

1. Two statements about triangle JKL are shown.

- $m \angle L = 90^\circ$
- $\sin(J) = \frac{99}{101}$

Which ratio represents $\cos(K)$?

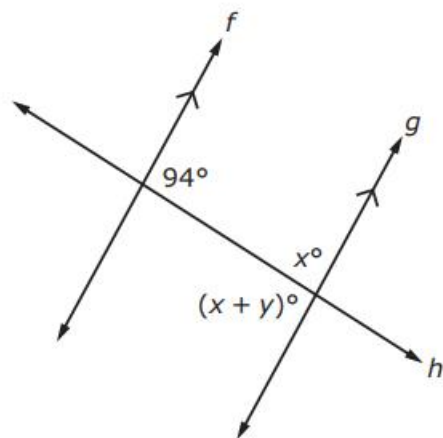
2. Line segment MN has endpoints $M(-7, 10)$ and $N(-1, 1)$. Point P is on line segment MN such that the ratio $MP:PN$ is 2:1.

What is the x -coordinate of point P ?

3. Which statement is true when a three-dimensional figure is dilated by a given scale factor?

- Ⓐ A dilation by a scale factor of $\frac{2}{3}$ results in an increase in volume.
- Ⓑ A dilation by a scale factor of 0.1 results in no change in volume.
- Ⓒ A dilation by a scale factor of $\frac{3}{2}$ results in a decrease in surface area.
- Ⓓ A dilation by a scale factor of 3.5 results in an increase in surface area.

4. Two parallel lines, f and g , are cut by a transversal, h , as shown.



What are the values of x and y ?

5. Which statement must be true for all parallelograms?

- Ⓐ Diagonals are congruent.
- Ⓑ Diagonals are perpendicular.
- Ⓒ Opposite angles are complementary.
- Ⓓ Consecutive angles are supplementary.

6. A true statement is given.

“If two given shapes are circles, then the shapes are similar.”

Select the boxes to identify what could be the converse, inverse, and contrapositive of the given statement.

	Converse	Inverse	Contrapositive
If two given shapes are not similar, then the shapes are not circles.	(A)	(B)	(C)
If two given shapes are similar, then the shapes are circles.	(D)	(E)	(F)
If two given shapes are not circles, then the shapes are not similar.	(G)	(H)	(I)

7. This question has **two** parts.

The vertices of two triangles are given.

- The coordinates of the vertices of the first triangle are $Q(2, 0)$, $R(6, 0)$, and $S(2, 4)$.
- The coordinates of the vertices of the second triangle are $T(8, 0)$, $U(4, -4)$, and $V(4, 0)$.

Part A

Which statement describes a relationship between the first and second triangles?

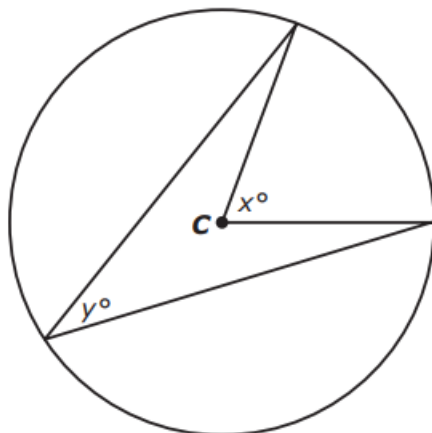
- (A) $\triangle QRS \cong \triangle TUV$
- (B) $\triangle QRS \cong \triangle VTU$
- (C) $\triangle QRS \sim \triangle TUV$
- (D) $\triangle QRS \sim \triangle UVT$

Part B

Select expressions to create a transformation that proves the statement in Part A.

$(x, y) \rightarrow$ [(A) $2x$ (B) $-x$ (C) $x + 2$ (D) $x - 2$], [(A) $2y$ (B) $-y$ (C) $y + 8$ (D) $y - 8$]

8. An inscribed angle and a central angle are shown in circle C.



Create an equation to show the relationship between x and y .

9. Figure A is drawn on a coordinate plane. Transformations are performed on figure A to create figure B.

Select the boxes to identify whether each transformation performed on figure A results in a congruent or noncongruent figure B.

