- C. 56 square units
- D. 60 square units

Use the following compound statement to answer questions 2 and 3.

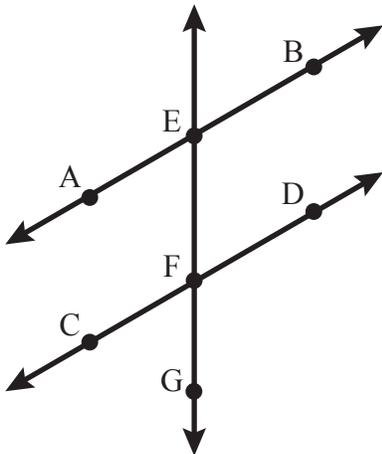
**“If Mary’s favorite color is green, then Chang’s favorite color is blue.”**

2. Which one of the following compound statements is the contrapositive of, and logically equivalent to, the given statement?
- A. If Chang’s favorite color is not blue, then Mary’s favorite color is not green.
  - B. Either Chang’s favorite color is not blue or Mary’s favorite color is green.
  - C. If Chang’s favorite color is blue, then Mary’s favorite color is green.
  - D. Chang’s favorite color is blue and Mary’s favorite color is not green.
3. Which one of the following compound statements is the converse of the given statement?
- A. If Mary’s favorite color is blue, then Chang’s favorite color is green.
  - B. If Chang’s favorite color is not blue, then Mary’s favorite color is not green.
  - C. If Chang’s favorite color is blue, then Mary’s favorite color is green.
  - D. If Mary’s favorite color is green, then Chang’s favorite color is not blue.

4. The geodesic dome at Epcot, near Orlando, is in the shape of a large sphere. The dome is about 50 meters in diameter.

What is the approximate volume of the dome, in terms of  $\pi$ ?

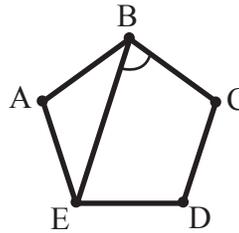
- A.  $800\pi$  cubic meters
  - B.  $3,000\pi$  cubic meters
  - C.  $21,000\pi$  cubic meters
  - D.  $167,000\pi$  cubic meters
5. Lines AB and CD are parallel. Line EG intersects line AB at point E and intersects line CD at point F, as shown below.



What is a necessary relationship between  $\angle BEF$  and  $\angle CFG$  in this diagram?

- A. They are vertical angles.
- B. They are congruent angles.
- C. They are complementary angles.
- D. They are supplementary angles.

6. In the following figure, ABCDE is a regular pentagon.



What is the measure of angle EBC?

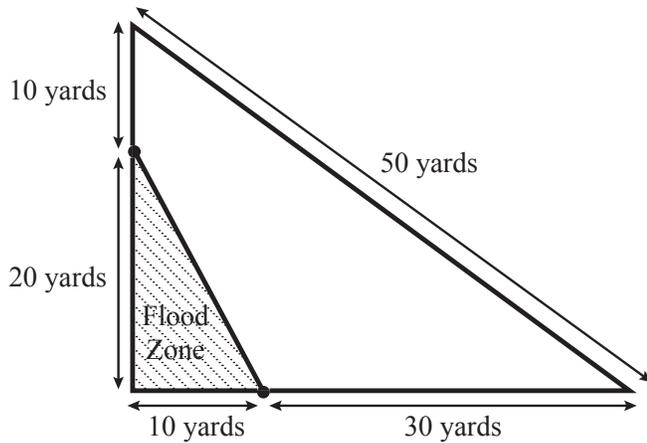
- A.  $45^\circ$
  - B.  $72^\circ$
  - C.  $80^\circ$
  - D.  $108^\circ$
7. Clarence would like to estimate the height of a tall pole near his house. A tree next to the pole is 2.5 meters in height, and Clarence measured the tree's shadow to be 1.5 meters in length. At the same time of day, Clarence measured the length of the pole's shadow to be 9.0 meters.

