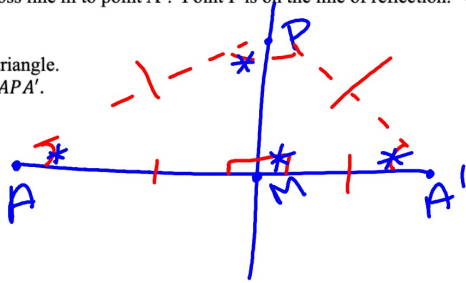
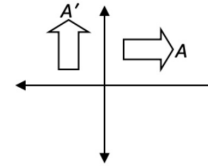


1. Point A is reflected across line  $m$  to point  $A'$ . Point P is on the line of reflection. Which of the following statements are true?

- ☐ A.  $\triangle APA'$  is an isosceles triangle.
- ☐ B. Segment PM bisects  $\angle APA'$ .
- ☒ C.  $\angle APM \cong \angle A'MP$
- ☐ D.  $\angle PAM \cong \angle MA'P$
- ☐ E.  $\triangle APM \cong \triangle A'PM$



2. Determine the angle and direction of rotation about the origin for the transformation shown below.

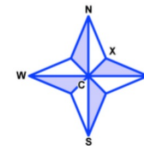


rotate  $90^\circ$   
CCW  
or  $270^\circ$   
CW

3. Let  $R(3, 1)$  be a point on a polygon, and  $R'$  be the corresponding point on a new image. The figure is translated by using  $(x, y) \rightarrow (x-1, y+4)$  to arrive at  $R'$ . What are the coordinates of  $R'$ ?

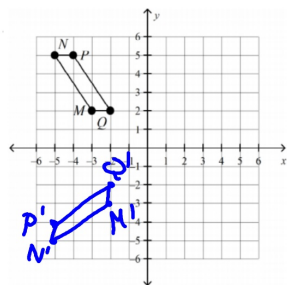
$R(3, 1)$   $R'(2, 5)$

4. A four-pointed star can be used to represent a compass on a map. If this star has vertical, horizontal, and rotational symmetry, then what would the measure of  $\angle XCE$ ?



$$\frac{360}{8} = 45^\circ$$

5. What are the new coordinates of the quadrilateral below after a  $90^\circ$  counterclockwise rotation? Draw the image.



$$(x, y) \rightarrow (-y, x)$$

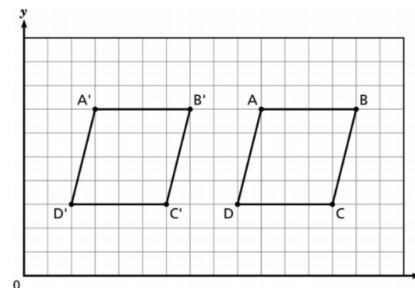
$$P'(-5, -4)$$

$$N'(-5, -5)$$

$$M'(-2, -3)$$

$$Q'(-2, -2)$$

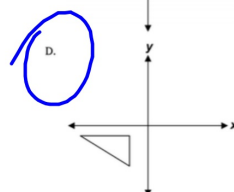
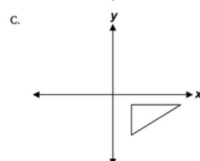
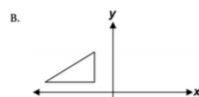
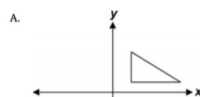
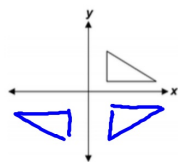
1. Parallelogram  $ABCD$  was translated to parallelogram  $A'B'C'D'$ .



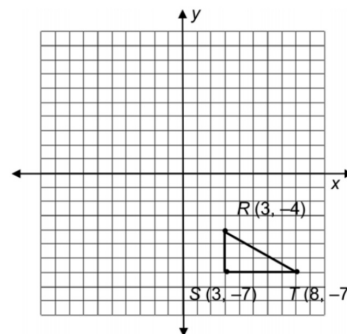
How many units and in which direction were the x-coordinates of parallelogram  $ABCD$  moved?

- A. 3 units to the right    B. 3 units to the left  
C. 7 units to the right    D. 7 units to the left

2. Which figure shows the triangle below reflected over the x-axis, then reflected over the y-axis?



3. Triangle  $RST$  is shown in the coordinate plane.



What are the coordinates of  $R'S'T'$  if the figure is reflected over the x-axis and translated down two units?

- A.  $(1, -6)$ ,  $(1, -9)$ ,  $(6, -9)$   
B.  $(3, 4)$ ,  $(3, 7)$ ,  $(8, 7)$   
C.  $(1, 2)$ ,  $(1, 5)$ ,  $(6, 5)$   
D.  $(3, 2)$ ,  $(3, 5)$ ,  $(8, 5)$

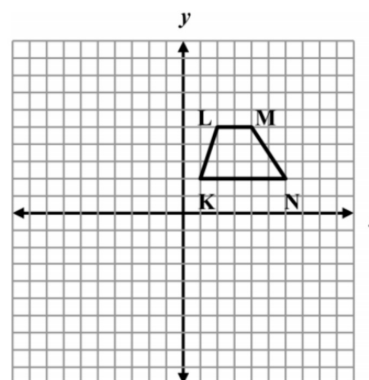
4. The shaded piece has been transformed into a frieze pattern.



Which transformations *best* describe how the pattern was created?

- ☒ A. reflections  
☒ B. translations  
☒ C. reflections and rotations  
☒ D. translations and rotations

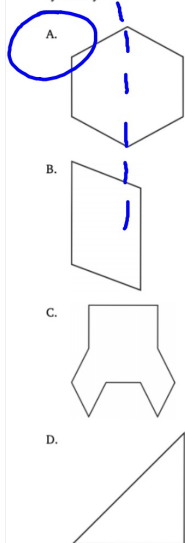
5. If trapezoid  $KLMN$  shown below is reflected across the  $x$ -axis to form trapezoid  $K'L'M'N'$ , what are the apparent coordinates of  $M'$ ?



$$(x, y) \rightarrow (x, -y)$$

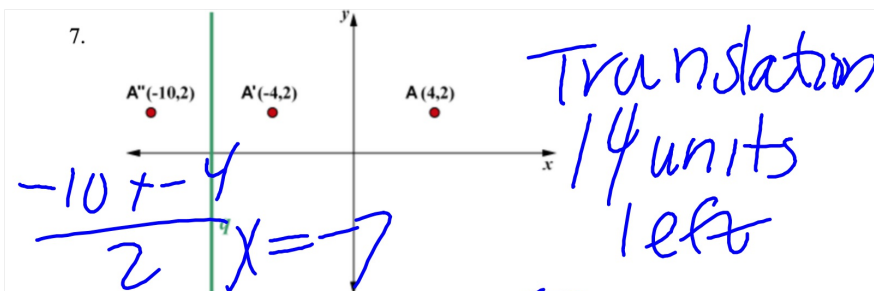
- ☒ A.  $(-4, 5)$   
☒ B.  $(-4, -5)$   
☒ C.  $(4, -5)$   
☒ D.  $(4, 5)$

6. Which figure has a line of symmetry and rotational symmetry?



$$\frac{360}{6} = 60$$

7.



Point A is reflected across the  $y$ -axis and then reflected across line  $q$ . What single transformation maps point A directly to point  $A''$ ?