	Congruent	Noncongruent
$(x, y) \rightarrow (y, -x)$	Ⓐ	Ⓑ
$(x, y) \rightarrow \left(\frac{1}{2}x, \frac{1}{2}y\right)$	Ⓒ	Ⓓ
a reflection across the line $y = -x$	Ⓔ	Ⓕ
a 50-degree clockwise rotation about the origin	Ⓖ	Ⓗ

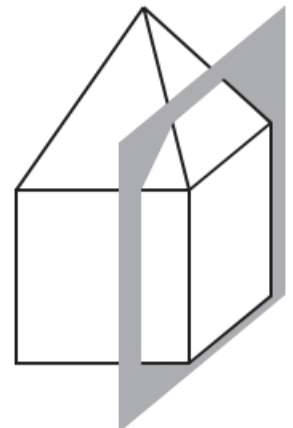
10. A line segment has an endpoint at $(1, 1)$ and a midpoint at $(1, -3)$.

What are the coordinates of the other endpoint?

- Ⓐ $(1, 5)$
 - Ⓑ $(1, -1)$
 - Ⓒ $(1, -5)$
 - Ⓓ $(1, -7)$
11. The figure consisting of a right pyramid and a right rectangular prism is sliced perpendicular to its base, as shown.

What is the shape of the resulting cross section?

- Ⓐ a rectangle
- Ⓑ a trapezoid
- Ⓒ a composite shape made up of a rectangle and a triangle
- Ⓓ a composite shape made up of a rectangle and a trapezoid



12. A triangle has vertices at $T(2, 5)$, $U(6, 6)$, and $V(4, -3)$.

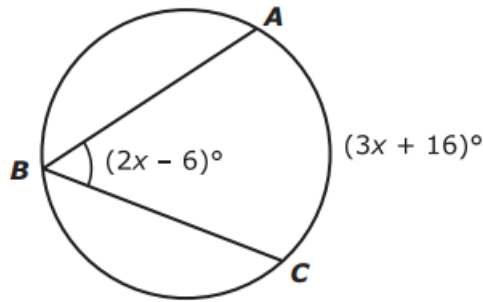
Complete the statements to explain why triangle TUV is a right triangle.

The slope of \overline{TU} is ,

and the slope of \overline{TV} is .

Triangle TUV is a right triangle because \overline{TU} and \overline{TV} are
 [Ⓐ skewed Ⓑ parallel Ⓒ perpendicular] and therefore form a right angle.

13. Points A , B , and C lie on the circle, as shown.



- The measure of $\angle ABC$ is $(2x - 6)^\circ$.
- The measure of \widehat{AC} is $(3x + 16)^\circ$.

What is the measure, in degrees, of $\angle ABC$?

14. A cone has a radius of 3 units, a height of 4 units, and a slant height of 5 units.

Which expression represents the surface area, in square units, of the cone?

- (A) 15π
- (B) 21π
- (C) 24π
- (D) 29π

15. Rectangle $ABCD$ has the given side lengths.

- $AB = 5$ units
- $BC = 11$ units

Rectangle $PQRS$ is congruent to rectangle $ABCD$.

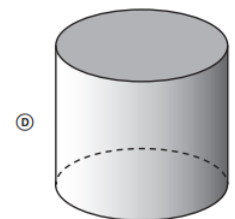
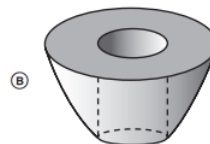
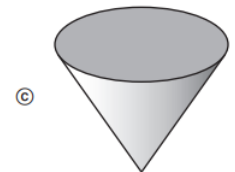
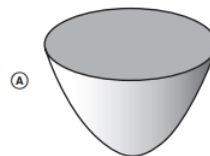
What is the length of \overline{QR} , in units?