What is the height of the pole?

- A. 5.4 meters
- B. 13.5 meters
- C. 15.0 meters
- D. 33.75 meters

Use the following information and figure to answer questions 8 and 9.

Juanita is thinking of buying a small tract of land that has the shape of a right triangle whose legs are 40 and 30 yards long and whose hypotenuse is 50 yards long. However, a corner of the lot regularly floods and will be of no use to her. See the following figure.



8. What is the area of the usable part of the lot?

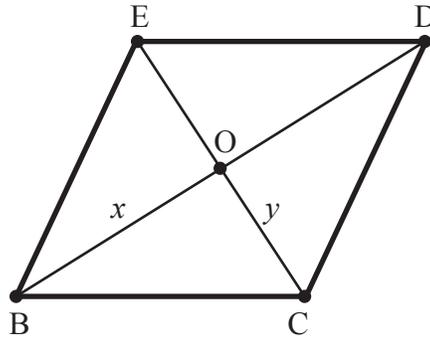
- A. 600 square yards
- B. 560 square yards
- C. 530 square yards
- D. 500 square yards

9. Juanita would like to build a fence all the way around the usable part of the lot.

To the nearest yard, how long would the fence be?

- A. 112 yards
- B. 110 yards
- C. 103 yards
- D. 97 yards

10. Kim was thinking about a rhombus BCDE with diagonals BD and CE intersecting at point O. She let the length of OB be  $x$  and the length of OC be  $y$ .

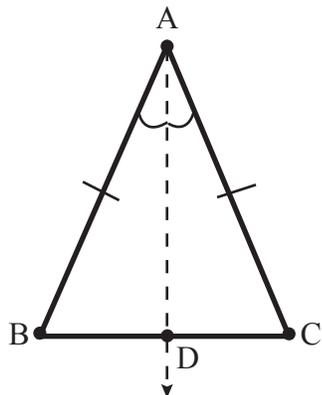


Kim suddenly realized that the area,  $A$ , of any rhombus is given by the simple formula  $A = 2xy$ .

Which property of a rhombus could Kim best use to justify this formula?

- A. Opposite sides are congruent.
- B. Opposite angles are congruent.
- C. Each interior angle of the rhombus is bisected by a diagonal.
- D. The diagonals divide the rhombus into 4 congruent right triangles.

11. Ricardo is working on a proof to show that a ray that bisects the vertex angle of an isosceles triangle divides the triangle into two congruent triangles. Here is the figure he is using and his proof so far.

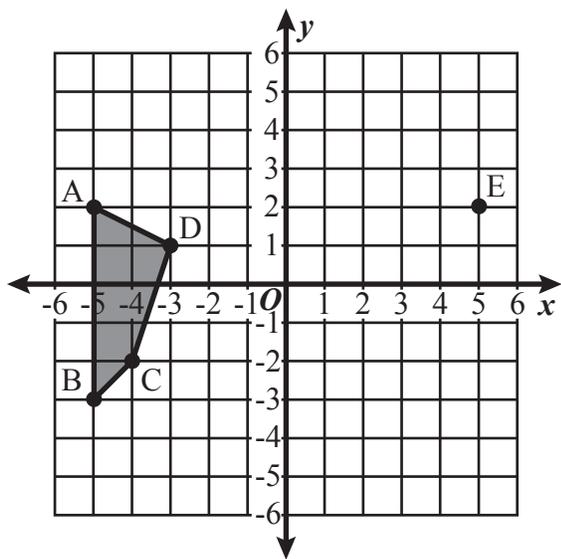


Statement	Reason
1. Triangle ABC is isosceles with base BC and vertex angle at point A.	given
2. Ray AD bisects the vertex angle at A.	given
3. Angle BAD is congruent to angle CAD.	definition of angle bisector (2)
4. Segment AB is congruent to segment AC.	definition of isosceles triangle (1)
5. Segment AD is congruent to segment AD.	reflexive property of congruence
6. Triangle BAD is congruent to triangle CAD.	_____

What reason should Ricardo use to justify his conclusion at line 6?

