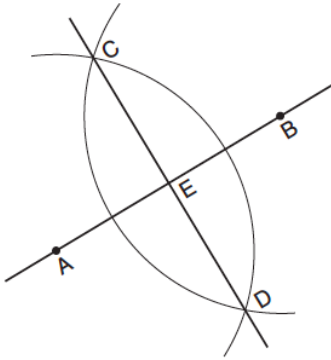


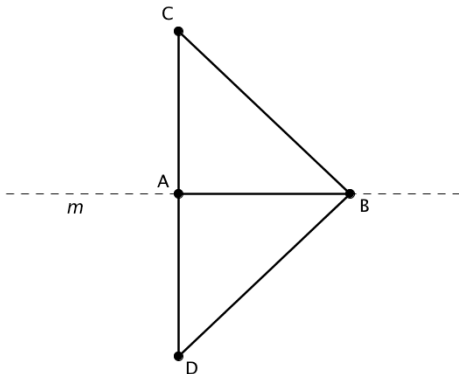
## Geometry Magic 20 - Set 2

1. Based on the construction below, which conclusion is *not always* true?



- A.  $\overline{AB} \perp \overline{CD}$
- B.  $AB = CD$
- C.  $AE = EB$
- D.  $CE = DE$

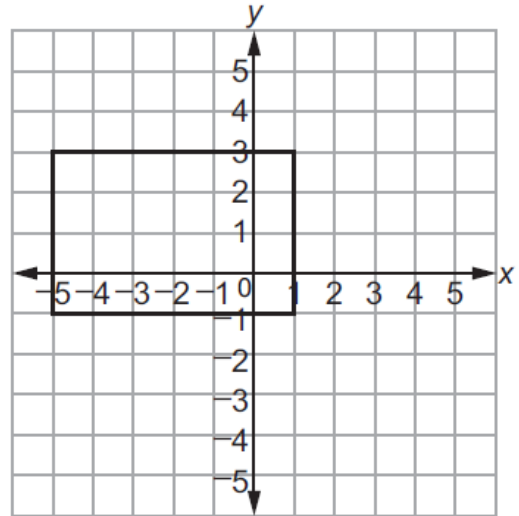
2. As shown in the diagram below, when right triangle  $DAB$  is reflected over the line  $m$ , its image is triangle  $CAB$ .



Which statement justifies why  $\overline{CB} \cong \overline{DB}$ ?

- A. Distance is preserved under reflection.
- B. Orientation is preserved under reflection.
- C. Points on the line of reflection remain invariant.
- D. Right angles remain congruent under reflection.

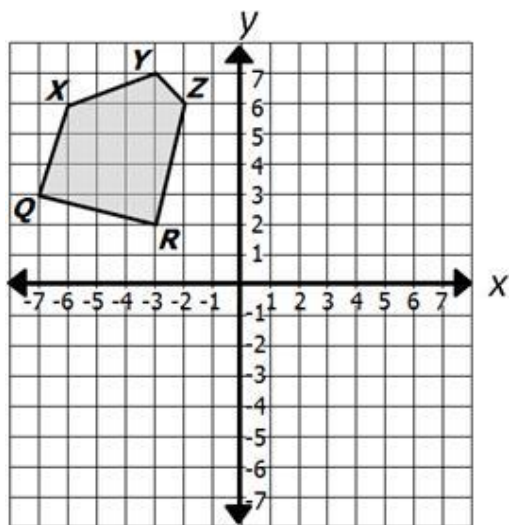
3. A rectangle is shown on the coordinate plane below.



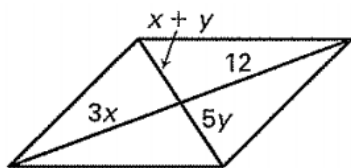
Identify a line that the rectangle could be reflected over to result in a rectangle that has the same vertices as the original.

- A.  $x = 0$
  - B.  $x = 1$
  - C.  $y = 0$
  - D.  $y = 1$
4. Students in Ms. Garcia's geometry class created posters of geometric definitions. Which of the following is a precise definition?
- A. Parallel lines are lines that do not intersect.
  - B. A line segment is part of a line that has an endpoint.
  - C. An angle is formed by two lines, two segments or two rays in one plane.
  - D. Perpendicular lines are lines in the same plane that intersect at a right angle.

5. What are the new coordinates of point  $R$  after polygon  $QXYZR$  is rotated  $180^\circ$  and translated 3 units left?

