10-7

Name _____ Date _____

Translations (Pages 456–459)

In a coordinate plane, a sliding motion for a figure is called a **translation**. A translation down or to the left is negative. A translation up or to the right is positive.

Graphing Translations	To translate a point in the way described by an ordered pair, add the coordinates of the ordered pair to the coordinates of the point. (x, y) translated by (a, b) becomes $(x + a, y + b)$.

EXAMPLES

A What are the coordinates of $(-2, 3)$ translated by $(1, -2)$?

Add the coordinates of (1, −2) to the coordinates of (−2, 3). The new point is (−1, 1).

B What are the coordinates of $(3, -5)$ translated by $(0, 2)$?

Add the coordinates of (0, 2) to the coordinates of (3, −5). The new point is (3, −3).

Try These Together

1. Find the coordinates of $D(0, 0)$, $E(-2, 2)$, and $F(1, 3)$ after they are translated by $(2, -1)$. Then graph triangle DEF and its translation, triangle $D'E'F'$.

HINT: Add 2 to each x-coordinate and add −1 to each y-coordinate.

2. Find the coordinates of the square with vertices $A(-1, 2)$, $B(-1, 4)$, $C(1, 4)$, and $D(1, 2)$ after it is translated by $(-3, -2)$. Then graph the square and its translation.

HINT: Add −3 to the first coordinate and −2 to the second.

PRACTICE

Find the coordinates of the vertices of each figure after the translation described. Then graph the figure and its translation.

3. parallelogram $BCDE$ with vertices $B(-3, 3)$, $C(3, 3)$, $D(1, 1)$, and $E(-5, 1)$ translated by $(4, 3)$

4. quadrilateral $HIJK$ with vertices $H(1, 0)$, $I(3, -2)$, $J(1, -5)$, and $K(-1, -2)$ translated by $(-3, 0)$

5. The vertices of triangle KLM are $K(1, 2)$, $L(1, -5)$, and $M(5, 0)$. L' has the coordinates $(-3, -8)$

a. Describe the translation using an ordered pair.

b. Find the coordinates of K' and M'.

6. **Standardized Test Practice** Manuela is planting a garden with one rectangle of flowers beside another. If the first has vertices $A(-2, 3)$, $B(3, 3)$, $C(3, 1)$, and $D(-2, 1)$, and the second has vertices $E(3, -3)$, $F(8, -3)$, $G(8, -5)$, and $H(3, -5)$, what is the translation from $ABCD$ to $EFGH$?

A $(10, -6)$ **B** $(-1, -1)$ **C** $(1, 0)$ **D** $(5, -6)$

Answers: **1–4.** See Answer Key for graphs. **1.** $D'(2, -1)$, $E'(0, 1)$, $F'(3, 2)$ **2.** $A'(-4, 0)$, $B'(-4, 2)$, $C'(-2, 2)$, $D'(-2, 0)$ **3.** $B'(1, 6)$, $C'(7, 6)$, $D'(5, 4)$, $E'(-1, 4)$ **4.** $H'(-2, 0)$, $I'(0, -2)$, $J'(-2, -5)$, $K'(-4, -2)$ **5a.** $(-4, -3)$ **5b.** $K'(-3, -1)$, $M'(1, -3)$ **6.** D