- A. side-side-angle congruence (5, 4, 3)
- B. side-angle-side congruence (4, 3, 5)
- C. side-side-side congruence (1, 4, 5)
- D. side-angle-angle congruence (5, 3, 1)

12. Look at figure ABCD in the grid below.

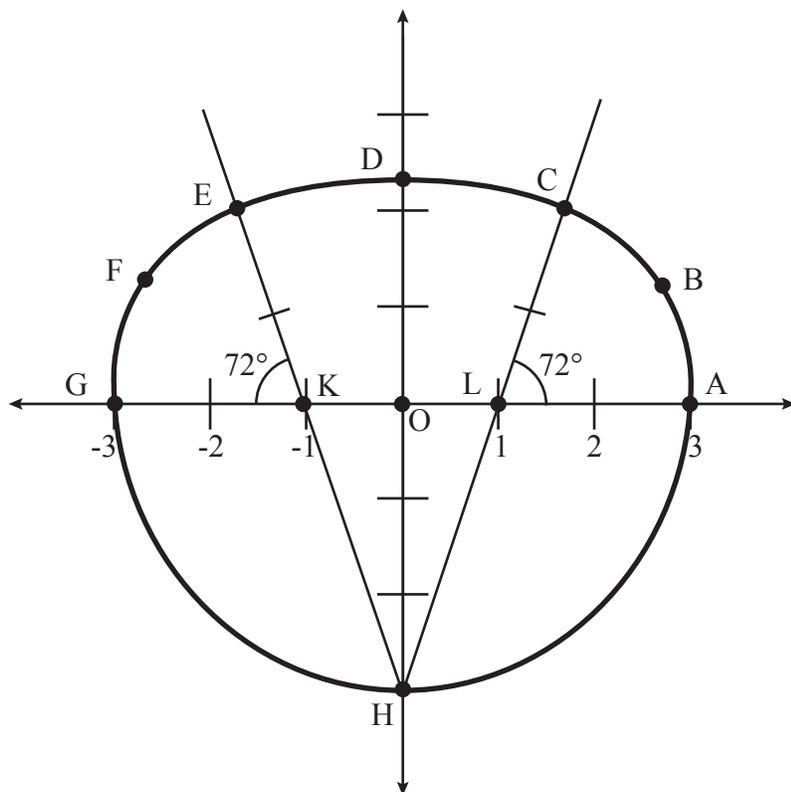


Similar figure AEFG will be drawn on this grid, sharing point A with the figure above.

Which of these is a possible location of point F?

- A. (5, 4)
- B. (5, 0)
- C. (4, 4)
- D. (3, 0)

13. At an ancient stone monument near Barbrook, in Derbyshire, the stones seem to be arranged along a curve that is some kind of “flattened” circle. The scale figure below shows one theory for the shape of the curve.



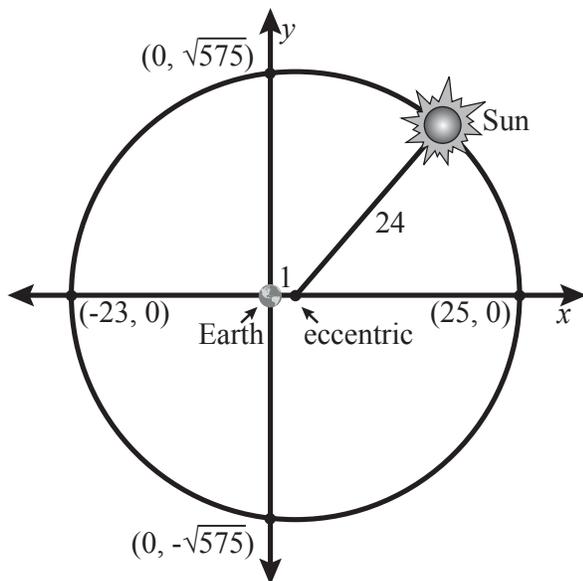
This “flattened” circle is really made by joining together pieces of 4 different circles, as follows.

