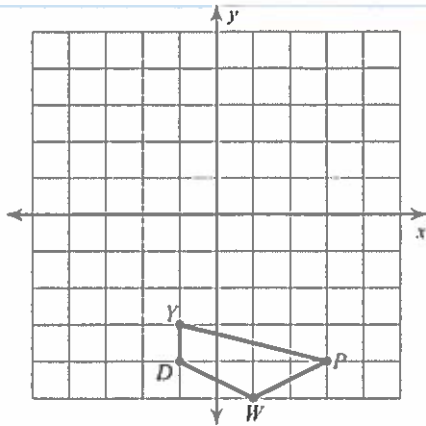


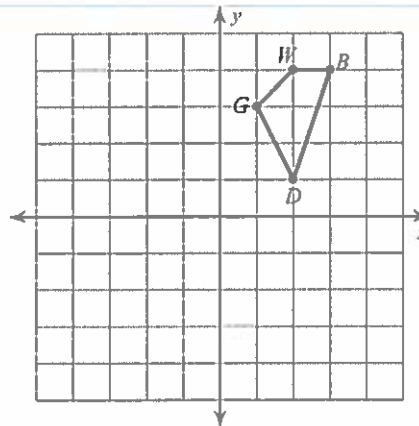
# Transformations Review

Graph the image of the figure using the transformation given.

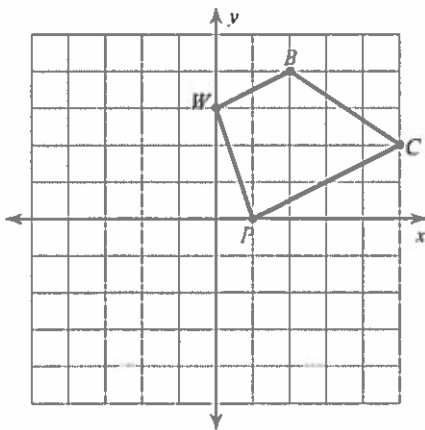
1) rotation  $90^\circ$  clockwise about the origin



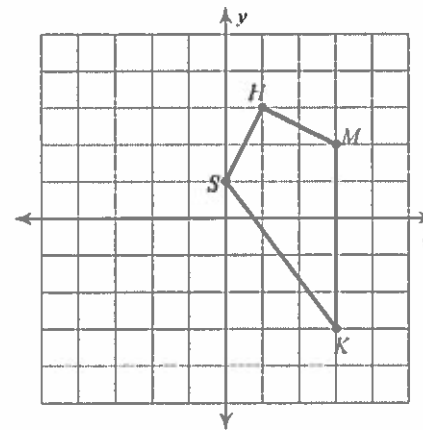
2) translation:  $(x, y) \rightarrow (x + 2, y - 6)$



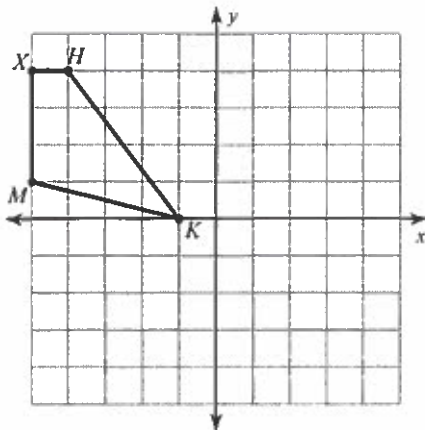
3) rotation  $180^\circ$  about the origin



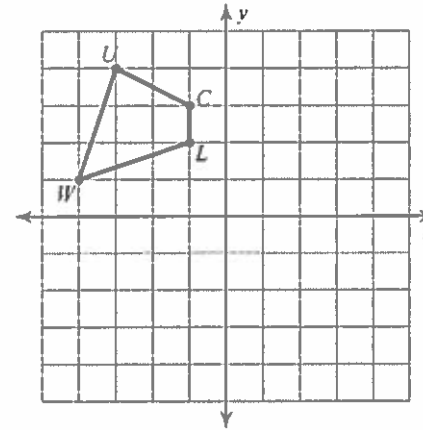
4) reflection across the y-axis



5) translation:  $(x, y) \rightarrow (x + 5, y)$



6) reflection across the x-axis



Find the coordinates of the vertices of each figure after the given transformation.

