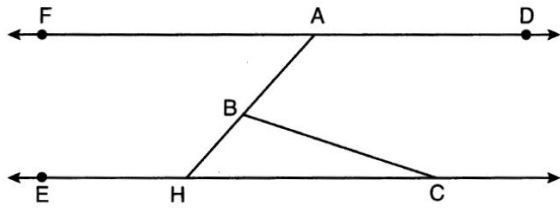


Geometry Magic 20 - Set 5 Answer Key

1. In the diagram below, $\overline{FD} \parallel \overline{EC}$ and \overline{AH} and \overline{BC} are drawn.



If $m\angle FAB = 48^\circ$ and $m\angle ECB = 18^\circ$, what is $m\angle ABC$?

- A. 18°
 B. 48°
 C. 66°
 D. 114°
2. Triangle JGR is similar to triangle MST . Which statement is NOT always true?

- A. $\angle J \cong \angle M$
 B. $\angle G \cong \angle T$
 C. $\angle R \cong \angle T$
 D. $\angle G \cong \angle S$

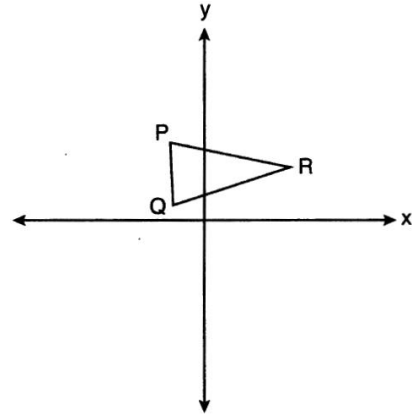
3. In parallelogram $ABCD$, diagonals \overline{AC} and \overline{BD} intersect at E . Which statement proves $ABCD$ is a rectangle?

- A. $\overline{AC} \cong \overline{BD}$
 B. $\overline{AB} \perp \overline{BD}$
 C. $\overline{AC} \perp \overline{BD}$
 D. \overline{AC} bisects $\angle BCD$

4. A regular hexagon is rotated about its center. Which degree measure will carry the regular hexagon onto itself?

- A. 45°
 B. 90°
 C. 120°
 D. 135°

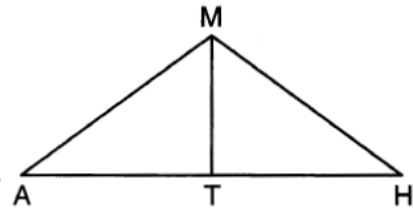
5. Triangle PQR is shown on the set of axes below.



Which quadrant will contain point R'' , the image of point R , after a 90° clockwise rotation centered at $(0,0)$ followed by a reflection over the x -axis?

- A. I
 B. II
 C. III
 D. IV

6. In triangle MAH below, \overline{MT} is the perpendicular bisector of \overline{AH} .



Which statement are always true? Select all that apply

- A. $\triangle MAH$ is isosceles.
 B. $\triangle MAT$ is isosceles.
 C. \overline{MT} bisects $\angle AMH$.
 D. $\angle A$ and $\angle TMH$ are complementary.
 E. $\angle ATM$ and $\angle HTM$ are supplementary.

7. In triangle ABC , $\angle A$ and $\angle B$ are complementary, where $\cos A = 0.5$. What is the measure, in degrees, of $\angle B$?

30°

8. Trisha wants to create the perpendicular bisector of line segment AB .

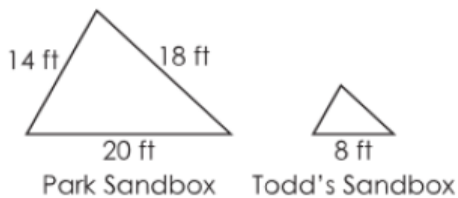
She places her compass on point A and opens it with the width equal to the length of the line segment AB . She makes arcs above and below the line segment.

What could be Trisha's next step to create the perpendicular bisector of line segment AB ?

- A. connect the two arcs using a straightedge
- B. connect each arc with point B using straightedge
- C. place the compass on the approximate midpoint and draw intersecting arcs
- D. place the compass on point B and complete the same steps that she did for point A

9. A park has a triangular sandbox. Todd wants to create a smaller sandbox at his backyard having the same angles as the park sandbox.

Drawings of both sandboxes are shown.



What is the perimeter, in feet (ft), of Todd's sandbox?

20.8

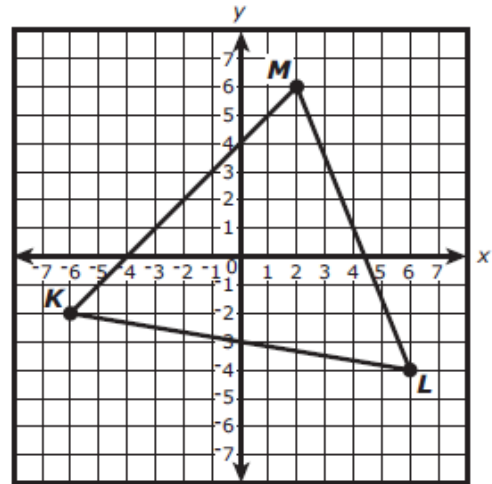
10. Line w is represented by this equation.

$$y = 5x + 3$$

Which of the following equations represents a line that is perpendicular to line w and passes through point $(10, -1)$?