- Circular arc ABC has a radius of 2 units and center at point L.
- Circular arc CDE has a length of 3.3 units and center at point H.
- Circular arc EFG has a radius of 2 units and center at point K.
- Arc GHA is a semicircle with a length of 9.4 units and center at point O.

What is the perimeter of the “flattened” circle, approximately?

- A. 15.2 units
- B. 15.8 units
- C. 17.7 units
- D. 18.8 units

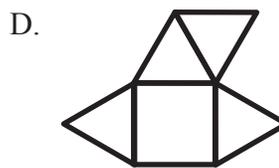
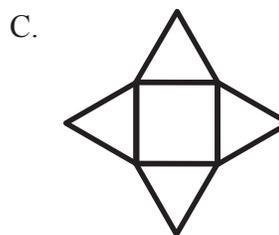
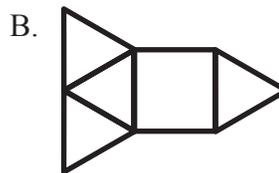
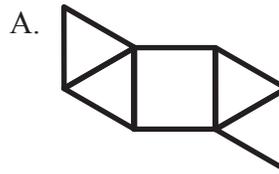
14. Hipparchus was an ancient Greek astronomer who lived in the 2nd century BCE. He thought that the Sun moved with constant speed on a circular path around Earth, while Earth stayed in one place. However, to account for his observations he realized that Earth could not be located at the center of the Sun's circular orbit. He named the point that was the center of the orbit the "eccentric." He also estimated that if the distance from Earth to the eccentric was 1 unit, then the radius of the Sun's orbit about the eccentric was 24 units. Assume Earth, the eccentric, and the circular orbit all lie in a plane.



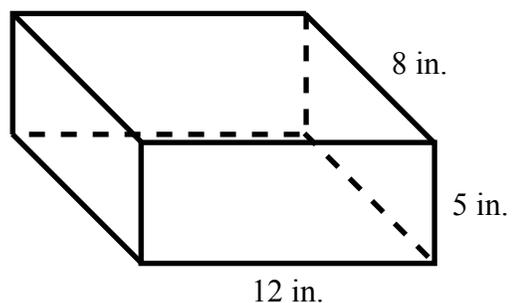
Which of the following equations could describe the orbit of the Sun using Cartesian coordinates where the location of Earth has coordinates (0, 0)?

- A.  $(x + 1)^2 + y^2 = 25$
- B.  $(x - 1)^2 + y^2 = 24^2$
- C.  $(x - 24)^2 + y^2 = 1$
- D.  $x^2 + y^2 = 24^2$

15. Which of the following could NOT be the net of a right square pyramid?



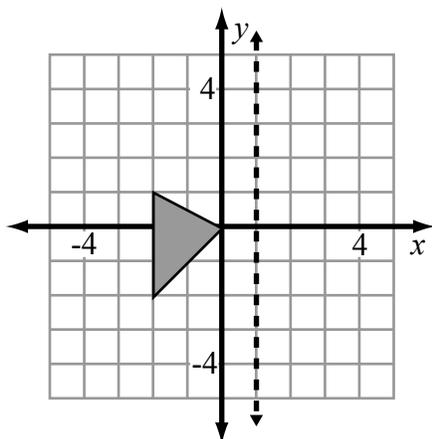
16. Shea is wrapping a gift box and needs to know how much gift wrap she will need. Her box is 12 inches long, 8 inches wide, and 5 inches tall.



