About Graphing Lines: Examples
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About Graphing Lines: Examples

**Ordered Pairs**

In the given diagram, (5, 3) represents an ordered pair, where 5 indicates a value 5 units right of the origin and 3 indicates a value 3 units above the origin. The intersection of these two values is the point being documented. The x coordinate tells us the distance right (positive) or the distance left (negative) of the origin, while the y coordinate tells us the distance up (positive) or the distance down (negative) from the origin.

Note that since both coordinates are positive, this ordered pair would be placed in the first quadrant. The point would be placed five units right (x-axis) of the origin and three units above (y-axis) the origin.
Now, let us consider the ordered pair (5, -3).

The x-coordinate is identical to the previous example, but the y-coordinate is now negative. Referring to the Cartesian plane, this ordered pair is in the fourth quadrant.

**Line Segments**

**Slope of a Line Segment**

Consider the graph below.

In other words, for each increase in x by 1 unit, y increases by 2 units!
Consider the graph below.

\[ \text{slope (m)} = \frac{8 - 5}{-3 - 1} = \frac{3}{-4} = -\frac{3}{4} \]

In other words, for each increase in x by 1 unit, y decreases by \(\frac{3}{4}\) units or for each increase in x by 4 units, y decreases by 3 units!

**Midpoint Formula**

Consider the line segment below.

Midpoint of \(AB\) = \(\left( \frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)\)

\[ = \left( \frac{-5 + 5}{2}, \frac{2 + 2}{2} \right) \]

\[ = \left( \frac{0}{2}, \frac{4}{2} \right) \]

\[ = (0, 2) \]
Consider the line segment below.

Midpoint of \( AB \) = \( \left( \frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right) \)

\[ = \left( \frac{0 + 3}{2}, \frac{3 + (-2)}{2} \right) \]

\[ = \left( \frac{3}{2}, \frac{1}{2} \right) \]

\[ = (1.5, 0.5) \]
Distance Formula

Distance Formula

Consider the graph below.

\[ \overline{AB} = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} \]
\[ = \sqrt{(1 - (-3))^2 + ((-2) - 6)^2} \]
\[ = \sqrt{(1 + 3)^2 + ((-2) - 6)^2} \]
\[ = \sqrt{(4)^2 + ((-2) - 6)^2} \]
\[ = \sqrt{16 + 64} \]
\[ = \sqrt{80} \]
\[ = 8.9 \text{ units} \]