7) translation:  $(x, y) \rightarrow (x + 1, y - 1)$   
 $J(-3, -3), H(-4, -2), I(-2, 3), Z(-1, 2)$

8) reflection across the y-axis  
 $U(-5, 1), M(-2, 5), K(-3, 0)$

9) translation:  $(x, y) \rightarrow (x + 2, y)$   
 $V(1, -3), E(2, -2), Q(3, -4), P(2, -5)$

10) rotation  $180^\circ$  about the origin  
 $Z(1, -5), P(2, -3), S(5, -3)$

11) rotation  $180^\circ$  about the origin  
 $P(3, -4), X(3, -2), M(5, -2)$

12) reflection across the x-axis  
 $N(3, -2), T(3, -1), J(5, -3)$

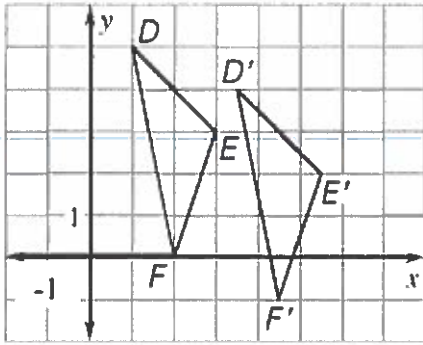
13) reflection across the x-axis  
 $H(-4, 3), X(-2, 5), F(-2, 2)$

14) rotation  $90^\circ$  counterclockwise about the origin  
 $U(0, 1), J(-2, 4), B(0, 5), R(3, 4)$

15) rotation  $90^\circ$  clockwise about the origin  
 $T(-3, 1), I(-3, 2), N(-1, 4), B(1, 2)$

16) translation:  $(x, y) \rightarrow (x + 1, y - 3)$   
 $A(-3, -1), U(-4, 1), M(-3, 2), B(0, 3)$

3) Write a rule that translates the  $\triangle DEF$  to  $\triangle D'E'F'$ .



4) Given the following coordinates of a point and a line of reflection, determine the coordinates of the image.

a)  $A(3, -5)$  in the  $x$ -axis

b)  $B(-2, 7)$  in the  $y$ -axis

c)  $C(4, 6)$  in the line  $y = x$

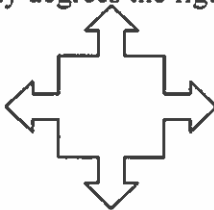
d)  $D(2, 4)$  in the line  $y = -x$

~~e)  $E(3, 1)$  in the line  $y = 3$~~

~~f)  $F(8, -3)$  in the line  $x = -5$~~

5) Determine whether the figure has rotational symmetry. If so, describe any and all rotation(s) (how many degrees the figure must be rotated) that will map the figure onto itself.

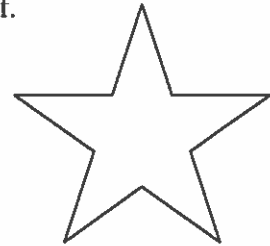
a)



b)



c)