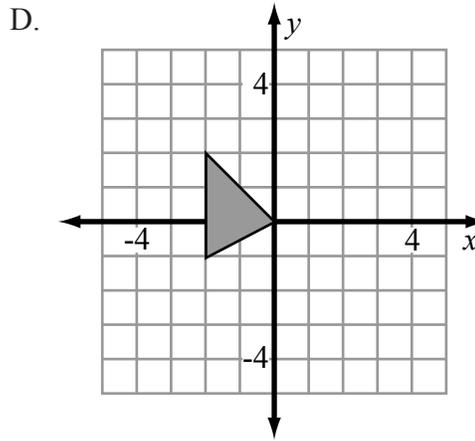
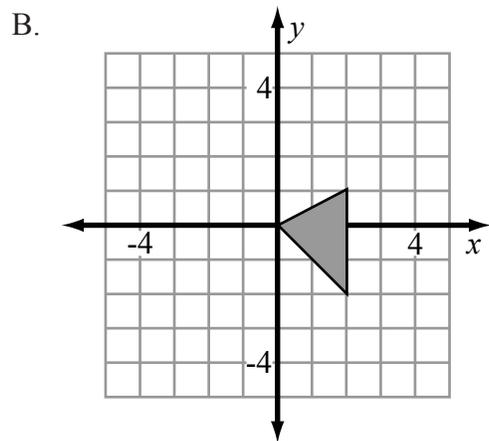
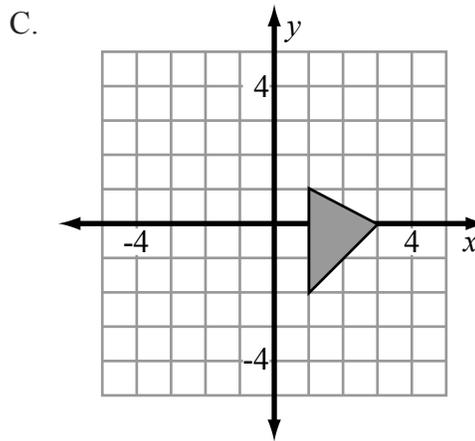
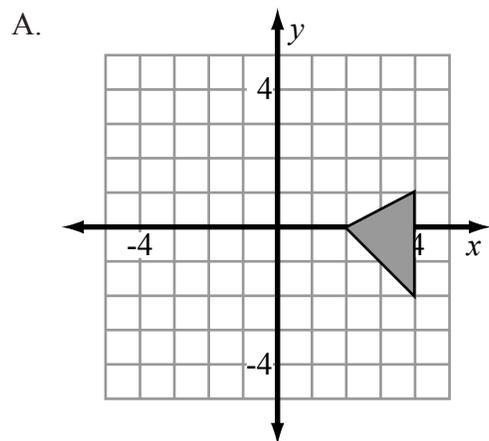
Use the formula for surface area to determine how much gift wrap Shea will need.

- A.  $160 \text{ in}^2$
- B.  $240 \text{ in}^2$
- C.  $392 \text{ in}^2$
- D.  $480 \text{ in}^2$

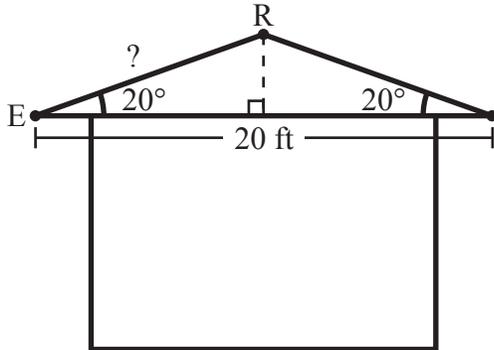
17. Look at the triangle and the line  $x = 1$  in the coordinate plane below.



Identify the result of reflecting this triangle across the line  $x = 1$ .



