2 Chapter Review

Review Key Vocabulary

congruent figures, *p. 44*   translation, *p. 50*   angle of rotation, *p. 62*
corresponding angles, *p. 44*   reflection, *p. 56*   similar figures, *p. 72*
corresponding sides, *p. 44*   line of reflection, *p. 56*   dilation, *p. 84*
transformation, *p. 50*   rotation, *p. 62*   center of dilation, *p. 84*
image, *p. 50*   center of rotation, *p. 62*   scale factor, *p. 84*

Review Examples and Exercises

2.1 Congruent Figures (pp. 42–47)

Trapezoids *EFGH* and *QRST* are congruent.
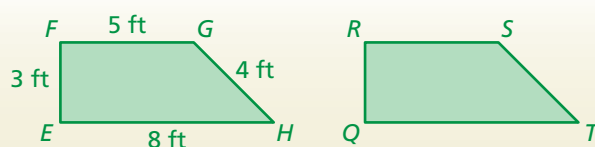
a. What is the length of side *QT*?

Side *QT* corresponds to side *EH*.

So, the length of side *QT* is 8 feet.

b. Which angle of *QRST* corresponds to ∠*H*?

∠*T* corresponds to ∠*H*.

Exercises

Use the figures above.

1. What is the length of side *QR*?   **2.** What is the perimeter of *QRST*?

The figures are congruent. Name the corresponding angles and the corresponding sides.
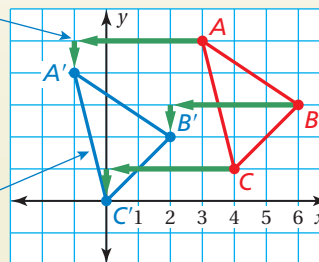
3.

4.
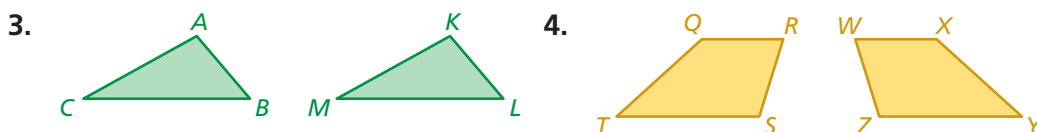
2.2 Translations (pp. 48–53)

Translate the red triangle 4 units left and 1 unit down. What are the coordinates of the image?

Move each vertex 4 units left and 1 unit down.
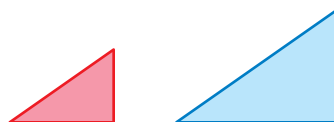
Connect the vertices. Label as *A′*, *B′*, and *C′*.

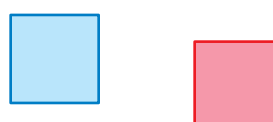The coordinates of the image are $A'(-1, 4)$, $B'(2, 2)$, and $C'(0, 0)$.

Exercises

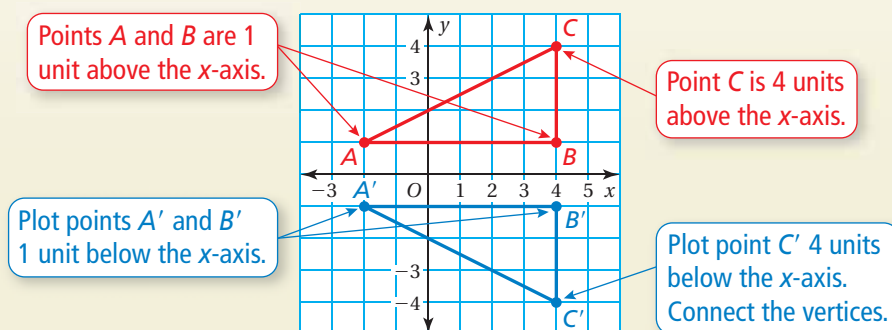**Tell whether the blue figure is a translation of the red figure.**

5.

6.

7. The vertices of a quadrilateral are $W(1, 2)$, $X(1, 4)$, $Y(4, 4)$, and $Z(4, 2)$. Draw the figure and its image after a translation 3 units left and 2 units down.

8. The vertices of a triangle are $A(-1, -2)$, $B(-2, 2)$, and $C(-3, 0)$. Draw the figure and its image after a translation 5 units right and 1 unit up.

2.3 **Reflections** *(pp. 54–59)*

The vertices of a triangle are $A(-2, 1)$, $B(4, 1)$, and $C(4, 4)$. Draw the figure and its reflection in the x-axis. What are the coordinates of the image?
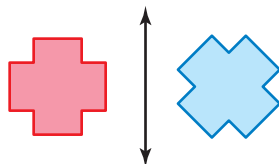
Points A and B are 1 unit above the x-axis.

