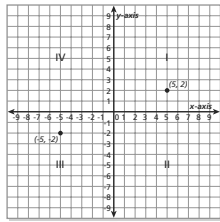


# Math Background

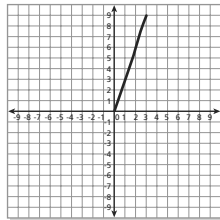
## The Coordinate Grid

The Cartesian coordinate system, or coordinate grid, is used to display relationships between two variables. Its horizontal  $x$ -axis and vertical  $y$ -axis divide it into four quadrants. Every point on the grid can be shown as an ordered pair:  $(x, y)$ . The first number in the pair describes the position of the point along the  $x$ -axis. The second number in the pair describes the position of the point along the  $y$ -axis. Since all the points in the first quadrant (I) are described by positive numbers, this is the only quadrant used in this unit (until optional Lesson 4).

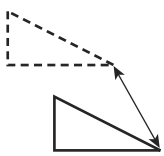
Coordinate Grid



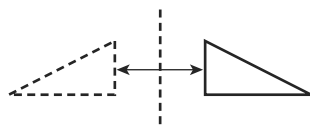
By substituting values for  $x$  into functions of the form  $y = 3x$ , students can generate ordered pairs, for example,  $(0, 3)$ ,  $(1, 3)$ ,  $(2, 6)$ ,  $(3, 9)$ , and plot the function on a coordinate grid.



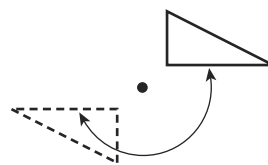
## Translations, Reflections, and Rotations



Translation



Reflection



Rotation

Translations, reflections, and rotations are known as isometries. In these transformations, the shape of a figure does not change, but its position does. In reflections, the figure's image becomes a mirror image of the original figure. Performing these transformations on a grid allows students to check their work and verify the unchanging shape by counting grid lines.