Practice 8-1

Translations

Use arrow notation to write a rule that describes the translation shown on each graph.

1.

2.

3.

Copy $\triangle MNP$. Then graph the image after each translation. List the coordinates of each image’s vertices.

4. left 2 units, down 2 units

5. right 2 units, down 1 unit

6. left 2 units, up 3 units

Copy $\square RSTU$. Then graph the image after each translation. List the coordinates of each image’s vertices.

7. right 1 unit, down 2 units

8. left 3 units, up 0 units

9. right 2 units, up 4 units

Use the graph at the right for Exercises 10 and 11.

10. A rectangle has its vertices at $M(1,1)$, $N(6,1)$, $O(6,5)$, and $P(1,5)$. The rectangle is translated to the left 4 units and down 3 units. What are the coordinates of $M'$, $N'$, $O'$, and $P'$? Graph the rectangles $MNOP$ and $M'O'N'O'P'$.

11. Use arrow notation to write a rule that describes the translation of $M'N'O'P'$ to $MNOP$. 

Practice 8-2

How many lines of symmetry can you find for each letter?


Graph the given point and its image after each reflection. Name the coordinates of the reflected point.

5. A(5, -4) over the vertical dashed line
6. B(-3, 2) over the horizontal dashed line

7. C(-5, 0) over the y-axis
8. D(3, 4) over the x-axis

ΔABC has vertices A(2, 1), B(3, -5), and C(-2, 4). Graph ΔABC and its image, ΔA′B′C′, after a reflection over each line. Name the coordinates of A′, B′, and C′.

9. the x-axis
10. the line through (-1, 2) and (1, 2)
11. the y-axis

Fold your paper over each dashed line. Are the figures reflections of each other over the given line?

12. 
13. 
14.
Practice 8-3

Graph each point. Then rotate it the given number of degrees about the origin. Give the coordinates of the image.

1. \( V(2, -3); 90^\circ \)
2. \( M(-4, 5); 270^\circ \)
3. \( V(0, 5); 180^\circ \)
4. \( V(3, 4); 360^\circ \)
5. Graph \( \triangle RST \) with vertices \( R(-1, 3), S(4, -2), \) and \( T(2, -5) \). Graph the image formed by rotating the triangle about the origin by each angle.

- a \( 90^\circ \)
- b \( 180^\circ \)
- c \( 270^\circ \)

Determine if each figure could be a rotation of the figure at the right. For each figure that could be a rotation, tell what the angle of rotation appears to be.
Practice 8-4  

Transformations and Congruence

The three figures in each diagram are congruent. Describe the sequence of transformations that maps the original figure onto the final image.

1. 

2. 

Determine whether the two figures in each diagram are congruent. If the figures are congruent, tell what sequence of transformations will map one figure onto the other. Then write a congruence statement. If they are not congruent, explain why.

3. 

4.
Practice 8-5

Transformations and Congruence

Graph quadrilateral $ABCD$ with the given vertices. Find the coordinates of the vertices of its image $A'B'C'D'$ after a dilation with the given scale factor.

1. $A(2, -2), B(3, 2), C(-3, 2), D(-2, -2)$; scale factor $2$

2. $A(6, 3), B(0, 6), C(-6, 2), D(-6, -5)$; scale factor $\frac{1}{2}$

Quadrilateral $A'B'C'D'$ is a dilation image of quadrilateral $ABCD$. Find the scale factor. Classify each dilation as an enlargement or a reduction.

3. 

4. 

5. 

6. A triangle has coordinates $A(-2, -2), B(4, -2)$, and $C(1, 1)$. Graph its image $A'B'C'$ after a dilation with scale factor $\frac{3}{2}$. Give the coordinates of $A'B'C'$, and the ratio of the areas of the figures $A'B'C'$ and $ABC$. 
Practice 8-6

1. You and a friend decide to start a lawn cutting business. You use a graphics program to make a flyer advertising your business. You choose a picture for your flyer and place it on the top, left of the computer screen. The size of the picture on your screen is 12 cm wide. It looks much too large, so you reduce it to 4 cm wide. You then center the picture both horizontally and vertically on the page. Describe the sequence of transformations that maps the original picture on the flyer to the final version.

The two figures in each diagram are similar. Describe the sequence of two transformations that maps the original figure onto the final image.

2. 

The two figures in each diagram are similar. Describe the sequence of two transformations that maps the original figure onto the final image.

3.

4.

5.