16. A two-dimensional figure and a vertical line are shown.

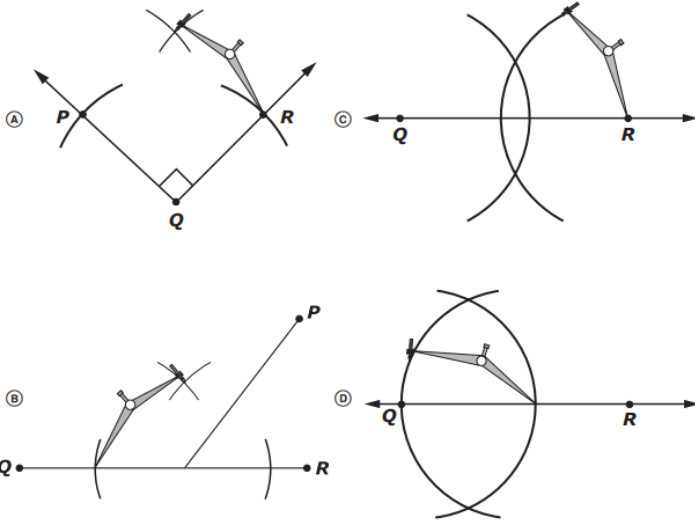


The figure is rotated about the vertical line.

Which object could be the result of this rotation?



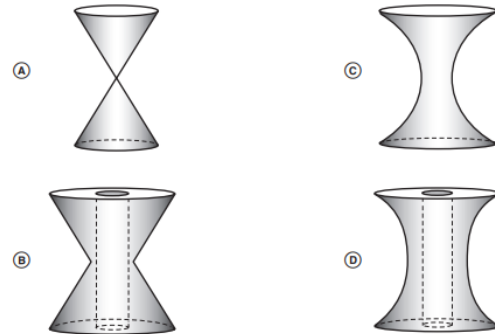
17. Which figure shows steps leading to the construction of a perpendicular bisector?



18. A figure and a vertical line are shown.



Which object is generated by rotating the figure around the vertical line?



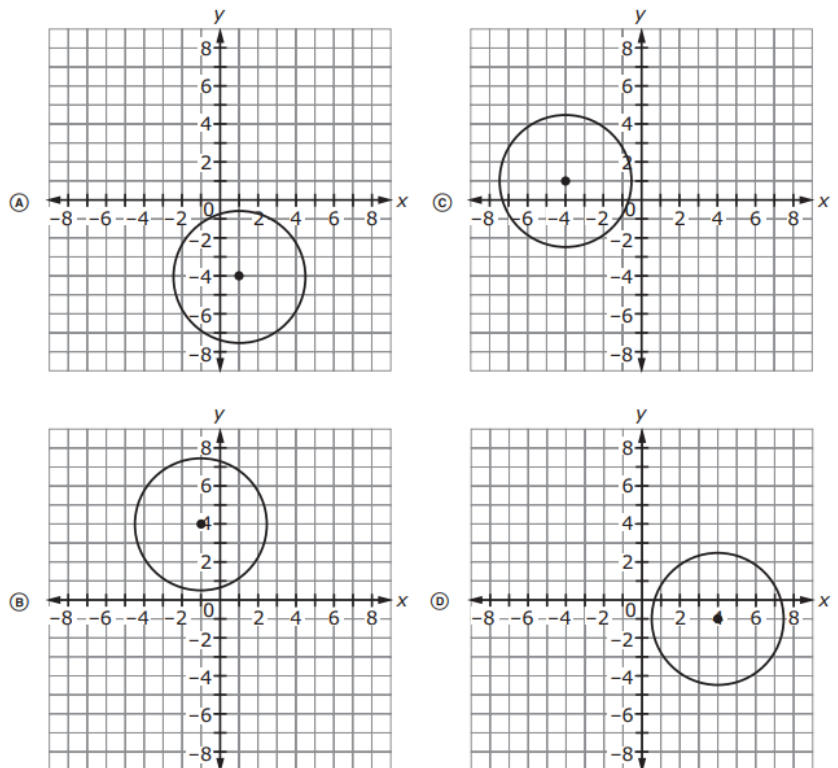
19. Triangle M has a base length of 18 inches and a height of 12 inches. Triangle N is congruent to triangle M .

What is the area, in square inches, of triangle N ?