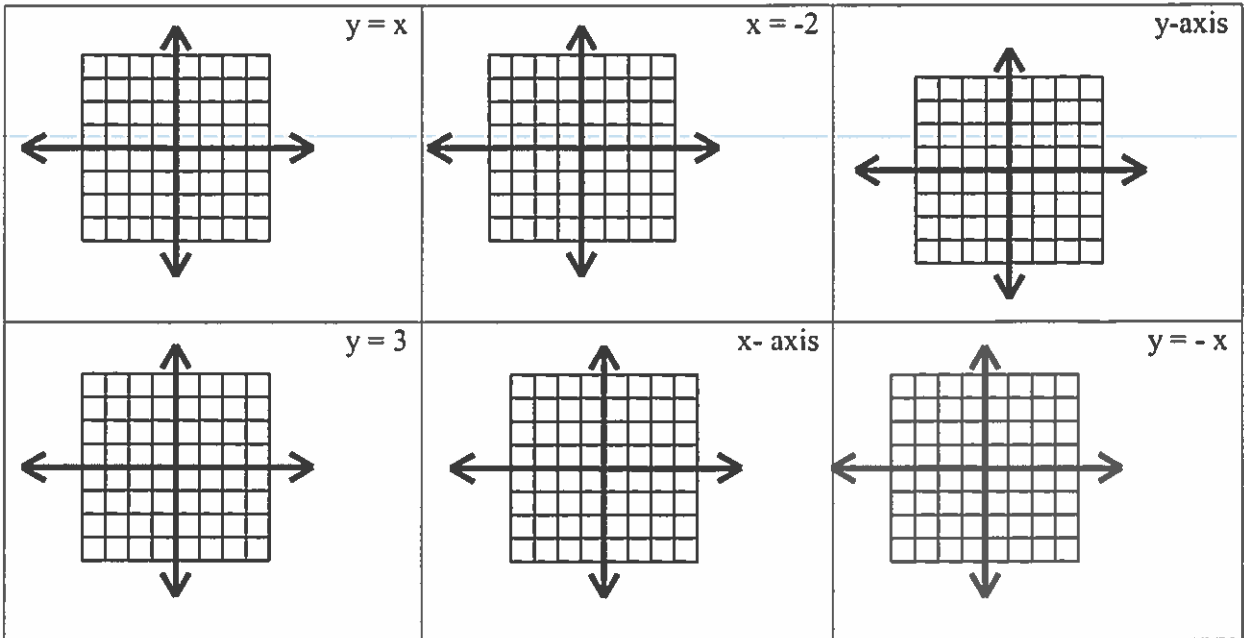
6) What does it mean for a transformation to be an isometry?

7) Use the translation  $(x, y) \rightarrow (x + 3, y - 2)$ .

a) What is the image of  $(-1, 5)$ ?

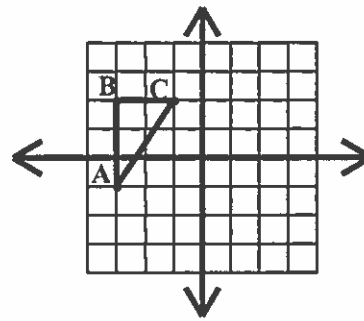
b) What is the preimage of  $(-4, -1)$ ?

15. Draw each of the following reflection lines:



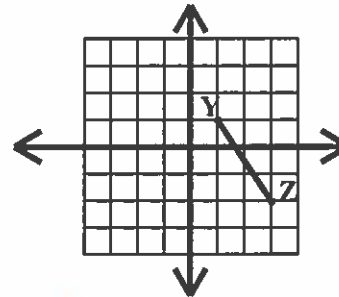
16. Suppose that  $\triangle ABC$  is reflected across the x-axis. What are the coordinates of the image of B?

- (a) (-3, 2)
- (b) (-3, -2)
- (c) (3, 2)
- (d) (3, -2)

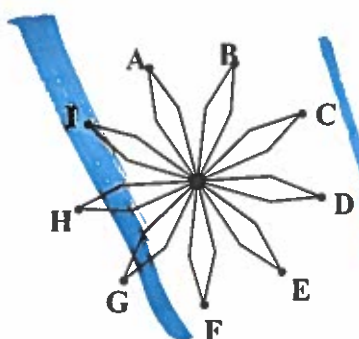


17. Suppose segment  $\overline{YZ}$  is translated 3 units to the left. What are the coordinates of the image of Y?

- (a) (-2, 1)
- (b) (-2, -1)
- (c) (2, 1)
- (d) (2, -1)



18.



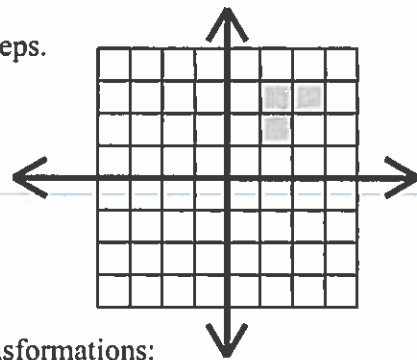
- (a) What is the *smallest* angle of rotation for the figure?
- (b) If point A is rotated  $200^\circ$  in a counterclockwise direction, with which point will it coincide?
- (c) If point A is rotated  $240^\circ$  in a clockwise direction, with which point will it coincide?
- (d) Is it possible to rotate the figure  $280^\circ$  and have it coincide with itself?
- (e) Is it possible to rotate the figure 300 degrees and have it coincide with itself?

