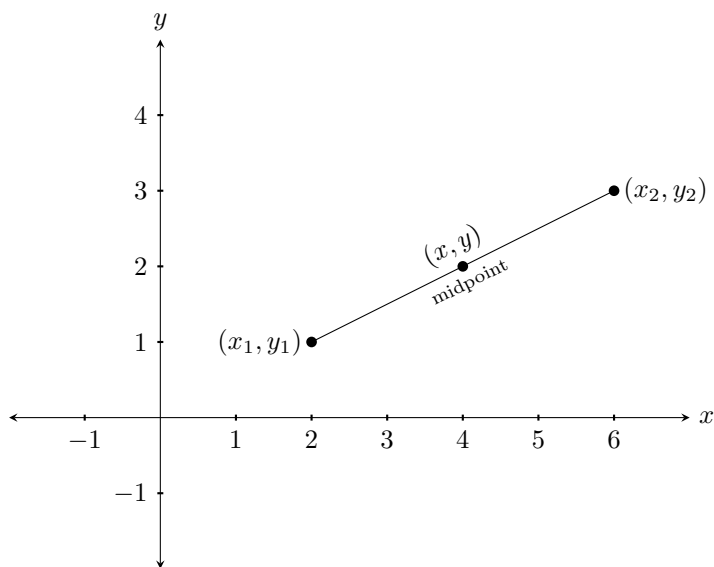


2.6 Midpoint, or Middle Location Between Two Endpoints

This is given by the formula:

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

It takes the form of a point of coordinates itself, with the comma in between the x and y variables (x, y) .^v



Just like the formula for *slope*, $m = \frac{y_2 - y_1}{x_2 - x_1}$, and the formula for *distance between two points*, it doesn't matter which coordinates you assign to (x_1, y_1) or (x_2, y_2) . You get the same answer for *midpoint* regardless of which way you assign the coordinates. See the following examples.

EXAMPLE: What is the midpoint between the points $(2, 1)$ and $(6, 3)$?

$$(x_1, y_1) = (2, 1)$$

$$(x_2, y_2) = (6, 3)$$

$$\begin{aligned} \text{midpoint} &= \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right) \\ &= \left(\frac{2 + 6}{2}, \frac{1 + 3}{2} \right) \\ &= \left(\frac{8}{2}, \frac{4}{2} \right) \\ &= (4, 2) \end{aligned}$$

$$(x_1, y_1) = (6, 3)$$

$$(x_2, y_2) = (2, 1)$$

$$\begin{aligned} \text{midpoint} &= \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right) \\ &= \left(\frac{6 + 2}{2}, \frac{3 + 1}{2} \right) \\ &= \left(\frac{8}{2}, \frac{4}{2} \right) \\ &= (4, 2) \end{aligned}$$

^vNote that the x values are grouped together on the left and the y values are grouped together on the right.

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