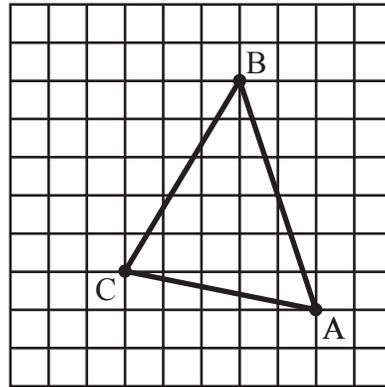
18. Rosa is designing a simple peaked roof to cover a small square building. The roof will cover an area that is 20 feet by 20 feet and its ridge will be over the midline of the building. The inclination of the roof will be  $20^\circ$ .



Which expression can be used to find the distance from the edge of the roof at E to its ridge at R?

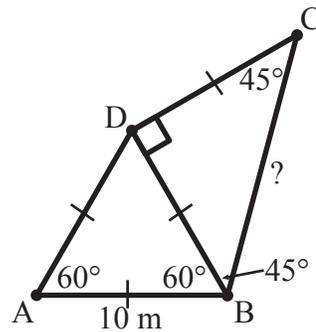
- A.  $\frac{\sin(20^\circ)}{10}$   
 B.  $\frac{\cos(20^\circ)}{10}$   
 C.  $\frac{10}{\cos(20^\circ)}$   
 D.  $\frac{10}{\sin(20^\circ)}$

19. Consider the following triangle ABC.



What is the approximate length of the side AB?

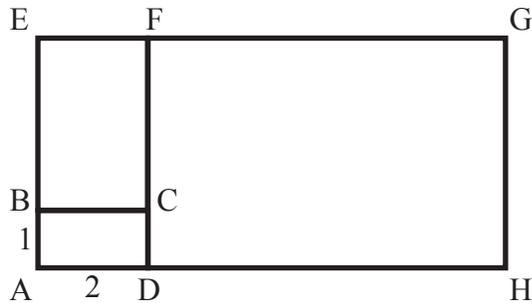
- A. 5.92 units  
 B. 6.32 units  
 C. 6.71 units  
 D. 7.07 units
20. Four trees in a park are located at points A, B, C, and D and their placement is shown in the diagram below.



Which answer choice shows the distance between the trees at points B and C?

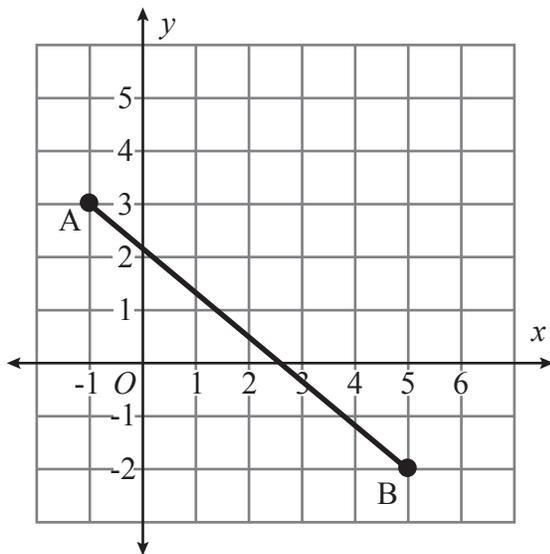
- A.  $2\sqrt{5}$  meters  
 B.  $10\sqrt{2}$  meters  
 C.  $10\sqrt{3}$  meters  
 D. 20 meters

21. Rectangle ABCD is similar to rectangle DAEF. Rectangle DAEF is similar to rectangle AEGH. The length of segment AB is 1 unit. The length of segment AD is 2 units.



What is the length of segment EG?

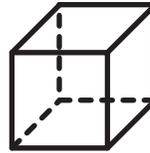
- A. 2 units  
 B. 4 units  
 C. 6 units  
 D. 8 units
22. Look at  $\overline{AB}$  in the grid below.



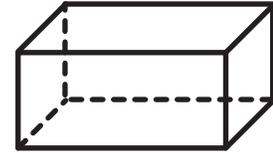
What are the coordinates of the midpoint of  $\overline{AB}$  ?

