

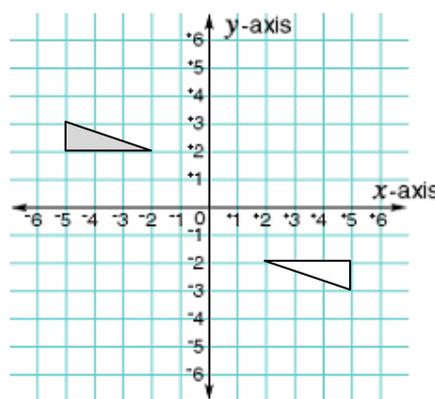
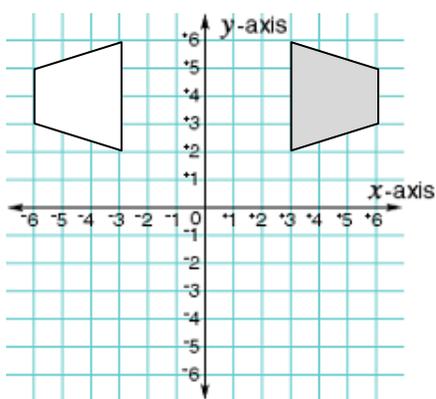
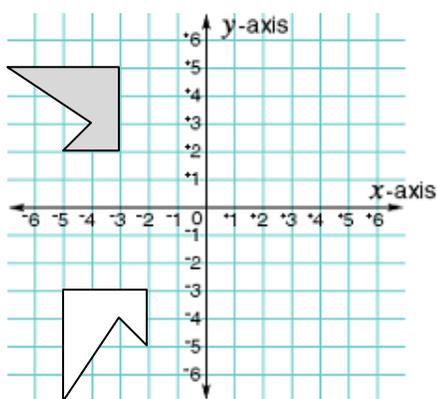


Rotations and Symmetry (page 1)

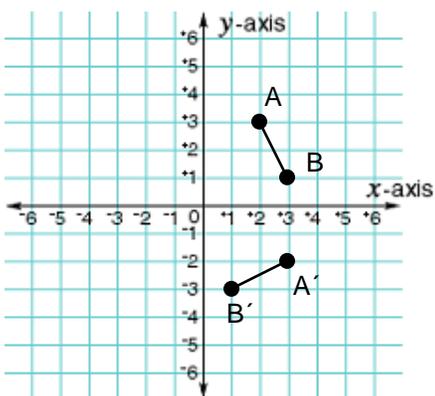
I. A rotation is a transformation in which a figure is turned about a fixed point, called the center of rotation. A figure can be rotated clockwise or counterclockwise. The angle of rotation is formed by rays drawn from the center of rotation through corresponding points.

Tell whether the transformation is a rotation about the origin. If so, give the angle and direction of rotation. (Hint: Highlight two corresponding points. Draw a line from the corresponding points to the origin. Measure the angle using a protractor. Repeat the process with another pair of corresponding points.)

The original figure is not shaded and the image is shaded.



II. You can use coordinate notation to describe the images of figures after rotations. Find the coordinates of A, B, A' and B' in all three examples. Use this information to write the coordinate notation for a 90° clockwise rotation, a 90° counterclockwise rotation, and a 180° rotation.