19. Transform the shaded figure using the following sequence of steps.  
As you transform, draw and *label each step* for each of the three steps.

*Step 1:* Translate the shaded figure by  $(0, -3)$ .

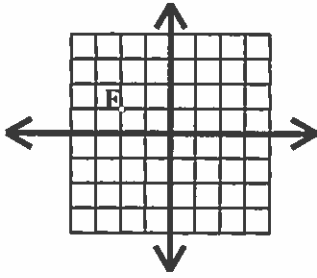
*Step 2:* Rotate the result of *step 1*  $180^\circ$  about the origin.

*Step 3:* Reflect the result of *step 2* over the x-axis



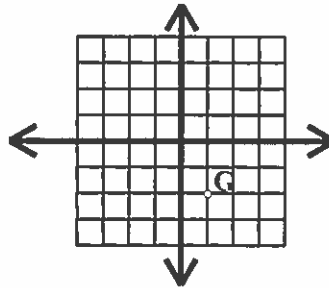
20. Give the coordinates of the image of each of the following transformations:

Reflect point F across the x-axis



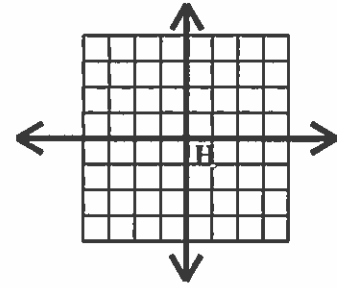
\_\_\_\_\_

Rotate G  $180^\circ$  about the origin



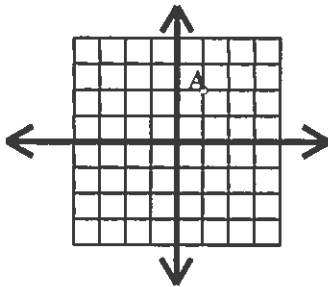
\_\_\_\_\_

Translate H by  $(-4, 3)$



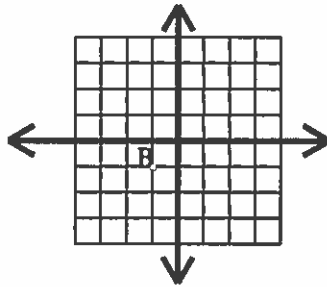
\_\_\_\_\_

Reflect A across  $y = -x$



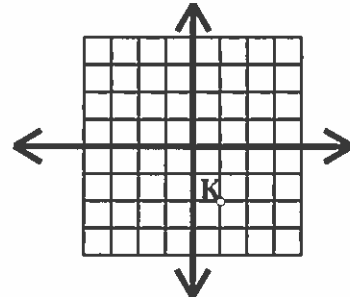
\_\_\_\_\_

Reflect B across  $x = -2$



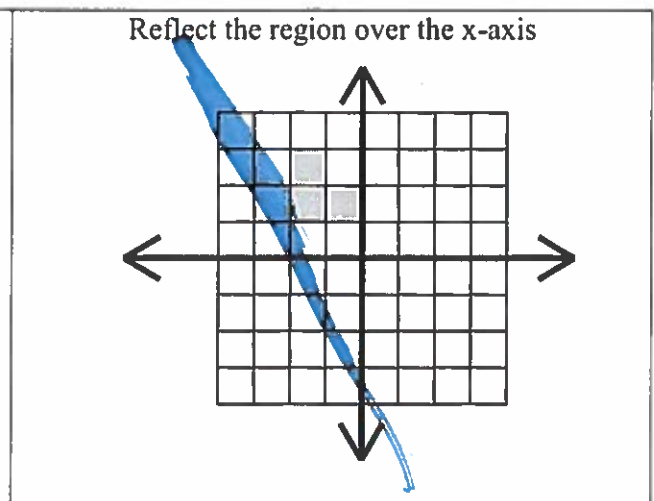
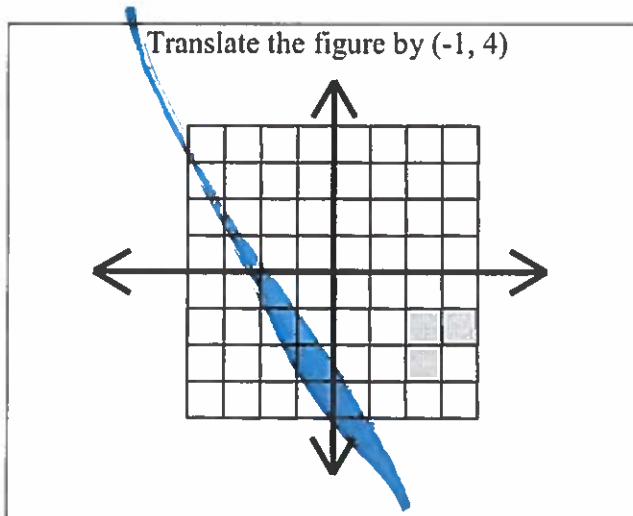
\_\_\_\_\_

Rotate K  $90^\circ$  clockwise



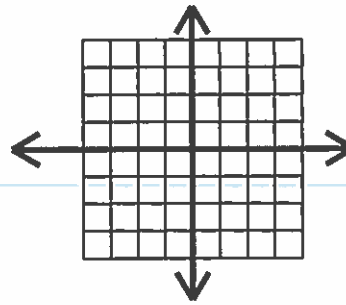
\_\_\_\_\_

21. Circle the *final image* of each of the following:



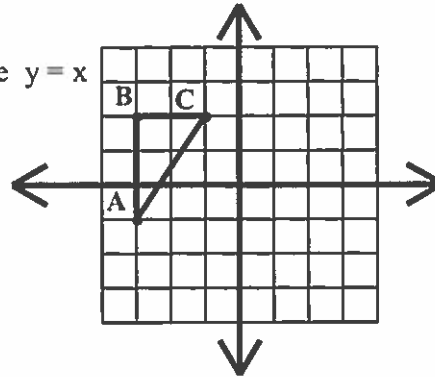
