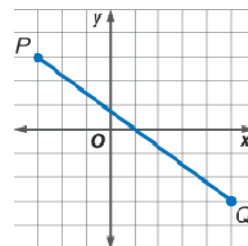


12-6 Examples

Example 1

SPACE EXPLORATION Suppose the grid shown was superimposed over a photograph taken by a space probe of the Martian landscape. Calculate the distance between points $P(-3,3)$ and $Q(5,-3)$.

**Solution**

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

$$d = \sqrt{(-3 - 5)^2 + (-3 - 3)^2}$$

$$d = \sqrt{(-8)^2 + 6^2}$$

$$d = \sqrt{64 + 36} = \sqrt{100} = 10$$

The distance between the points P and Q is 10.

Example 2

Find the midpoint of the line segment with endpoints $M(-4, 5)$ and $N(5, -2)$.

Solution

$$1 \frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \quad \text{Use the midpoint formula.}$$

$$1 \frac{-4 + 5}{2}, \frac{5 + (-2)}{2} \quad \text{Substitute coordinate values.}$$

$$1 \frac{1}{2}, \frac{3}{2} \quad \text{Simplify.}$$

The midpoint of \overline{MN} is $1 \frac{1}{2}, \frac{3}{2}$.

Example 3

SPORTS On the grid shown at the right, one unit represents 30 ft. A batter hits a ball from home plate to the point L . What is the distance?

Solution

The coordinates of home plate are $(-6, -4)$. Point L is located at $(3, -2)$. Use the distance formula to find the distance between the points.

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

$$d = \sqrt{(-6 - 3)^2 + (-4 - (-2))^2}$$

$$d = \sqrt{(-9)^2 + (-2)^2}$$

$$d = \sqrt{81 + 4} = \sqrt{85} \approx 9.2 \text{ units}$$

Since each unit equals 30 ft. multiply by 30: $9.2 \times 30 = 276$ ft.
The ball traveled about 276 ft.