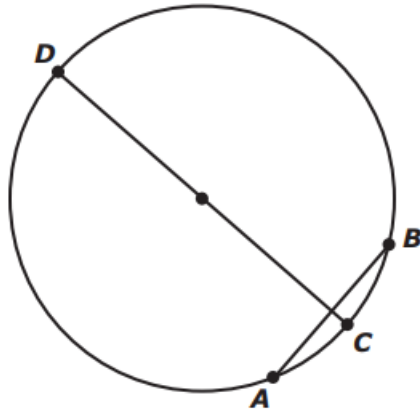
20. The equation of a circle is given.

$$(x - 1)^2 + (y + 4)^2 = 12.25$$

Which graph represents the equation?



21. A circle with chord AB and its perpendicular bisector CD is shown.



The measure of \widehat{AC} is 28° .

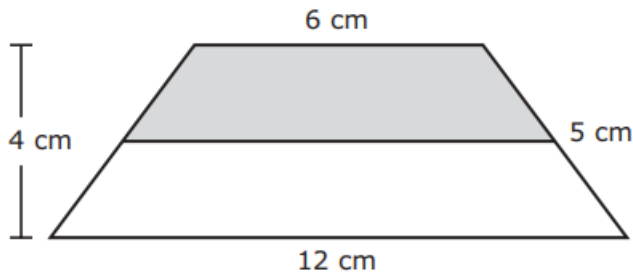
What is the measure, in degrees, of \widehat{BD} ?

22. Triangle XYZ is transformed to create triangle $X'Y'Z'$ using the rule $(x, y) \rightarrow (x + b, y + c)$.

- Triangle XYZ has the vertices $(3, -2)$, $(3, -4)$, and $(0, -4)$, respectively.
- Triangle $X'Y'Z'$ has the vertices $(-1, 5)$, $(-1, 3)$, and $(-4, 3)$, respectively.

What are the values of b and c ?

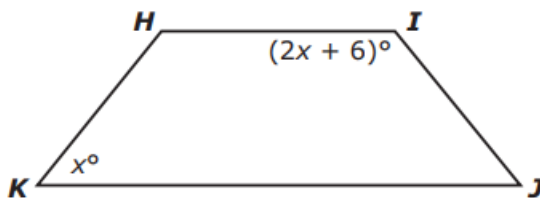
23. A tile is in the shape of an isosceles trapezoid. The tile is divided into 2 parts by its midsegment. The trapezoid, with lengths in centimeters (cm), is shown.



The top part is shaded.

What is the area, in square centimeters, of the shaded part?

24. An isosceles trapezoid is shown.

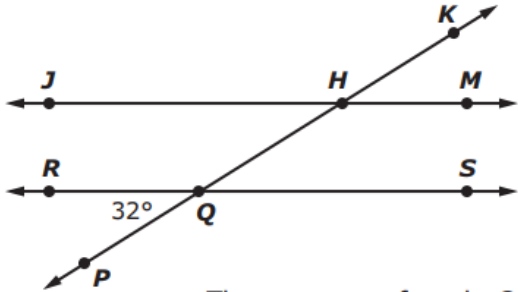


What is the measure of $\angle HIJ$, in degrees?

25. Rectangle G has a length of 15 inches and a width of 20 inches.
 Rectangle H is similar to rectangle G and has a length of 18 feet.

What is the width, in feet, of rectangle H ?

26. Transversal line KP passes through parallel lines JM and RS , as shown.

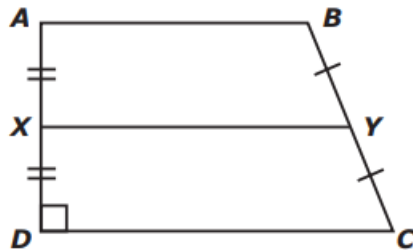


The measure of angle QHJ is

Complete the sentences to describe angle QHJ .

- Angles PQR and QHJ are [$\text{\textcircled{A}}$ congruent $\text{\textcircled{B}}$ supplementary
 $\text{\textcircled{C}}$ complementary] because they are [$\text{\textcircled{A}}$ consecutive $\text{\textcircled{B}}$ corresponding
 $\text{\textcircled{C}}$ alternate exterior] angles.

