

**Reteaching with Practice**

For use with pages 396–402

**GOALS** Identify the three basic rigid transformations.**VOCABULARY**

Figures in a plane can be reflected, rotated, or translated to produce new figures. The new figure is called the **image**, and the original figure is called the **preimage**.

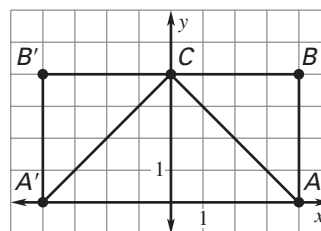
The operation that *maps*, or moves, the preimage onto the image is called a **transformation**.

An **isometry** is a transformation that preserves lengths.

**EXAMPLE 1** Naming Transformations

Use the graph of the transformation at the right.

- Name and describe the transformation.
- Name the coordinates of the vertices of the image.
- Is  $\triangle ABC$  congruent to its image?

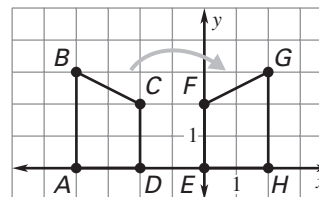
**SOLUTION**

- The transformation is a reflection in the  $y$ -axis.
- The coordinates of the vertices of the image,  $\triangle A'B'C'$ , are  $A'(-4, 0)$ ,  $B'(-4, 4)$ , and  $C'(0, 4)$ .
- Yes,  $\triangle ABC$  is congruent to its image  $\triangle A'B'C'$ . One way to show this would be to use the Distance Formula to find the lengths of the sides of both triangles. Then use the SSS Congruence Postulate.

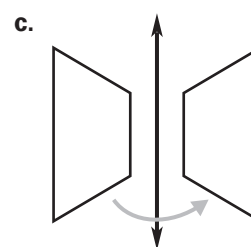
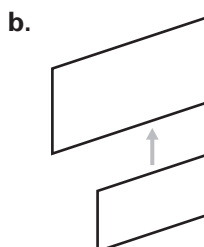
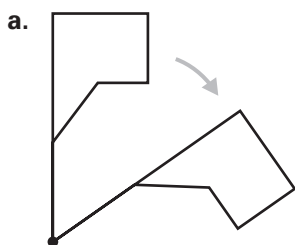
**Exercises for Example 1**

In Exercises 1–3, use the graph of the transformation to answer the questions.

- Name and describe the transformation.
- Name the coordinates of the vertices of the image.
- Name two angles with the same measure.

**EXAMPLE 2** Identifying Isometries

Which of the following transformations appear to be isometries?



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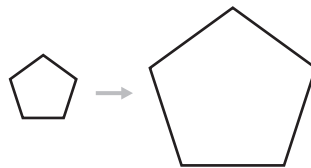
### SOLUTION

- This transformation appears to be an isometry. The preimage on the left is rotated about a point to produce a congruent image on the right.
- This transformation is not an isometry. The parallelogram on the top is not congruent to its preimage on the bottom.
- This transformation appears to be an isometry. The trapezoid on the left is reflected in a line to produce a congruent trapezoid on the right.

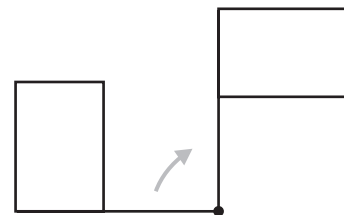
### Exercises for Example 2

State whether the transformation appears to be an isometry.

4.



5.



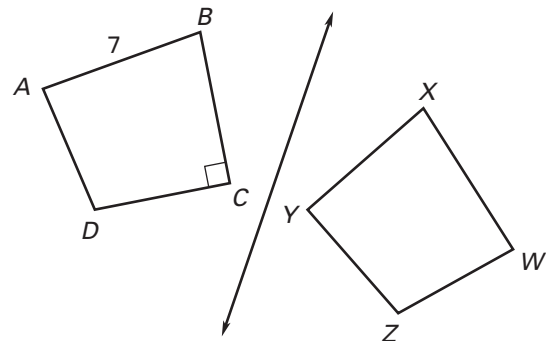
### EXAMPLE 3

### Preserving Length and Angle Measure

In the diagram,  $ABCD$  is mapped onto  $WXYZ$ . The mapping is a reflection.  
Given that  $ABCD \rightarrow WXYZ$  is an isometry, find the length of  $\overline{WX}$  and the measure of  $\angle Y$ .

### SOLUTION

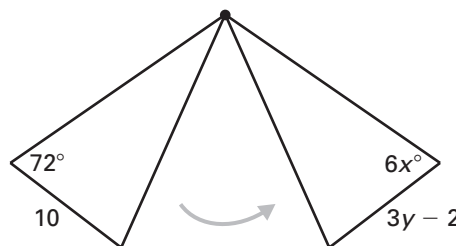
Because the transformation is an isometry, the two figures are congruent. So,  
 $WX = AB = 7$  and  $m\angle Y = m\angle C = 90^\circ$ .



### Exercises for Example 3

In Exercises 6 and 7, find the value of each variable, given that the transformation is an isometry.

6.



7.

