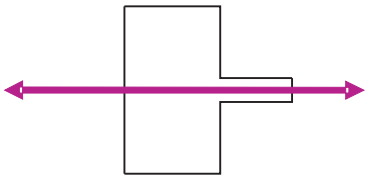
NAME_____

Module 11 **Transformation of Shapes**
Lesson 4 **Symmetry**

Independent Practice 11.4

Draw all the lines of symmetry.

1.



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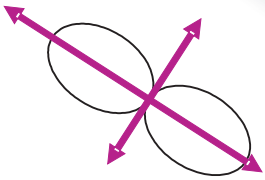
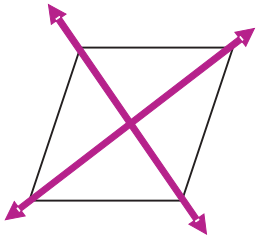
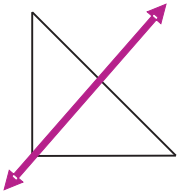


3.

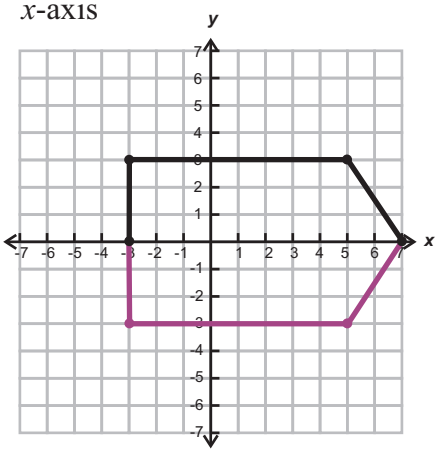


4.

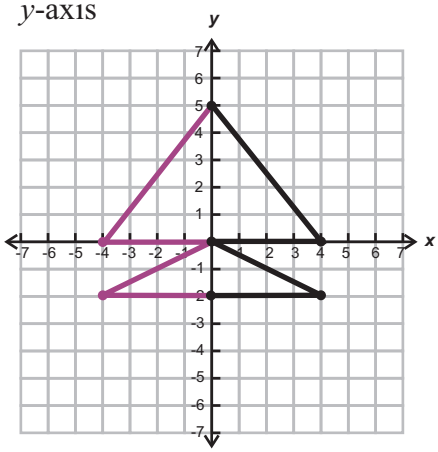


Complete the figure so it is symmetric about the given axis.

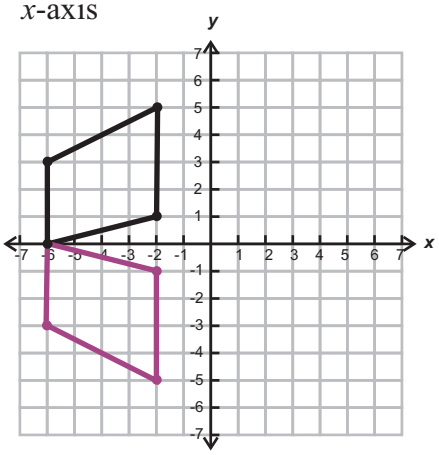
5. *x*-axis



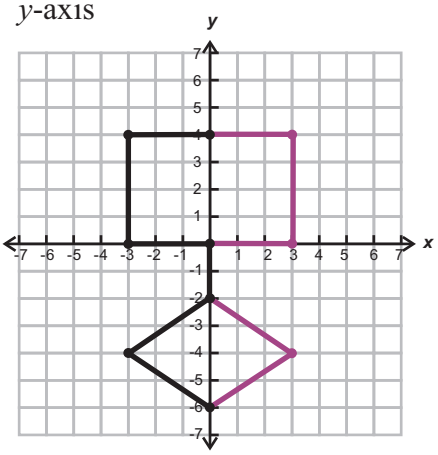
6. *y*-axis



7. *x*-axis

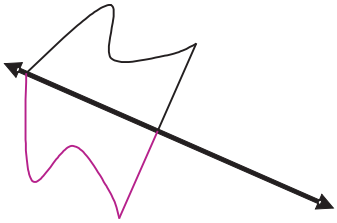


8. *y*-axis

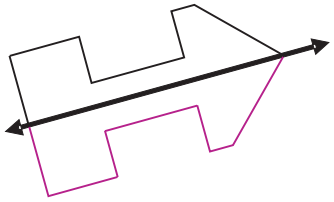


Complete the figure so it is symmetric about the given line.

9.

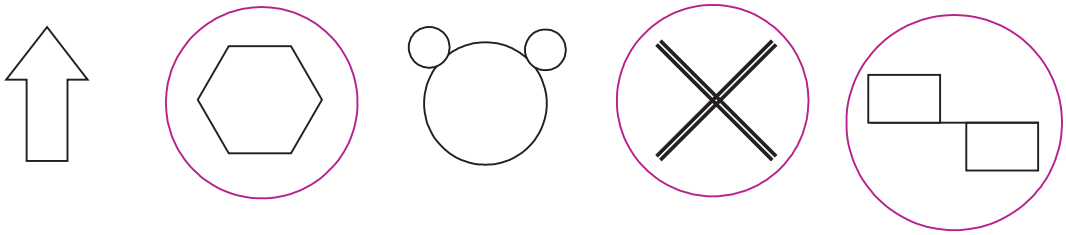


10.