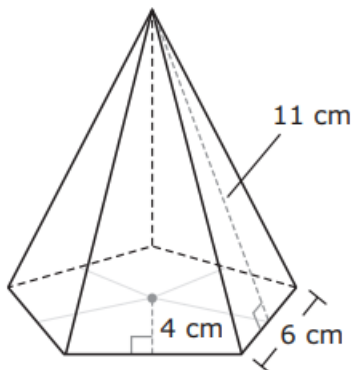
27. Trapezoid $ABCD$ is shown.



Select all the true statements.

- $\text{\textcircled{A}}$ $\overline{AX} \cong \overline{BY}$
 $\text{\textcircled{B}}$ $\overline{DX} \cong \overline{CY}$
 $\text{\textcircled{C}}$ $\overline{XY} \parallel \overline{CD}$
 $\text{\textcircled{D}}$ $XY = \frac{1}{2}(AB + CD)$
 $\text{\textcircled{E}}$ trapezoid $ABYX \cong$ trapezoid $XYCD$

28. A regular pentagonal pyramid is shown, with units in centimeters (cm).
 The slant height is 11 cm, the apothem of the base is 4 cm, and the side length of the base is 6 cm.



Which expression represents the surface area, in square centimeters, of the pyramid?

- $\text{\textcircled{A}}$ $\frac{6 \cdot 11 \cdot 5}{2}$
 $\text{\textcircled{B}}$ $6\left(4 + \frac{5 \cdot 11}{2}\right)$
 $\text{\textcircled{C}}$ $\frac{4 \cdot 11}{2}(6 + 5)$
 $\text{\textcircled{D}}$ $\frac{6 \cdot 5}{2}(4 + 11)$

29. Ashleigh draws a map of her town on a coordinate grid, where each unit represents 1 mile. A pizza shop in the town delivers to any location within a 6-mile radius.

- Ashleigh’s house is located at point (9, 3).
- The pizza shop is located at point (6, 7).

Complete the sentences to describe whether Ashleigh’s house is within the delivery radius of the pizza shop.

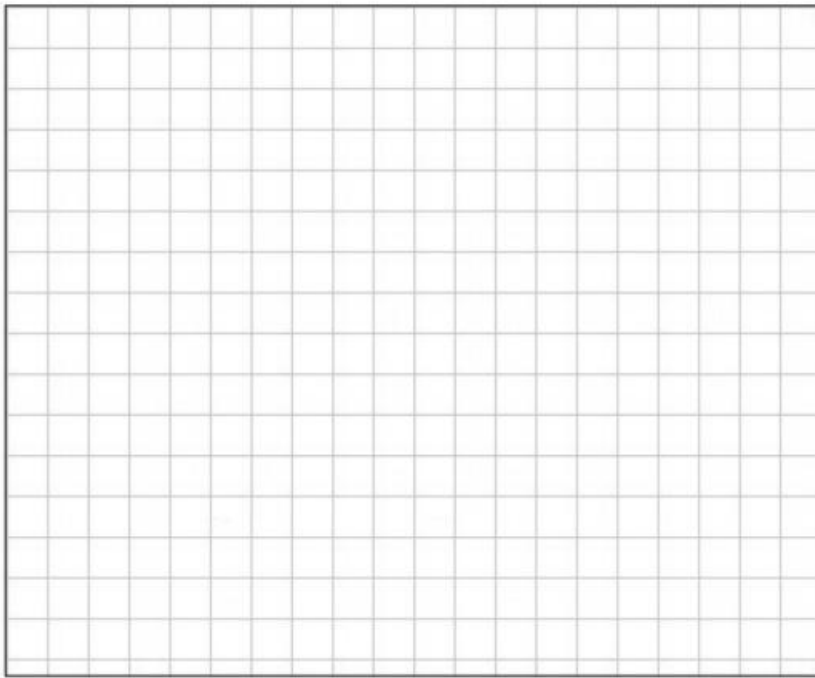
The shortest distance from the pizza shop to Ashleigh’s house is

 miles.

