

Section 4.4 The Slope of a Line

- slope 1. m
 2. rise / run \neq
 3. $\frac{\text{change in } y}{\text{change in } x} = \text{rate of change}$
 4.

$$\frac{y_2 - y_1}{x_2 - x_1} = m$$

EXAMPLES

1. A Line with a **Positive Slope Rises**

Find the slope of the line passing through $(-3, 0)$ and $(-1, 6)$. $m = \frac{6 - 0}{-1 - (-3)}$
 $m = 3$

2. A Line with a **Negative Slope Falls**

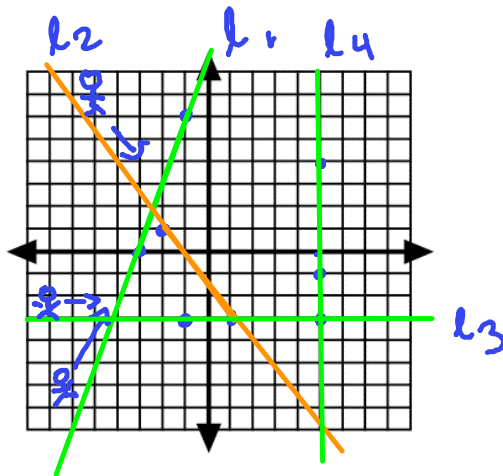
Find the slope of the line passing through $(-2, 1)$ and $(1, -3)$. $m = \frac{-3 - 1}{1 - (-2)}$
 $m = -\frac{4}{3}$

3. A Line with a **Zero Slope is Horizontal**

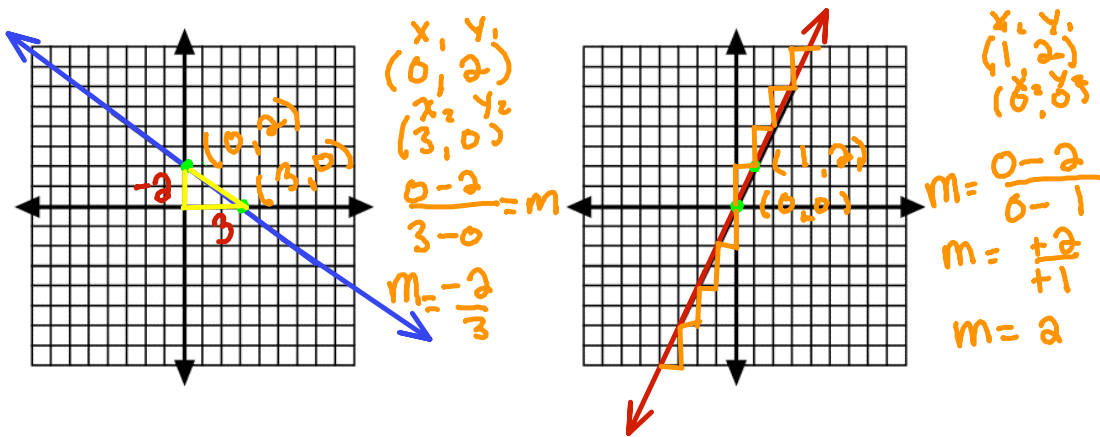
Find the slope of the line passing through $(-1, -3)$ and $(5, -3)$. $m = \frac{-3 - (-3)}{5 - (-1)}$
 $m = 0$

4. Slope of a **Vertical Line is Undefined**

Find the slope of the line passing through $(5, -1)$ and $(5, 4)$. $m = \frac{4 - (-1)}{5 - 5} = \frac{5}{0}$
 $m = \text{und.}$



5. Find the slope of each line.



6. You are traveling home by car and leave at 8:00 am. By 8:45 am, you are 36 miles from home. Find the average speed in miles per hour.

$x = \text{time}$
 $y = \text{dist.}$
 $\frac{36-0}{45-0} = \frac{36 \text{ mi}}{45 \text{ min}} \cdot \frac{60 \text{ min}}{1 \text{ hr}} = 48 \text{ mph}$

$(8:00, 0)$
 $(8:45, 36)$
 x_1, y_1
 x_2, y_2

7. You are parachuting. When you open your parachute, you are at a height of 2500 feet. After 35 seconds of falling, you are at a height of 2115 feet. What is your average rate of change in height?

$(0, 2500 \text{ ft})$
 $(35, 2115)$
 x_1, y_1
 x_2, y_2

$m = \frac{2115 - 2500}{35 - 0} = -\frac{385}{35} = -11 \text{ ft/Sec}$