- A. (3, 0)  
 B. (2, -3)  
 C. (2, 0.5)  
 D. (2, 1)

23. Brison has a cube-shaped box with a volume of 64 cubic inches. He would like to increase the length of the box in order to double its volume.



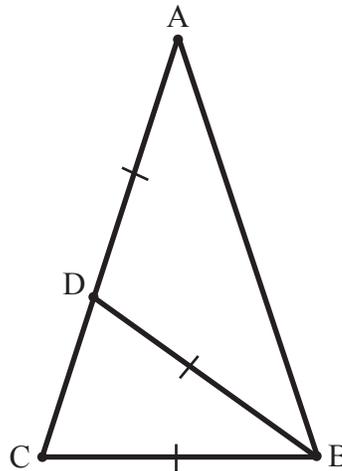
$$V = 64 \text{ in}^3$$



$$V = 128 \text{ in}^3$$

What is the new **perimeter** of the base?

- A. 20 inches  
 B. 24 inches  
 C. 32 inches  
 D. 64 inches
24. In the following diagram, triangle CAB is isosceles with side CA congruent to side BA. Line segment DB bisects angle ABC and point D lies on side CA.



Use the properties of isosceles triangles and the angle sum theorem for triangles to make a conjecture about the congruence of the angles in this diagram.

What must be the measure of angle CAB?

- A.  $60^\circ$   
 B.  $45^\circ$   
 C.  $40^\circ$   
 D.  $36^\circ$

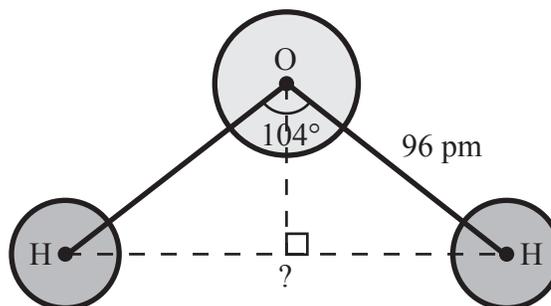
25. The current Eddystone Lighthouse is located about 9 miles off the coast of the United Kingdom and rises about 170 feet above sea-level. A person in a small boat observes that the angle of elevation from the surface of the sea to the top of the lighthouse is about  $5^\circ$ .



Which of the following gives the closest approximation for the distance from the boat to the base of the lighthouse?

- A. 1,860 feet
- B. 1,940 feet
- C. 1,950 feet
- D. 2,120 feet

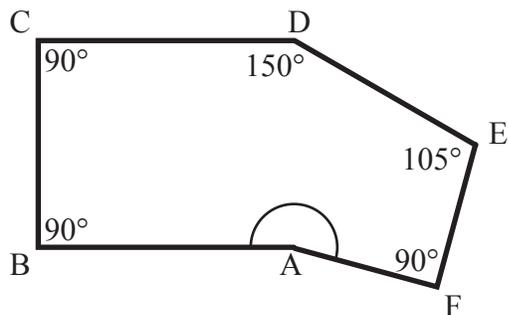
26. A water molecule consists of two atoms of hydrogen and one atom of oxygen. The molecule is formed by bonds from each hydrogen atom to the oxygen atom. The angle between the bonds is about  $104^\circ$ . The distance between the centers of each hydrogen atom and the center of the oxygen atom is about 96 picometers.



Which expression can be used to find the distance between the centers of the hydrogen atoms, in picometers?

- A.  $192 \cos(52^\circ)$
- B.  $192 \sin(52^\circ)$
- C.  $\frac{192}{\sin(52^\circ)}$
- D.  $\frac{192}{\cos(52^\circ)}$

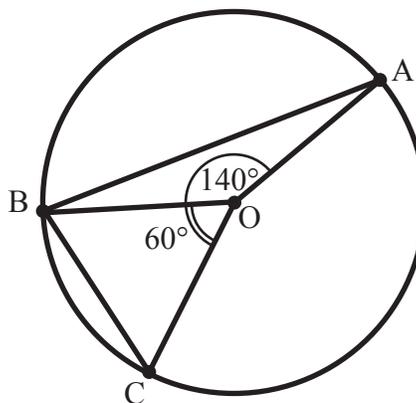
27. In the following hexagon, the measures of five of the interior angles are known.



