

Graphing Transformations (pages 215–217)

When a geometric figure is moved to a different position, the various kinds of moves are called **transformations**. When you flip a figure over a line, the move is called a **reflection**. When you slide a figure, the move is called a **translation**.

Transforming Figures	<p>Reflections:</p> <ul style="list-style-type: none"> • When you flip a figure over the x-axis, you are changing the up-and-down positions of the vertices, so the y-coordinates change. • When you flip a figure over the y-axis, you are changing the left-and-right positions of the vertices, so the x-coordinates change. <p>Translations:</p> <ul style="list-style-type: none"> • A translation may change one or both of the coordinates of the vertices.
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EXAMPLE

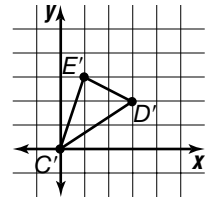
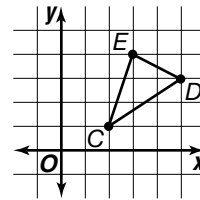
Triangle CDE with vertices $C(2, 1)$, $D(5, 3)$, and $E(3, 4)$ is translated two units left and one unit down. What are the new coordinates of its vertices?

$C(2, 1)$ moves two left and one down so C' is $(0, 0)$.

To find D' , subtract 2 from the x -coordinate and subtract 1 from the y -coordinate. D' is at $(3, 2)$.

$E(3, 4)$ translates to $E'(1, 3)$.

The new coordinates are $C'(0, 0)$, $D'(3, 2)$, and $E'(1, 3)$.



Try This Together

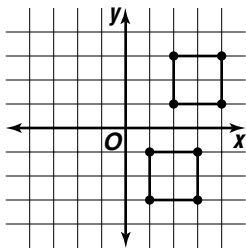
1. Triangle CDE from the Example is reflected over the x -axis. What are the new coordinates of the vertices?

HINT: Transform $C(2, 1)$, $D(5, 3)$, and $E(3, 4)$ by multiplying each y -coordinate by -1 .

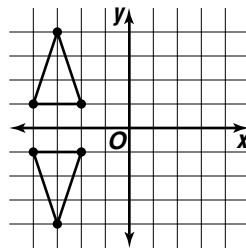
PRACTICE

Classify each graph as a reflection or a translation.

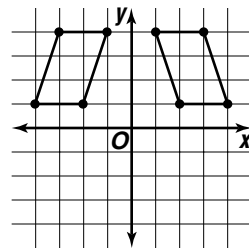
2.



3.



4.



5. **Standardized Test Practice** Point $P(5, 3)$ is translated 2 units to the right and 1 unit down to locate P' . What is the ordered pair for P' ?

A $(2, 5)$

B $(7, 2)$

C $(3, 2)$

D $(7, 4)$

Answers: 1. $C'(2, -1)$, $D'(5, -3)$, and $E'(3, -4)$ 2. translation 3. reflection 4. reflection 5. B