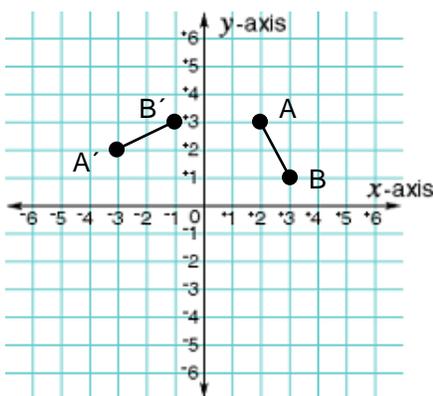


90° clockwise

$$A(2, 3) \rightarrow A'(3, -2)$$

$$B(3, 1) \rightarrow B'(-1, -3)$$

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

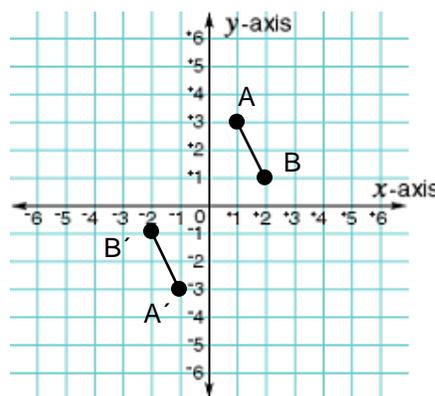


90° counterclockwise

$$A(2, 3) \rightarrow A'(-3, 2)$$

$$B(3, 1) \rightarrow B'(1, 3)$$

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



180° rotation

$$A(2, 3) \rightarrow A'(-2, -3)$$

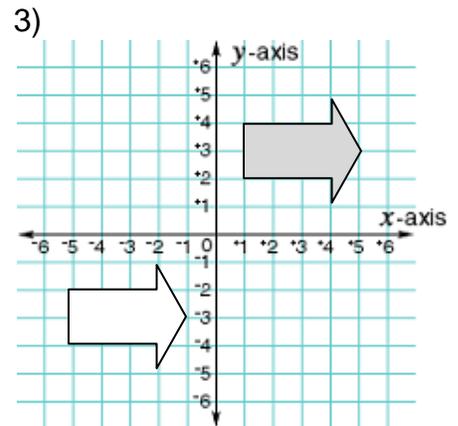
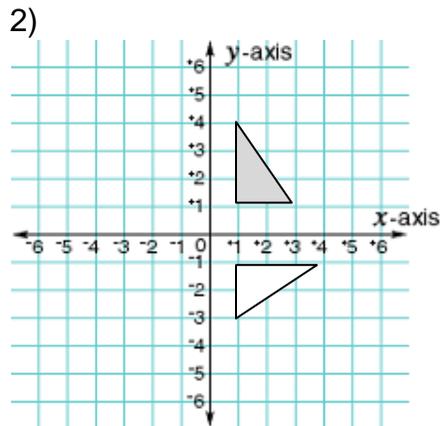
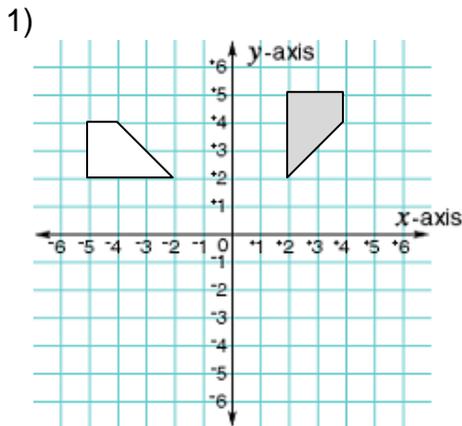
$$B(3, 1) \rightarrow B'(-3, -1)$$

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

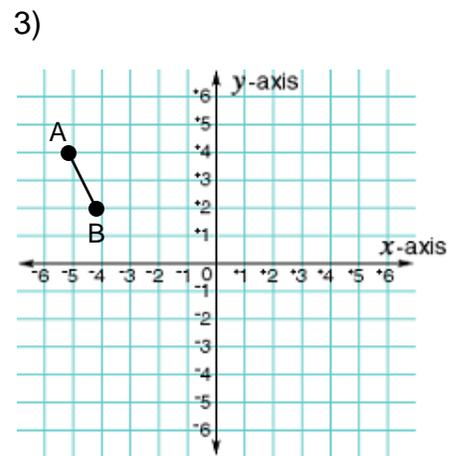
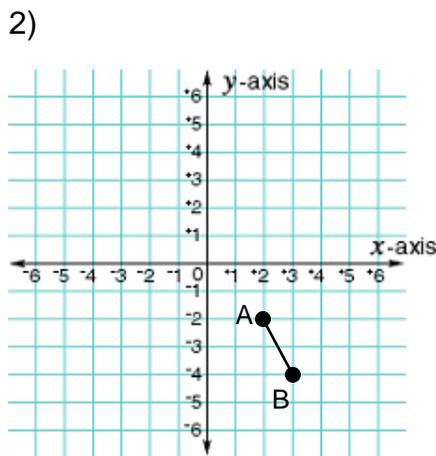
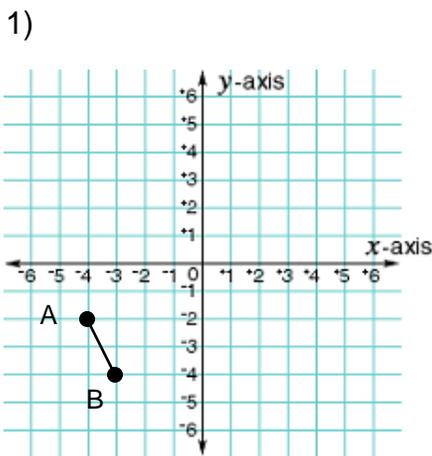
Rotations and Symmetry (page 2)