What is the measure of the interior angle at vertex A?

- A.  $195^\circ$
- B.  $200^\circ$
- C.  $210^\circ$
- D.  $225^\circ$

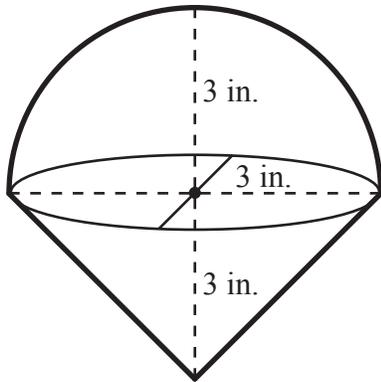
28. Amelia, Bob, and Carol are standing at different locations, A, B, and C around a large circular track. Their coach, Owen, is standing at the center of the circular track. Their coach has arranged them so that Bob is  $140^\circ$  ahead of Amelia, and Carol is  $60^\circ$  ahead of Bob, from Owen's point of view.



What is the angle between Amelia and Carol as seen from Bob's point of view, that is, what is the measure of angle ABC?

- A.  $70^\circ$
- B.  $75^\circ$
- C.  $80^\circ$
- D.  $90^\circ$

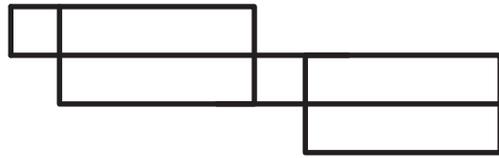
29. Aaron is designing a spinning top he plans to make for his younger brother. Aaron plans to attach a hemisphere to the base of a right circular cone. He thought it would work best if the radius of the hemisphere, the radius of the base of the cone, and the height of the cone were all equal to each other. When the top stands on its pointed end, Aaron wants it to be 6 inches tall.



What will be the volume of this top, in terms of  $\pi$ ?

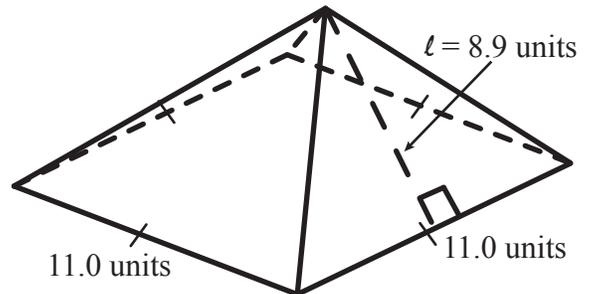
- A.  $21\pi$  cubic inches  
 B.  $27\pi$  cubic inches  
 C.  $36\pi$  cubic inches  
 D.  $45\pi$  cubic inches
30. Which of the following shows the equation of a circle in the standard  $(x, y)$  coordinate plane centered at the point  $(1, 2)$  with a radius of 5?
- A.  $(x - 1)^2 + (y - 2)^2 = 5$   
 B.  $(x - 1)^2 + (y + 2)^2 = 5$   
 C.  $(x + 1)^2 + (y + 2)^2 = 25$   
 D.  $(x - 1)^2 + (y - 2)^2 = 25$

31. Consider the following net for a polyhedron.



What is the shape of the polyhedron?

- A. rectangular prism  
 B. dodecahedron  
 C. pyramid  
 D. cube
32. Based on both measurements and the study of an ancient Egyptian mathematics “textbook” written around 1650 BCE, some archeologists believe the original shape of the Great Pyramid of Cheops at Giza was a right square pyramid, with some of the dimensions shown below.



What is the approximate surface area, including the base, of the Great Pyramid?

- A. 170 square units  
 B. 196 square units  
 C. 317 square units  
 D. 359 square units