24. As a result of a particular transformation, the image of  $(-2, 3)$  is  $(2, 3)$ . This is an example of a reflection across

- (c)  $y = -x$
- (f)  $y$ -axis
- (g)  $x$ -axis
- (h)  $y = x$

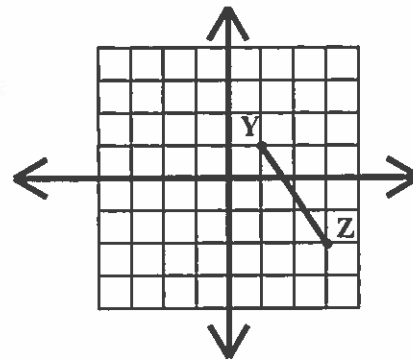


25. Suppose that  $\triangle ABC$  is reflected across the line  $y = x$ . What are the coordinates of the image of B?

\_\_\_\_\_



26. Suppose segment  $\overline{YZ}$  is translated by  $(0, -3)$ . What are the coordinates of the image of Y? \_\_\_\_\_



27. Match each transformation to the phrase best associated with it

- A. Reflection
- B. Rotation of 180 degrees
- C. Translation
- D. Isometry
- E. Dilation
- F. Rotation of 90 degrees

- (a) the pre-image and the image are congruent. \_\_\_\_\_
- (b) the orientation is always reversed \_\_\_\_\_
- (c) the result of reflecting over the line  $y = x$  followed by a reflection over the  $x$ -axis \_\_\_\_\_
- (d) The size of the image is different from the size of the pre-image \_\_\_\_\_
- (e) the result of reflecting over the  $y$ -axis followed by a reflection over the  $x$ -axis \_\_\_\_\_
- (f) The result of moving a pre-image first in a horizontal direction and then in a vertical direction. \_\_\_\_\_