Therefore, Ashleigh’s house is [within outside] the delivery radius of the pizza shop.

30. Kyla claims that the sum of the interior angles of any closed figure is 360 degrees or greater.

Use the Connect Line tool to draw a figure that is a counterexample to Kyla’s claim.

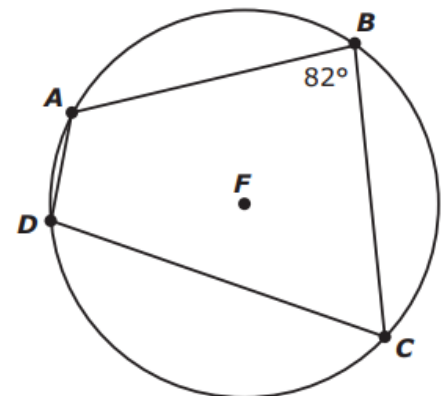


31. Quadrilateral $ABCD$ is inscribed in circle F , as shown.

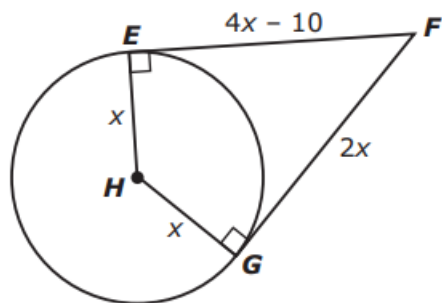
Complete the statements to describe the measure, in degrees, of $\angle ADC$.

Angle ABC and angle ADC are [complementary. congruent. supplementary.]

This means the measure of $\angle ADC =$



32. A circle with two tangent segments is shown.



Part A

Which equation is true?

- (A) $(4x - 10) = 2x$
- (B) $x(4x - 10) = (2x)$
- (C) $(4x - 10) + 2x = 180$
- (D) $x + x + 2x + (4x - 10) = 360$

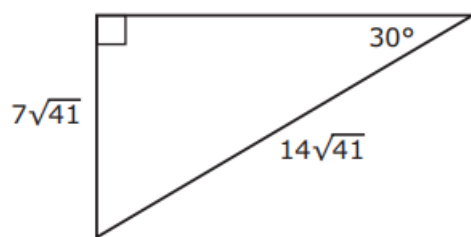
Part B

What is the value of x ?

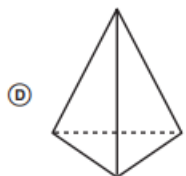
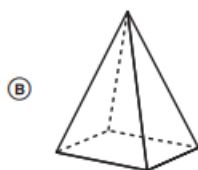
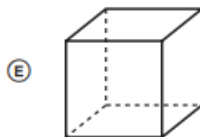
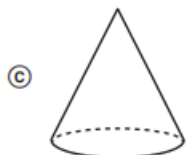
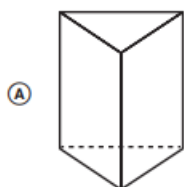
33. A right triangle is shown, with side lengths in units.

Select an expression to complete the trigonometric ratio for the triangle.

$$\tan(30^\circ) = \frac{7\sqrt{41}}{[\text{A } 7\sqrt{41} \quad \text{B } 14\sqrt{41} \quad \text{C } 7\sqrt{123} \quad \text{D } 14\sqrt{123}]}$$



34. Select all the figures that have a triangular cross section when sliced parallel to their bases.



35. Prism A is dilated by a scale factor greater than 0 and less than 1 to create prism B.

Complete the sentences to compare the volume and surface area of the two prisms.

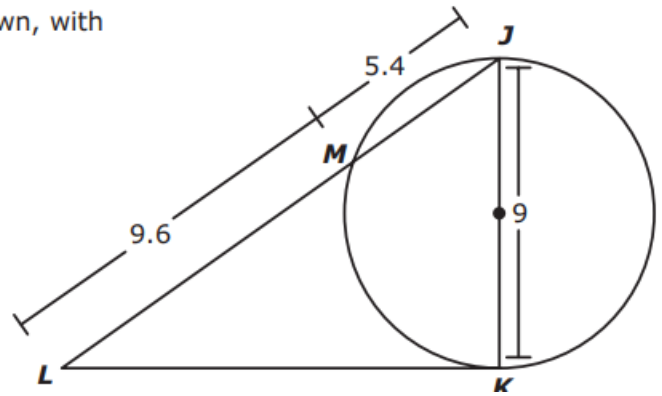
The volume of prism A is [(A) equal to (B) less than (C) greater than] the volume of prism B.