Point C is 4 units above the x-axis.

Plot points A′ and B′ 1 unit below the x-axis.

Plot point C′ 4 units below the x-axis. Connect the vertices.

The coordinates of the image are $A'(-2, -1)$, $B'(4, -1)$, and $C'(4, -4)$.
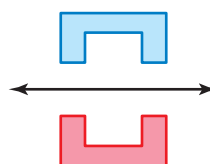

Exercises

Tell whether the blue figure is a reflection of the red figure.

9.

10.

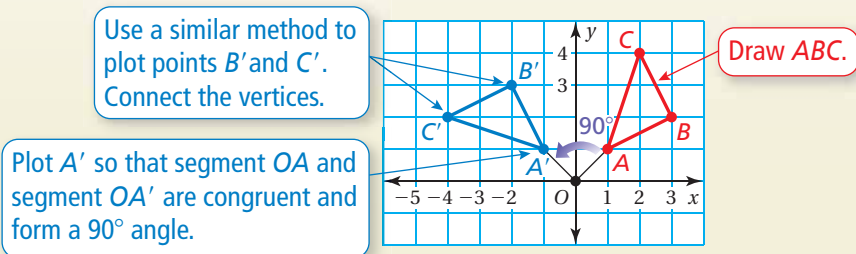**Draw the figure and its reflection in (a) the x-axis and (b) the y-axis.**

11. $A(2, 0)$, $B(1, 5)$, $C(4, 3)$

12. $D(-5, -5)$, $E(-5, -1)$, $F(-2, -2)$, $G(-2, -5)$

13. The vertices of a rectangle are $E(-1, 1)$, $F(-1, 3)$, $G(-5, 3)$, and $H(-5, 1)$. Find the coordinates of the figure after reflecting in the x-axis, and then translating 3 units right.

2.4 Rotations (pp. 60–67)

The vertices of a triangle are $A(1, 1)$, $B(3, 2)$, and $C(2, 4)$. Rotate the triangle 90° counterclockwise about the origin. What are the coordinates of the image?

Use a similar method to plot points B' and C'. Connect the vertices.

Plot A' so that segment OA and segment OA' are congruent and form a 90° angle.

Draw ABC.

The coordinates of the image are $A'(-1, 1)$, $B'(-2, 3)$, and $C'(-4, 2)$.

Exercises

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

14.

15.
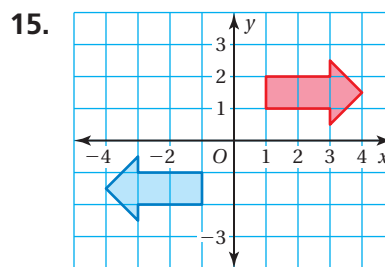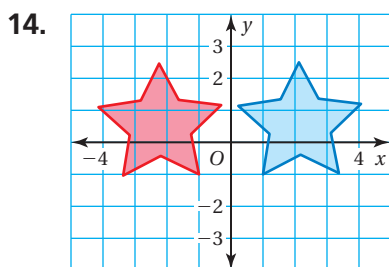
The vertices of a triangle are $A(-4, 2)$, $B(-2, 2)$, and $C(-3, 4)$. Rotate the triangle about the origin as described. Find the coordinates of the image.
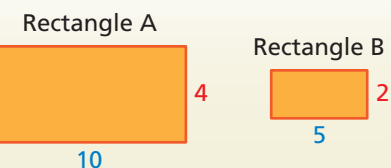
16. 180°

17. 270° clockwise

2.5 Similar Figures (pp. 70–75)

a. Is Rectangle A similar to Rectangle B?

Each figure is a rectangle. So, corresponding angles are congruent. Check to see if corresponding side lengths are proportional.

$$\frac{\text{Length of A}}{\text{Length of B}} = \frac{10}{5} = 2 \qquad \frac{\text{Width of A}}{\text{Width of B}} = \frac{4}{2} = 2 \qquad \text{Proportional}$$

So, Rectangle A is similar to Rectangle B.

b. The two rectangles are similar. Find x.

Because the rectangles are similar, corresponding side lengths are proportional. So, write and solve a proportion to find x.
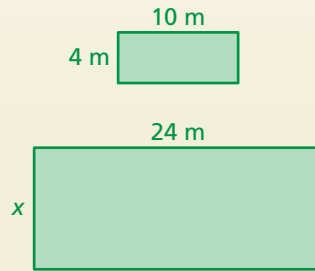
$$\frac{10}{24} = \frac{4}{x}$$ Write a proportion.

$$10x = 96$$ Cross Products Property
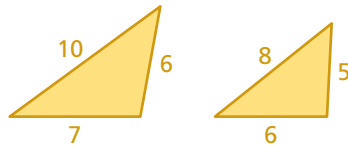
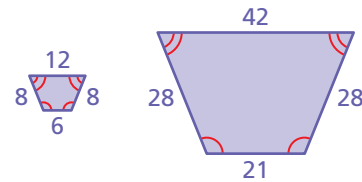$$x = 9.6$$ Divide each side by 10.

