

**Reteaching with Practice**

For use with pages 437–443

**GOAL****Use transformations to classify frieze patterns.****VOCABULARY**

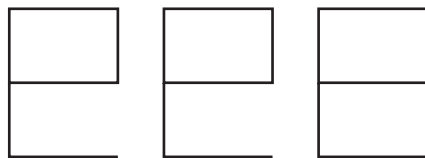
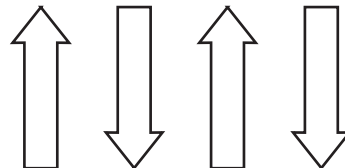
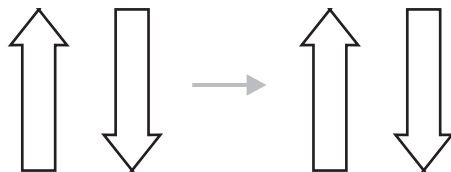
A **frieze pattern** or **border pattern** is a pattern that extends to the left and right in such a way that the pattern can be mapped onto itself by a horizontal translation.

**Classification of Frieze Patterns**

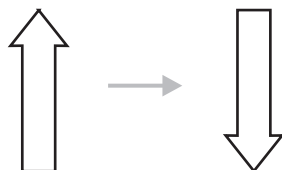
<b>T</b>	Translation
<b>TR</b>	Translation and 180° rotation
<b>TG</b>	Translation and horizontal glide reflection
<b>TV</b>	Translation and vertical line reflection
<b>THG</b>	Translation, horizontal line reflection, and horizontal glide reflection
<b>TRVG</b>	Translation, 180° rotation, vertical line reflection, and horizontal glide reflection
<b>TRHVG</b>	Translation, 180° rotation, horizontal line reflection, vertical line reflection, and horizontal glide reflection

**EXAMPLE 1****Classifying Patterns**

Name the isometries that map the frieze pattern onto itself.

**a.****b.****SOLUTION****a.** This frieze pattern can be mapped onto itself by a horizontal translation (T).**b.** This frieze pattern can be mapped onto itself by a horizontal translation (T)

or by a horizontal glide reflection (G).

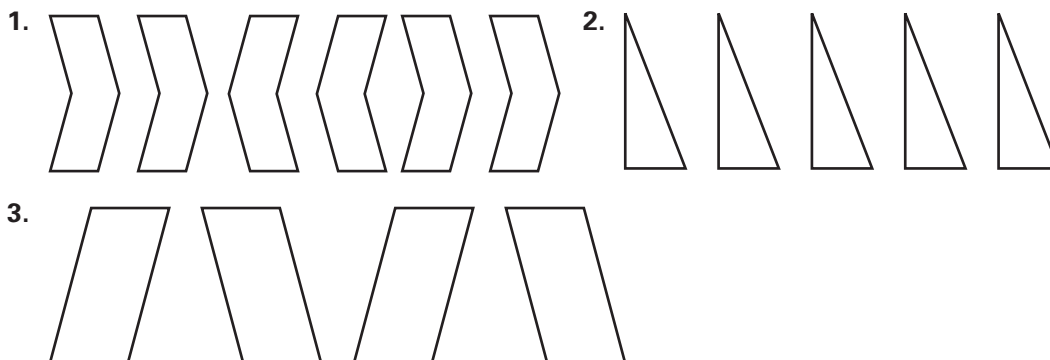


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## Exercises for Example 1

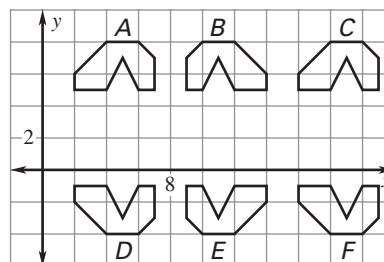
In Exercises 1–5, name the isometries that map the frieze pattern onto itself.



## EXAMPLE 2 Describing Transformations

Use the diagram of the frieze pattern.

- Is there a reflection in a vertical line?
- Is there a reflection in a horizontal line?
- Name and describe the transformation that maps A onto F.
- Name and describe the transformation that maps D onto E.



### SOLUTION

- Yes, there is a reflection in the line  $x = 8$  and also in the line  $x = 15$ .
- Yes, there is a reflection in the line  $y = 2$ .
- A can be mapped onto F by a horizontal glide reflection.
- D can be mapped onto E by a translation.

## Exercises for Example 2

In Exercises 4–7, use the diagram of the frieze pattern.

- Is there a reflection in a horizontal line? If so, describe the reflection(s).
- Is there a reflection in a vertical line? If so, describe the reflection(s).
- Name and describe the transformation that maps B onto C.
- Name and describe the transformation that maps D onto C.