The surface area of prism A is [(A) equal to (B) less than (C) greater than] the surface area of prism B.

36. Line segments JK , KL , and LJ form triangle JKL , as shown, with dimensions in units.

- Segment KL is tangent to the circle.
- Segment LJ is a secant of the circle.
- Segment JK is a diameter of the circle.

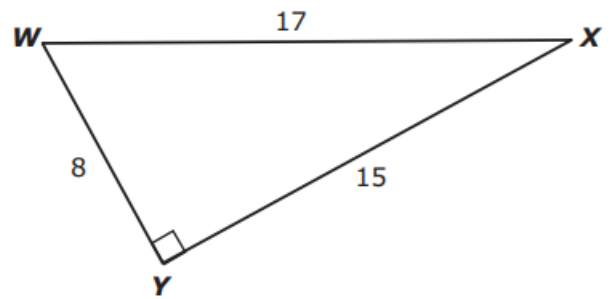
What is the perimeter, in units, of triangle JKL ?



37. Triangle WXY is shown, with side lengths in units.

Match each trigonometric ratio to its value.

	$\frac{15}{17}$	$\frac{17}{15}$	$\frac{8}{17}$	$\frac{17}{8}$	$\frac{8}{15}$	$\frac{15}{8}$
$\cos(x)$	(A)	(B)	(C)	(D)	(E)	(F)
$\tan(W)$	(G)	(H)	(I)	(J)	(K)	(L)

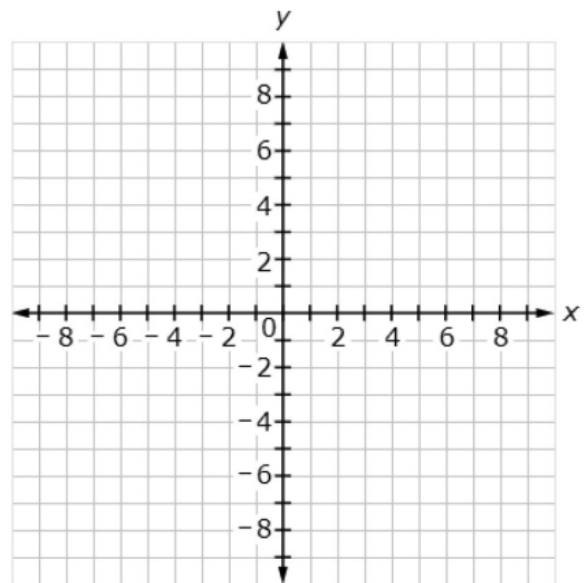
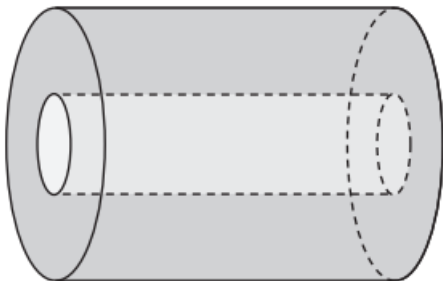


38. Maria has a circular pizza with a diameter of 12 inches. She cuts the pizza so that each slice has a central angle that measures 90 degrees.

What is the area, in square inches, of each slice of pizza?

39. Karina draws a figure on the coordinate plane. Then, she rotates the figure around the x -axis. The resulting object is shown.

Use the Connect Line tool to create a possible figure that Karina could have drawn.