- A. $y = -\frac{1}{5}x + 1$
- B. $y = -\frac{1}{5}x - 1$
- C. $y = \frac{1}{5}x + 1$
- D. $y = \frac{1}{5}x - 1$

11. On the set of axes below, triangle KLM has vertices whose coordinates are $K(-6, -2)$, $L(6, -4)$, and $M(2, 6)$.



What is the perimeter of triangle KLM ? Round your answer to the nearest tenth.

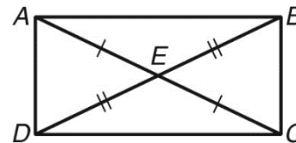
34.2

12. On a coordinate plane, a single transformation will be performed on square $RSTU$.

Select three transformations of square $RSTU$ that would result in a congruent figure.

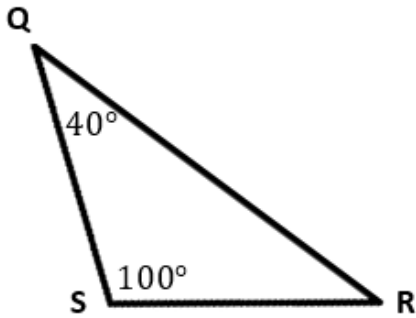
- A. a translation 3 units up and 8 units to the right
- B. a rotation of 270° counterclockwise about the origin
- C. a dilation by a scale factor of 1 with respect to the origin
- D. a dilation by a scale factor of 1.5 with respect to the origin
- E. a dilation by a scale factor of -2 with respect to the origin

13. If $AD = 5y + 7$ and $BC = 7y - 3$, what must the value of y be to prove $\triangle AED \cong \triangle CEB$ by SSS ?



- A. 2
- B. 5
- C. 17
- D. 32

14. Triangle QRS is shown below.



Which triangle must be similar to triangle QRS ?

- A. A triangle with two angles that measure 40° .
 B. A triangle with angles that measure 40° and 60° .
 C. A scalene triangle with only one angle that measure 100° .
 D. An isosceles triangle with only one angle that measure 40° .

15. Triangle FXY is rotated and then translated to a new location and named triangle ABC . Which of the following is true?

- A. $\triangle FXY$ is congruent to $\triangle ABC$ because only rigid motions were performed.
 B. $\triangle FXY$ is congruent to $\triangle ABC$ because non-rigid motions were performed.
 C. $\triangle FXY$ is not congruent to $\triangle ABC$ because only rigid motions were performed.
 D. $\triangle FXY$ is not congruent to $\triangle ABC$ because non-rigid motions were performed.

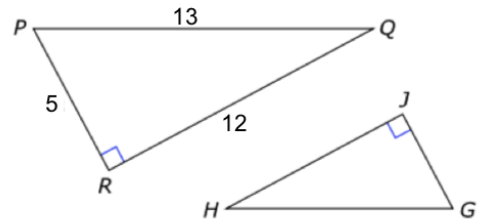
16. If one line passes through the points $(8, -3)$ & $(9, 1)$, and a parallel line passes through the point $(4, -2)$, what is another point that would lie on the 2nd line. Circle all that apply.

- A. $(0, -1)$
 B. $(8, -3)$
 C. $(2, 5)$
 D. $(5, 2)$
 E. $(-3, 8)$
 F. $(3, -6)$

17. What is the center and the radius of the circle whose equation is $(x - 5)^2 + (y - 3)^2 = 169$?

- A. $C(-5, -3); r = 13$
 B. $C(-5, -3); r = 169$
 C. $C(5, 3); r = 13$
 D. $C(5, 3); r = 169$

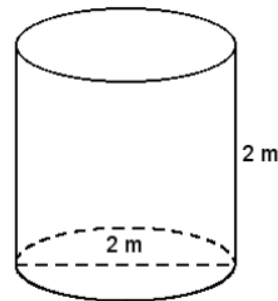
18. In this figure, $\triangle GHJ$ is similar to $\triangle PQR$.



Based on this information, which ratio represents $\tan H$?

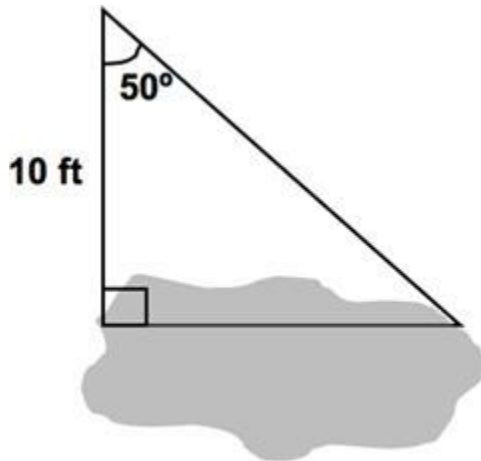
- A. $\frac{5}{12}$
 B. $\frac{5}{13}$
 C. $\frac{12}{5}$
 D. $\frac{13}{5}$

19. A concrete cylinder has the dimensions shown and a mass of 14,500 kg. To the nearest kilogram per cubic meter, what is the density of the concrete in the cylinder?



- A. $577 \frac{kg}{m^3}$
 B. $2308 \frac{kg}{m^3}$
 C. $4615 \frac{kg}{m^3}$
 D. $14,500 \frac{kg}{m^3}$

20. Keith needs to build a bridge to go across a pond. He has been able to collect the following measurements. About how long does his bridge need to be?



- A. 11.9 ft.
- B. 8.4 ft.
- C. 7.7 ft.
- D. 6.4 ft.