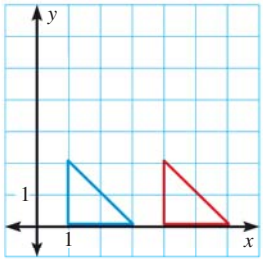
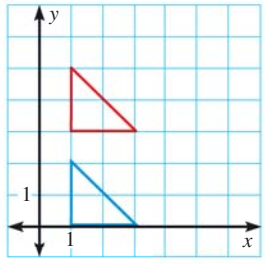
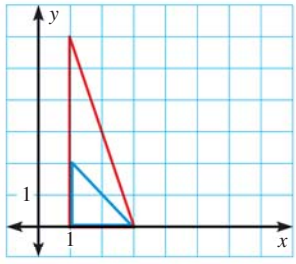
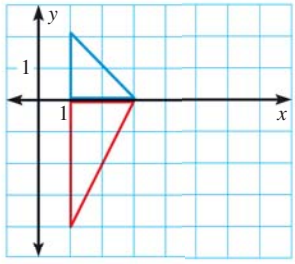
CONCEPT SUMMARY *For Your Notebook*

Identifying Transformations

Translation		Vertical stretch or shrink	
Horizontal	**Vertical**	**Without reflection**	**With reflection**
$(x, y) \rightarrow (x + h, y)$	$(x, y) \rightarrow (x, y + k)$	$(x, y) \rightarrow (x, ay)$ where $a > 0$	$(x, y) \rightarrow (x, ay)$ where $a < 0$
			

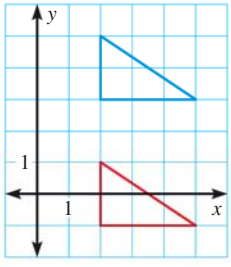
PRACTICE

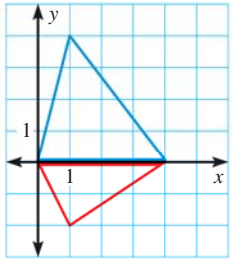
1. **VOCABULARY** Does a translation or a vertical stretch always produce a figure that is the same size and shape as the original figure? *Explain*.

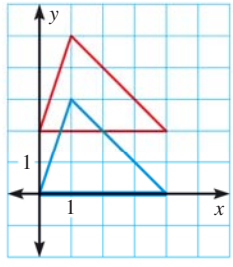
2. **WRITING** *Describe* the vertical shrink $(x, y) \rightarrow (x, \frac{1}{2}y)$ in words.

EXAMPLES 1 and 2 on p. 213 for Exs. 3–14

DESCRIBING TRANSFORMATIONS **Use words to describe the transformation of the blue figure to the red figure.**

3. 

4. 

5. 

PERFORMING TRANSFORMATIONS **Square $ABCD$ has vertices at (0, 0), (0, 2), (2, 2), and (2, 0). Perform the indicated transformation. Then give the coordinates of figure $A'B'C'D'$.**

6. $(x, y) \rightarrow (x, y - 5)$
7. $(x, y) \rightarrow (x, y + 1)$
8. $(x, y) \rightarrow (x, y - 7)$
9. $(x, y) \rightarrow (x, -y)$
10. $(x, y) \rightarrow (x, 4y)$
11. $(x, y) \rightarrow (x, -\frac{1}{2}y)$
12. $(x, y) \rightarrow (x + 2, y + 3)$
13. $(x, y) \rightarrow (x - 1, y + 4)$
14. $(x, y) \rightarrow (x + 3, y)$

15. **WRITING** A square has vertices at (0, 0), (0, 3), (3, 3), and (3, 0). Tell how you could use a transformation to move the square so that it has new vertices at (0, 0), (0, −3), (3, −3), and (3, 0).