III. Tell whether the transformation is a rotation about the origin. If so, give the angle and direction of rotation.

The original figure is not shaded and the image is shaded.



IV. Write the coordinates for \overline{AB} . Find and write the image of \overline{AB} under the specified rotation.



90° clockwise
 $(x, y) \rightarrow (\quad , \quad)$
 $A(\quad , \quad) \rightarrow A'(\quad , \quad)$
 $B(\quad , \quad) \rightarrow B'(\quad , \quad)$

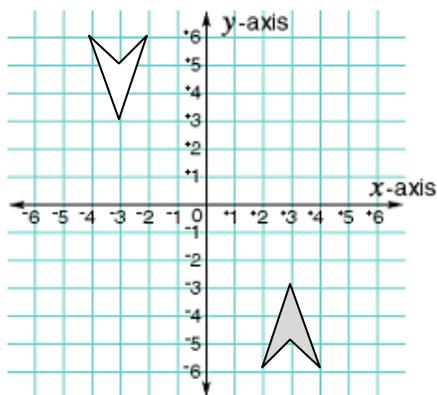
90° counterclockwise
 $(x, y) \rightarrow (\quad , \quad)$
 $A(\quad , \quad) \rightarrow A'(\quad , \quad)$
 $B(\quad , \quad) \rightarrow B'(\quad , \quad)$

180° rotation
 $(x, y) \rightarrow (\quad , \quad)$
 $A(\quad , \quad) \rightarrow A'(\quad , \quad)$
 $B(\quad , \quad) \rightarrow B'(\quad , \quad)$

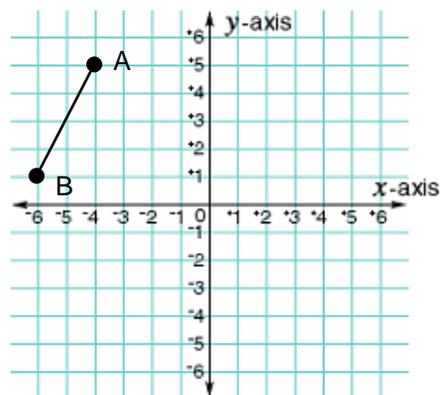
Rotations and Symmetry (page 3)

1) Describe a rotation in one word.

2) Tell whether the transformation is a rotation about the origin. If so, give the angle and direction of rotation.

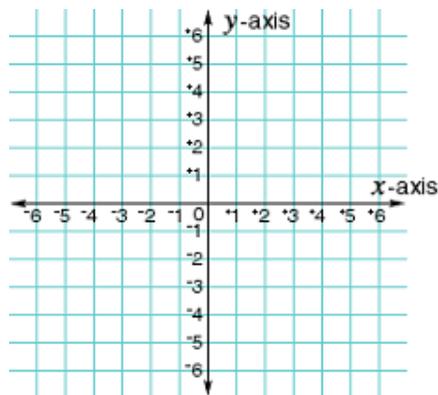


3) Write the coordinates for \overline{AB} . Find the image of \overline{AB} after a 90° counterclockwise rotation.



4) Treasure Hunt: You are located at the point (3, 4) in a coordinate plane. You need to find your way to a treasure chest. Starting at (3, 4), move from one image point to the next by following the order of the transformations listed. The final image point is the location of the treasure chest.

1. Rotate 180°
2. Reflect in the y -axis
3. Translate 5 units to the left and 4 units up
4. Reflect in the x -axis
5. Rotate 90° clockwise



5) CHALLENGE: A triangle is rotated 90° clockwise about the origin, then its image is translated using $(x, y) \rightarrow (x + 3, y - 1)$. The coordinates of the vertices of the final image are (1, -4), (3, -2), and (6, -5). Find the coordinates of the vertices of the original triangle.