So, x is 9.6 meters.

Exercises

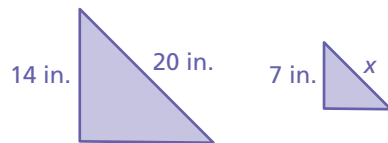**Tell whether the two figures are similar. Explain your reasoning.**
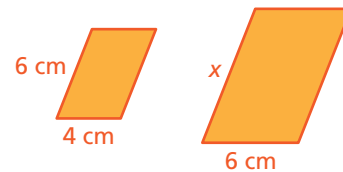
18.

19.
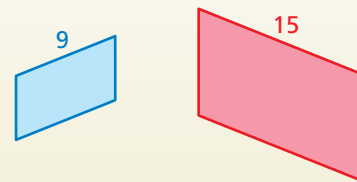
The figures are similar. Find x.

20.

21.

Perimeters and Areas of Similar Figures *(pp. 76–81)*

a. Find the ratio (red to blue) of the perimeters of the similar parallelograms.

$$\frac{\text{Perimeter of red parallelogram}}{\text{Perimeter of blue parallelogram}} = \frac{15}{9}$$
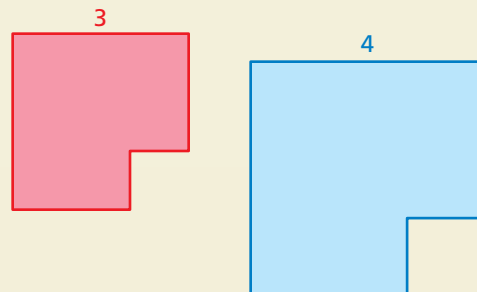
$$= \frac{5}{3}$$

The ratio of the perimeters is $\frac{5}{3}$.

b. Find the ratio (red to blue) of the areas of the similar figures.

$$\frac{\text{Area of red figure}}{\text{Area of blue figure}} = \left(\frac{3}{4}\right)^2$$

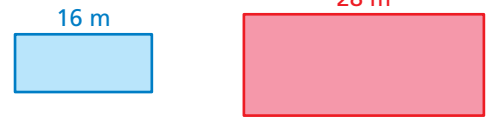$$= \frac{9}{16}$$

The ratio of the areas is $\frac{9}{16}$.

Exercises

The two figures are similar. Find the ratios (red to blue) of the perimeters and of the areas.

22.

6 m   8 m

23.

16 m   28 m

24. PHOTOS Two photos are similar. The ratio of the corresponding side lengths is 3 : 4. What is the ratio of the areas?
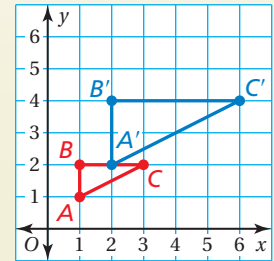
2.7 Dilations *(pp. 82–89)*

Draw the image of Triangle *ABC* after a dilation with a scale factor of 2. Identify the type of dilation.

Multiply each *x*- and *y*-coordinate by the scale factor 2.

Vertices of *ABC*	(2*x*, 2*y*)	Vertices of *A′B′C′*
$A(1, 1)$	$(2 \cdot 1, 2 \cdot 1)$	$A'(2, 2)$
$B(1, 2)$	$(2 \cdot 1, 2 \cdot 2)$	$B'(2, 4)$
$C(3, 2)$	$(2 \cdot 3, 2 \cdot 2)$	$C'(6, 4)$

∴ The image is shown at the above right. The dilation is an *enlargement* because the scale factor is greater than 1.
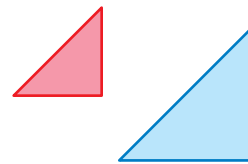
Exercises

Tell whether the blue figure is a dilation of the red figure.

25.

26.

The vertices of a figure are given. Draw the figure and its image after a dilation with the given scale factor. Identify the type of dilation.

27. $P(-3, -2), Q(-3, 0), R(0, 0); k = 4$

28. $B(3, 3), C(3, 6), D(6, 6), E(6, 3); k = \dfrac{1}{3}$

29. The vertices of a rectangle are $Q(-6, 2), R(6, 2), S(6, -4),$ and $T(-6, -4)$. Dilate the rectangle with respect to the origin using a scale factor of $\dfrac{3}{2}$. Then translate it 5 units right and 1 unit down. What are the coordinates of the image?