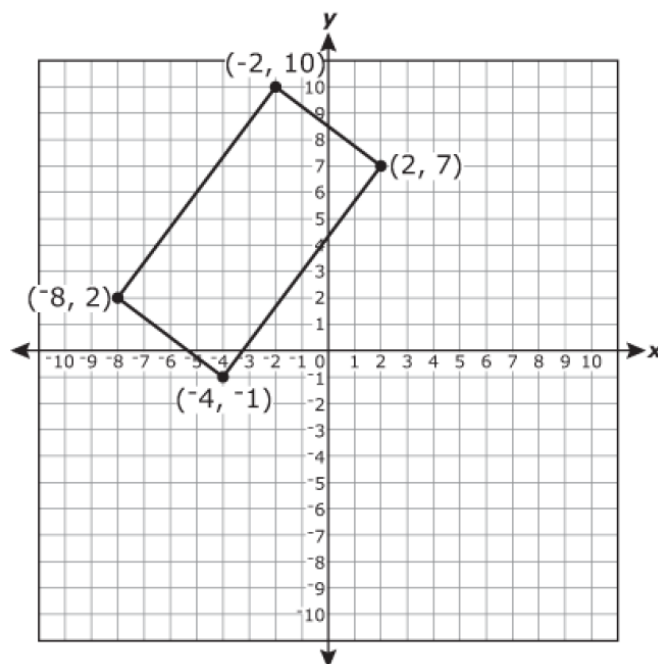


- A.  $(-6, 2)$   
 B.  $(0, -2)$   
 C.  $(6, -2)$   
 D.  $(3, -2)$
6. The equation of a line is  $3x - 5y = 8$ . Select three lines that are parallel to the given line.
- A.  $5x - 3y = 8$   
 B.  $9x - 10y = 16$   
 C.  $10y = 6x + 12$   
 D.  $12x - 20y = 24$   
 E.  $3x - 5y = 1$
7. What value of  $x$  and  $y$  will make the polygon below a parallelogram?



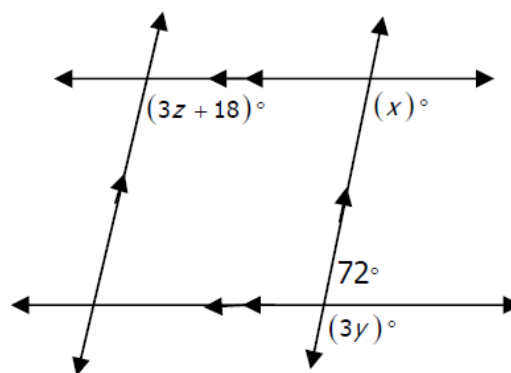
$x =$    $y =$

8. What is the area of the rectangle shown on the coordinate grid?



- A. 15 squared units  
 B. 24 squared units  
 C. 30 squared units  
 D. 50 squared units

9. Find the values of  $x$ ,  $y$ , and  $z$ .



$x =$

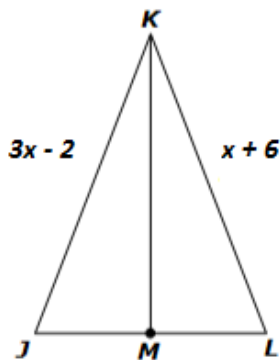
$y =$

$z =$

10. Which sequence of transformations of a figure will create an image that is NOT congruent to the original figure? Select all that apply.

- A. Dilation by a factor of 1 followed by a reflection about line  $y = 2x$ .
- B. Reflection about the line  $y = x$  followed by a rotation of  $90^\circ$  about point  $(2, 1)$ .
- C. Translation by 5 units to the left on the  $x$ -axis followed by a dilation by a factor of 0.5.
- D. Rotation by  $180^\circ$  followed by a reflection about the  $y$ -axis.
- E. Reflection about the line  $y = \frac{1}{3}x$  followed by a dilation by a factor of 3.

11. Examine the following figure.



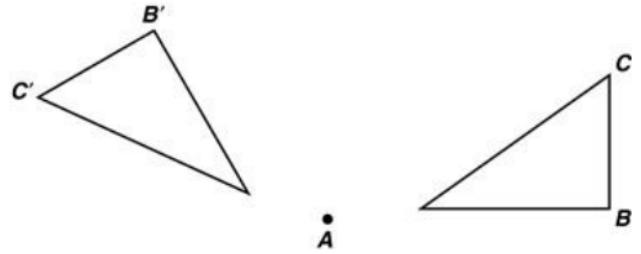
If  $JL = 12$ ,  $KM = 2x$ , and  $KM$  is a perpendicular bisector of  $JL$  determine which of the following values are correct. Select all that apply.

