2.4 Exercises

Check It Out
Help with Homework
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Vocabulary and Concept Check

1. **VOCABULARY** What are the coordinates of the center of rotation in Example 2? Example 3?

MENTAL MATH **A figure lies entirely in Quadrant II. In which quadrant will the figure lie after the given clockwise rotation about the origin?**

2. 90°
3. 180°
4. 270°
5. 360°

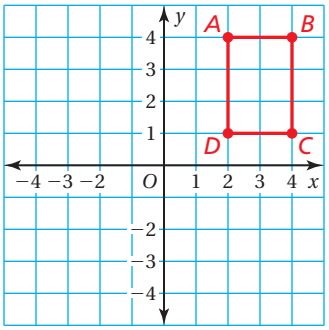
6. **DIFFERENT WORDS, SAME QUESTION** Which is different? Find "both" answers.

What are the coordinates of the figure after a 90° clockwise rotation about the origin?

What are the coordinates of the figure after a 270° clockwise rotation about the origin?

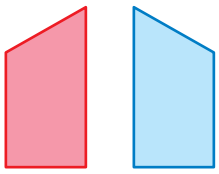
What are the coordinates of the figure after turning the figure 90° to the right about the origin?

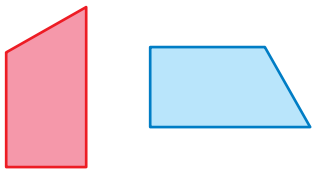
What are the coordinates of the figure after a 270° counterclockwise rotation about the origin?

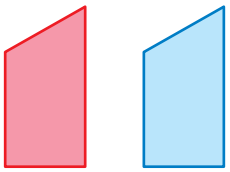


Practice and Problem Solving

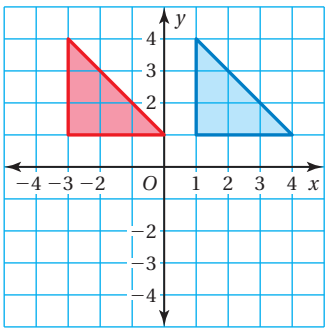
Identify the transformation.

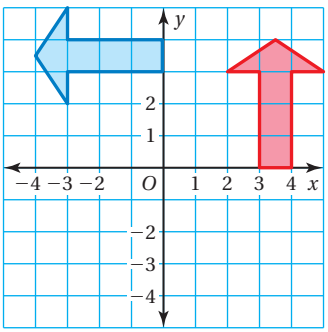
7. 

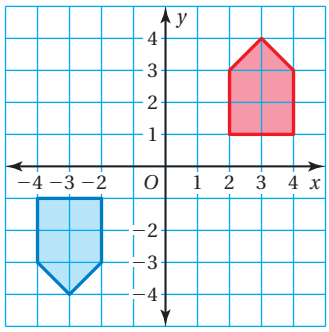
8. 

9. 

Tell whether the blue figure is a rotation of the red figure about the origin. If so, give the angle and direction of rotation.

10. 

11. 

12. 

The vertices of a figure are given. Rotate the figure as described. Find the coordinates of the image.

2 3 **13.** $A(2, -2)$, $B(4, -1)$, $C(4, -3)$, $D(2, -4)$
90° counterclockwise about the origin

14. $F(1, 2)$, $G(3, 5)$, $H(3, 2)$
180° about the origin

15. $J(-4, 1)$, $K(-2, 1)$, $L(-4, -3)$
90° clockwise about vertex L

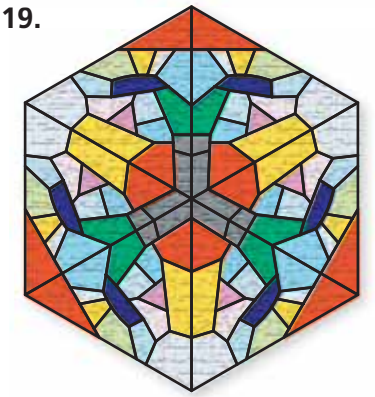
16. $P(-3, 4)$, $Q(-1, 4)$, $R(-2, 1)$, $S(-4, 1)$
180° about vertex R

17. $W(-6, -2)$, $X(-2, -2)$, $Y(-2, -6)$, $Z(-5, -6)$
270° counterclockwise about the origin

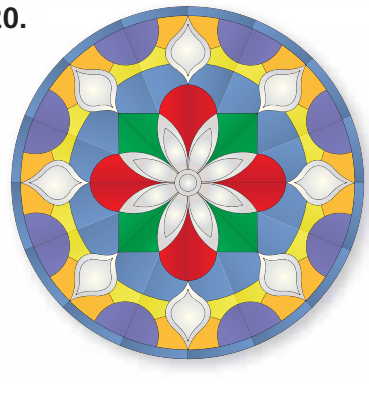
18. $A(1, -1)$, $B(5, -6)$, $C(1, -6)$
90° counterclockwise about vertex A

A figure has *rotational symmetry* if a rotation of 180° or less produces an image that fits exactly on the original figure. Explain why the figure has rotational symmetry.

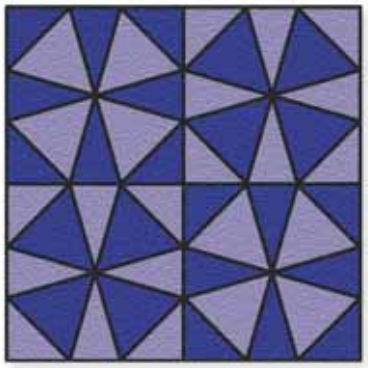
19.



20.



21.



The vertices of a figure are given. Find the coordinates of the figure after the transformations given.

4 **22.** $R(-7, -5)$, $S(-1, -2)$, $T(-1, -5)$

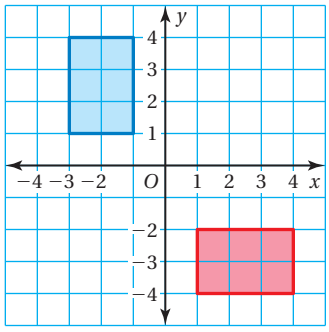
Rotate 90° counterclockwise about the origin. Then translate 3 units left and 8 units up.

23. $J(-4, 4)$, $K(-3, 4)$, $L(-1, 1)$, $M(-4, 1)$

Reflect in the x-axis, and then rotate 180° about the origin.

The red figure is congruent to the blue figure. Describe two different sequences of transformations in which the blue figure is the image of the red figure.

5 **24.**



25.