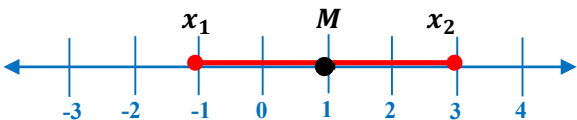


Midpoint and Distance in the Coordinate Plane Guide Notes

A midpoint of a segment is a point that divides the segment into two congruent segments.

On a number line the coordinates of the midpoint of a segment whose endpoints have coordinates x_1 and x_2 is:



$$M = \frac{x_1 + x_2}{2}$$

Sample Problem 1: Find the coordinate of the midpoint of the segment with the given endpoints.

a. Segment \overline{AB}

$$x_1 = -5$$

$$x_2 = 1$$

$$M = ?$$



b. Segment \overline{KL}

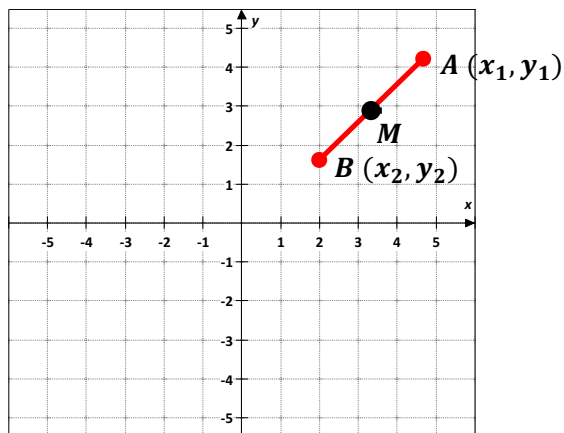
$$x_1 = -4$$

$$x_2 = -2$$

$$M = ?$$



The Midpoint Formula



In a coordinate plane, the coordinates of the midpoint of segments whose endpoints have coordinates $A(x_1, y_1)$ and $B(x_2, y_2)$ are:

$$M\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$$

Midpoint and Distance in the Coordinate Plane Guide Notes

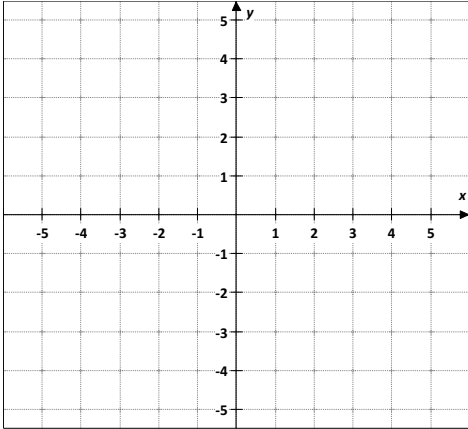
Sample Problem 2: Find the coordinate of the midpoint of the segment with the given endpoints.

a. Segment \overline{CD}

$C(6, -1)$

$D(4, 2)$

$M = ?$

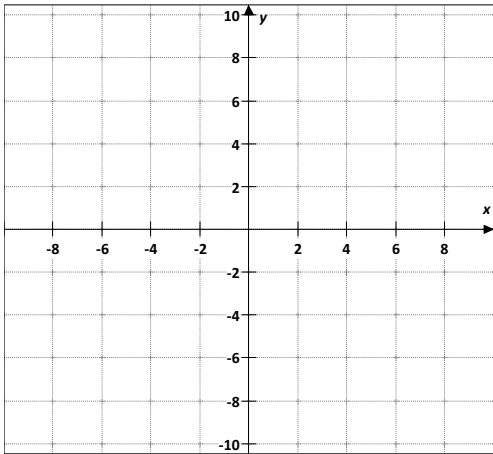


b. Segment \overline{ER}

$E(-5, 6)$

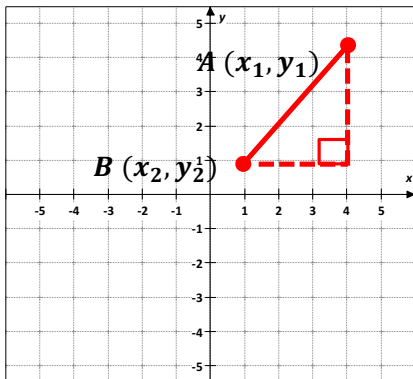
$R(-7, -4)$

$M = ?$



Midpoint and Distance in the Coordinate Plane Guide Notes

The Distance Formula



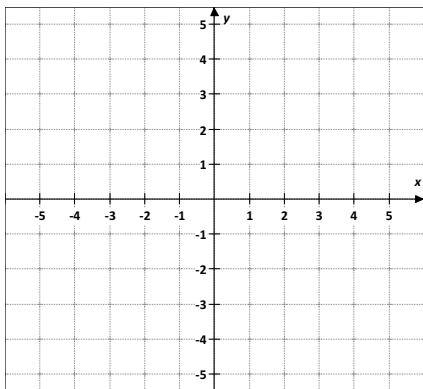
To calculate the distance d between points $A(x_1, y_1)$ and $B(x_2, y_2)$ use the formula:

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

The Distance Formula is based on the Pythagorean Theorem.

Sample Problem 3: Find the distance between each pair of points. Round to the nearest tenth.

- a. $S(4, 1)$ $K(0, -2)$
 $d(S, K) = ?$



- b. $L(-5, 5)$ $M(-2, 4)$
 $d(L, M) = ?$