- A.  $x = 4$
- B.  $JK = 10$
- C.  $KM = 8$
- D.  $ML = 6$
- E. Perimeter of  $\triangle JKM = 22$
- F. Area of  $\triangle JKL = 48$

12. What is the radius and center for  $(x - 2)^2 + y^2 = 16$ ?

- A.  $r = 16$ ; center is  $(2, 0)$
- B.  $r = 4$ ; center is  $(-2, 0)$
- C.  $r = 16$ ; center is  $(-2, 0)$
- D.  $r = 4$ ; center is  $(2, 0)$

13. A rotation about Point  $A$  maps Point  $B$  to  $B'$  and Point  $C$  to  $C'$ .



Which statement must be true?

- A.  $m\angle C'AB' = m\angle B'AC$
- B.  $m\angle C'AC = m\angle B'AB$
- C. If Point  $B$  is  $(1, -2)$  then Point  $B'$  must be  $(-1, 2)$ .
- D. If Point  $C$  is  $(1, 4)$  then Point  $C'$  must be  $(-4, 1)$ .

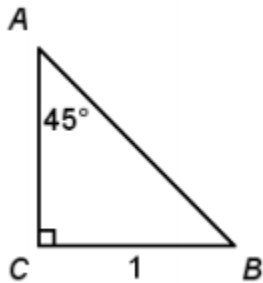
14. What is the equation of the line perpendicular to  $y - 4 = \frac{2}{5}(x - 6)$  and passes through the point  $(-3, 2)$ ?

- A.  $y - 2 = -\frac{5}{2}(x + 3)$
- B.  $y + 3 = -\frac{5}{2}(x - 2)$
- C.  $y - 2 = \frac{2}{5}(x + 3)$
- D.  $y + 3 = \frac{2}{5}(x - 2)$

15. Two right triangles are graphed on the coordinate plane. Triangle  $ABC$  has vertices  $A(0, 0)$ ,  $B(3, 0)$ , and  $C(0, 4)$ . Triangle  $DEF$  has vertices  $D(3, 7)$ ,  $E(3, -2)$ , and  $F(-9, -2)$ . Which of the following transformations cannot be used as part of a proof that  $ABC$  is similar to  $DEF$ ?

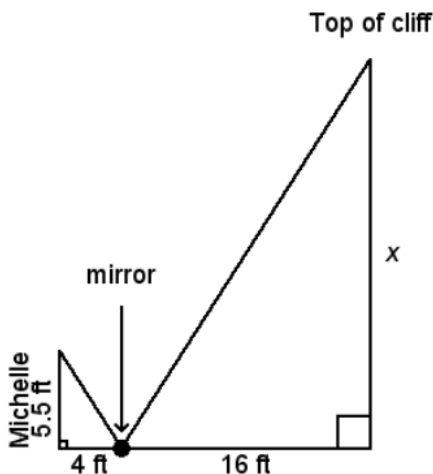
- A. Dilate  $ABC$  with a center at  $(0, 0)$  and a scale factor of 3.
- B. Reflect  $ABC$  over the line  $y = 0$ .
- C. Rotate  $ABC$   $90^\circ$  counterclockwise around the origin.
- D. Translate  $ABC$  using the transformation  $(x, y) \rightarrow (x + 3, y - 2)$

16. Use the figure shown to determine which statement below is true.



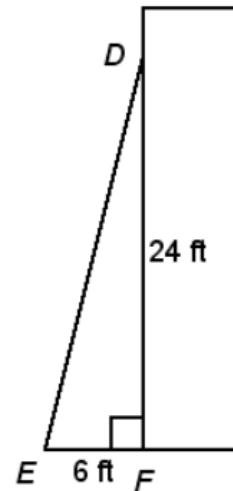
- A.  $\sin A + \cos A = 1$
- B.  $\sin A = \cos A$
- C.  $\sin A = \sqrt{2}$
- D.  $\cos A = 1$

17. Before rock climbing, Michelle wants to know how high she will climb. She places a mirror on the ground and walks backward until she can see the top of the cliff in the mirror. She drew a sketch of the situation. What is the height of the cliff?



- A. 16.5
  - B. 17.5
  - C. 20
  - D. 22
18. Greenland is the least densely populated country in the world, with a population of 57,714 and an area of 836,109 square miles. To the nearest hundredth, what is the population density of Greenland in people per square mile?

19. A ladder leans against the wall and reaches a point 24 feet up the wall. The base of the ladder is 6 feet from the wall. To the nearest degree, what angle does the ladder make with the wall?




20. Given circle C with radius  $r$  and circle D with radius  $s$ , what is an appropriate first step when proving circle C is similar to circle D?
- A. Transform circle C with a dilation that has center C and scale factor  $s$ .
  - B. Transform circle C with a dilation that has center C and scale factor  $r$ .
  - C. Transform circle C with the translation that maps point C onto point D.
  - D. Transform circle C with the translation that maps point onto point C.