

## Mid Point

A midpoint on a line segment is a point equidistant from the endpoints, (halfway)

Ex:  $\overline{AB}$  has endpoints  $(-8, 5)$  &  $(3, -6)$   
find the midpoint.

$$\left( \frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right) = \left( \frac{-8 + 3}{2}, \frac{5 - 6}{2} \right)$$

$$\text{MP} = \left( \frac{-5}{2}, -\frac{1}{2} \right)$$

## Slope measure of steepness

ratio of  $\frac{\text{vertical change}}{\text{horizontal change}}$   $\leftarrow \text{OR} \rightarrow \frac{\text{Rise}}{\text{Run}}$

Ex:  $(7, 6)$  &  $(3, 1)$   $\frac{y_2 - y_1}{x_2 - x_1} = m$

$(x_1, y_1)$   $(x_2, y_2)$

$$\frac{1 - 6}{3 - 7} = \frac{-5}{-4} = \frac{5}{4} = m$$

Ex  $(x, -3)$  &  $(-2, 2)$   $m = \frac{5}{7}$   $\frac{y_2 - y_1}{x_2 - x_1} = m$

$\text{pt 1}$   $\text{pt 2}$

$$\frac{2 - (-3)}{-2 - x} = \frac{5}{7} \quad \frac{5}{-2 - x} \leftarrow \begin{aligned} 7 &= -2 - x \\ 9 &= -x \\ x &= -9 \end{aligned}$$