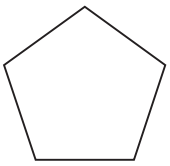
Circle the figures that have rotational symmetry.

11.



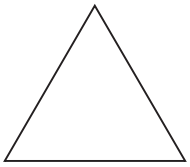
List all the angles of rotational symmetry. Then, name the order of the rotational symmetry. Last, tell if the figure has point symmetry.

12.



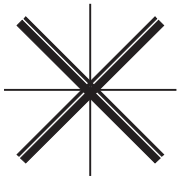
72°, 144°, 216°, 288°: Order 5: No

13.



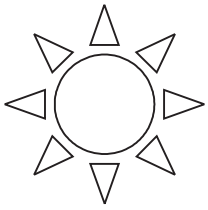
120°, 240°: Order 3: No

14.



90°, 180°, 270°: Order 4: Yes

15.



45°, 90°, 135°, 180°, 225°, 270°, 215: Order 8: Yes

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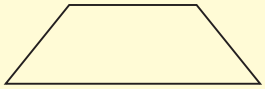
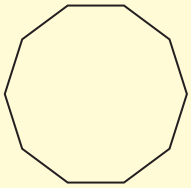
Module 11 **Transformation of Shapes**
Lesson 4 **Symmetry**

Journal

1. Erin said the trapezoid has a horizontal line of symmetry. Brian said it has a vertical line of symmetry. Who is correct and why?



2. Explain how a regular decagon has both line symmetry and rotational symmetry. Then, tell how to determine the angles of rotation.



3. Explain what it means for a figure to have point symmetry. Draw two figures with rotational symmetry such that one has point symmetry and the other does not.

Cumulative Review

1. The point located at (3, 5) is translated four units left and seven units down. What are the coordinates of the translated point?

(-1, -2)

2. The point located at (-6, 1) is translated one unit up. What are the coordinates of the translated point?

(-6, 2)

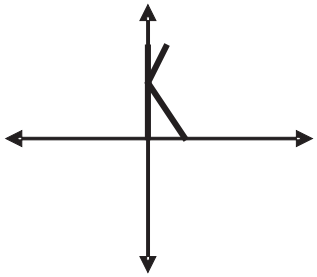
3. The point located at (2, -3) is reflected over the *x*-axis. What are the coordinates of the reflected point?

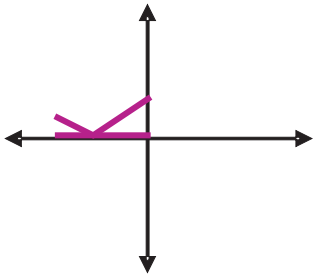
(2, 3)

4. The point located at (-1, -8) is rotated 90° counterclockwise about the origin. What are the coordinates of the rotated point?

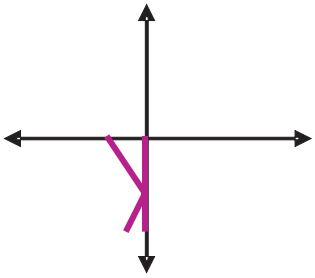
(8, -1)

5. Rotate the figure 90°, 180°, and 270° counterclockwise about the origin.

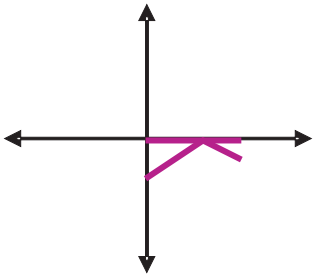




90°



180°



270°

6. A line segment with endpoints at (-2, 4) and (5, -3) is dilated with a scale factor of 1.5. What are the coordinates of the endpoints of the dilated segment?

(-3, 6) and (7.5, -4.5)

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Module 11 Transformation of Shapes
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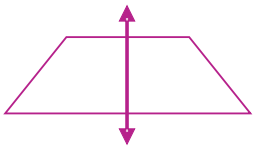
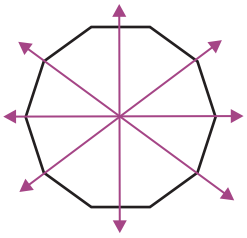
Possible Journal Answers

1. **Brian is correct. The trapezoid has a vertical line of symmetry; because when a vertical line is drawn through the middle, the two sides are congruent mirror images.**



Erin is incorrect; because when a horizontal line is drawn through the middle, the two sides are not mirror images. The top side is not as wide as the bottom side.

2. **A regular decagon has line symmetry because lines can be drawn that divide the image into two congruent mirror images. Four of these lines are shown.**



A regular decagon has rotational symmetry because the figure can be rotated less than a full turn and look like the original image. To determine the angles of rotation for which this happens, first find the order of rotation, which is how many times the figure can do this. This is 10, including turning it 360°. There are nine angles of rotation because an angle of rotation does not include the 360° turn. To find them, divide 360° by the order of rotation 10. The quotient is 36°. That means at every 36° rotation, the figure looks like the original: 36°, 72°, 108°, 144°, 180°, 216°, 252°, 288°, and 324°.

3. **A figure has point symmetry if it has an angle of rotation of 180°. A square has point symmetry because it can be turned 180°, or one half turn, and it will look like the original. An equilateral triangle has rotational symmetry, but not point symmetry; because after a 180° turn, the figure has a different orientation.**