Name: _____ # _____

Geometry: Period _____
Ms. Pierre
Date: _____

Dividing Line Segments

Today's Objective

SWBAT find the point on a line segment between two given points that divided the segment in a given ratio.

The midpoint of a line segment divides, or partitions, the segment in half, producing two line segments of equal length, so the lengths have a ratio of 1:1. It is possible to find the point that divides a given line segment into two segments of any given ratio.

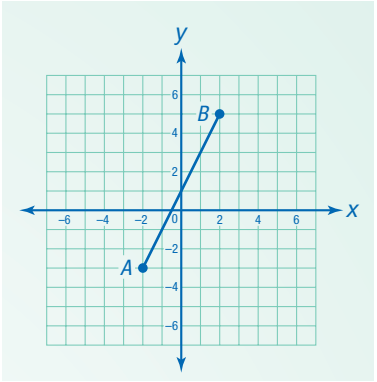
In general, for a line segment $\overline{AB}$ with endpoints $A(x_1, y_1)$ and $B(x_2, y_2)$, to find the point that partitions the segment in a ratio of m:n, or lies k of the way from A to B, use the following formula:

$$(x_1 + k(x_2 - x_1), y_1 + k(y_2 - y_1))$$

$$\text{where } k = \frac{m}{m+n}$$

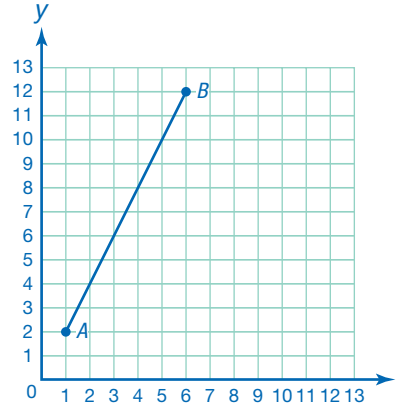
Example 1

The line segment $\overline{AB}$ is shown on the coordinate plane below. Find the point Q that is $\frac{3}{4}$ the distance from A to B.



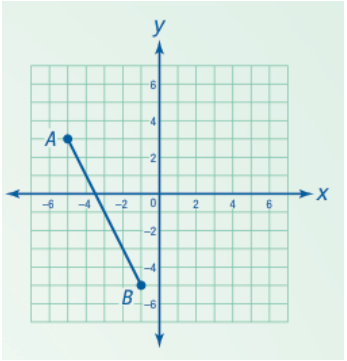
☑ Check for Understanding

The line segment $\overline{AB}$ is shown on the coordinate plane below. Find the point Q that is $\frac{1}{5}$ the distance from A to B.



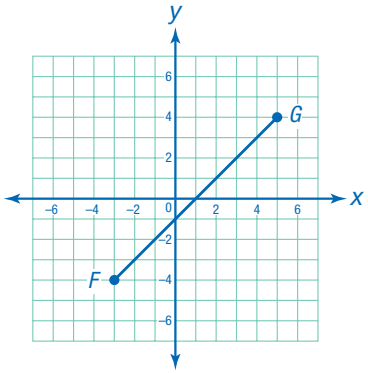
Example 2

The line segment $\overline{BA}$ is shown on the coordinate plane below. Find the point Q that partitions $\overline{BA}$ in a ratio of 1:3.



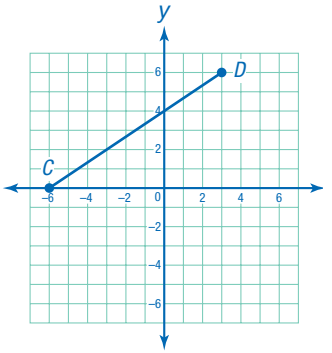
☑ Check for Understanding

The line segment $\overline{GF}$ is shown on the coordinate plane below. Find the point Q that partitions $\overline{GF}$ in a ratio of 1:3.

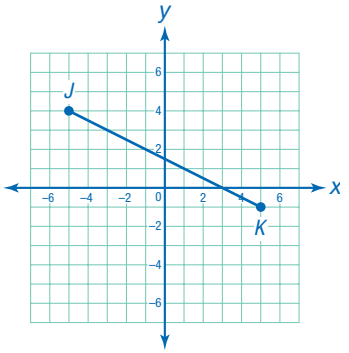


Guided Practice

1. The line segment $\overline{CD}$ is shown on the coordinate plane below. Find the point Q that is $\frac{2}{3}$ the distance from C to D.



2. The line segment $\overline{JK}$ is shown on the coordinate plane below Find the point Q that partitions $\overline{JK}$ in a ratio of 3:2.



Independent Practice

The endpoints of line segment $\overline{XY}$ are $X(-6, 2)$ and $Y(6, -10)$.

1. Find the point P that is $\frac{1}{3}$ the distance from X to Y.

2. Find the point Q that partitions $\overline{YX}$ in a ratio of 3:1.

Home Work

1. Point A is located at $(1, 4)$. Point P at $(3, 5)$ is $\frac{1}{3}$ the distance from A to point B. What are the coordinates of point B?

2. Point C is located at the origin. Point Q at $(-1, -2)$ partitior $\overline{CD}$ in a ratio of 1:6. What are the coordinates of point D?