40. The transformations given are performed on pentagon $ABCDE$ to create pentagon $A'B'C'D'E'$.

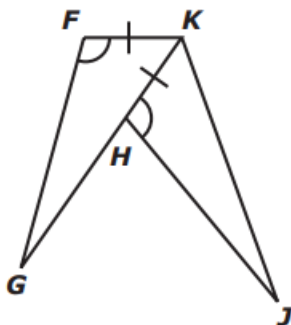
- $(x, y) \rightarrow (x - 5, y - 6)$
- counterclockwise rotation of 37° about the origin

Complete the sentence to explain whether or not the pentagons are congruent.

Pentagons $ABCDE$ and $A'B'C'D'E'$ [\textcircled{A} are \textcircled{B} are not] congruent because [\textcircled{A} each \textcircled{B} neither \textcircled{C} only the first \textcircled{D} only the second] transformation preserves side lengths and angle measures.

41. A figure is shown.

- Segment KG bisects angle FKJ .
- Angles GFK and JHK are congruent.
- Line segments FK and HK are congruent.



A partial proof is shown.

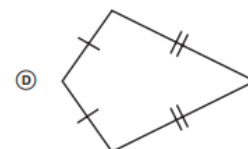
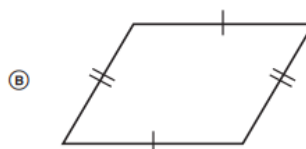
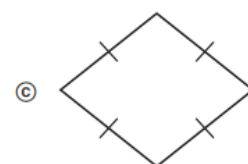
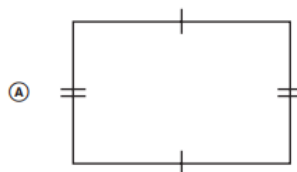
What could be Reason 4?

Statement	Reason
1. $\overline{FK} \cong \overline{HK}$ and $\angle GFK \cong \angle JHK$	1. Given
2. \overline{KG} bisects $\angle FKJ$	2. Given
3.	3. Definition of angle bisector
4. $\triangle GFK \cong \triangle JHK$	4.

42. Johanna makes the following claim:

"If a polygon is a quadrilateral, then two pairs of opposite sides are congruent."

Which polygon is a counterexample to Johanna's claim?



43. A sequence of transformations maps triangle QRS onto congruent triangle XYZ .

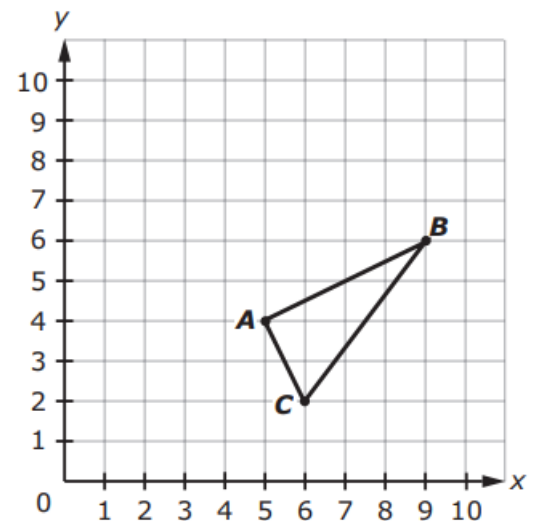
Select all the sequences of transformations that could have mapped triangle QRS onto triangle XYZ .

- (A) a reflection across the x -axis, followed by a 90° clockwise rotation about the origin
- (B) a 180° clockwise rotation about the origin, followed by a reflection across the line $y = 3$
- (C) a dilation by a scale factor of 3 centered at the origin, followed by a translation 5 units down
- (D) a reflection across the line $y = x$, followed by a dilation by a scale factor of $\frac{1}{3}$ centered at the origin
- (E) a translation 1 unit left and 3 units up, followed by a 270° counterclockwise rotation about the origin

44. Triangle ABC is shown on the coordinate grid.

Complete the steps to describe a sequence of transformations that will map triangle ABC onto itself.

Step 1	Translate triangle ABC 4 units up.
Step 2	Translate triangle ABC _____ units down.
Step 3	Dilate triangle ABC by a scale factor of _____ centered at the origin.



45. A figure is shown.

Complete the statement to describe $\triangle ABC$.

The [A medians B angle bisectors C perpendicular bisectors] of $\triangle ABC$ meet at point [A C. B D. C O.]

