SLOPE & RATE OF CHANGE FROM GRAPHS
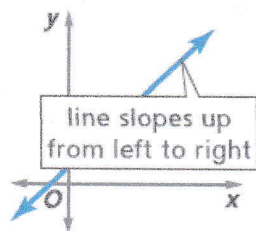
Essential Question: What does a positive or negative slope indicate about a line? Answer on your response card.

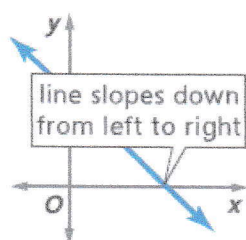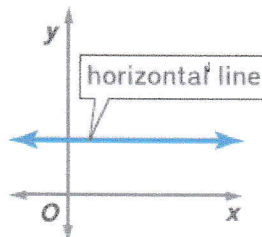**There are four different types of slope.**

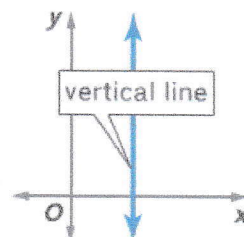| positive slope	negative slope	slope of 0	undefined slope
line slopes up from left to right	line slopes down from left to right	horizontal line	vertical line
The function values are increasing over the entire domain.	The function values are decreasing over the entire domain.	The function values are constant over the entire domain.	The relation is not a function.

We call the steepness of a line **slope**, it is represented by the variable *m*. The slope of a line is the <u>ratio</u> of the <u>vertical change</u> to the <u>horizontal change</u> of any two points on the line.
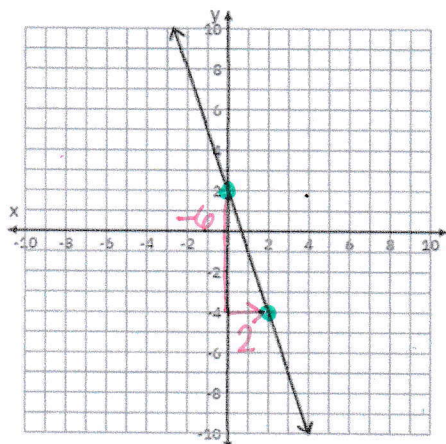
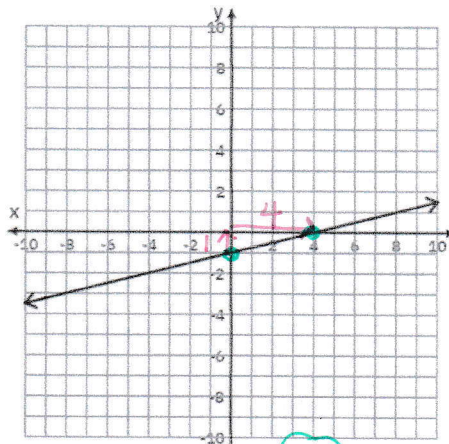$$m = \frac{\text{vertical change}}{\text{horizontal change}} = \frac{\text{rise}}{\text{run}}$$
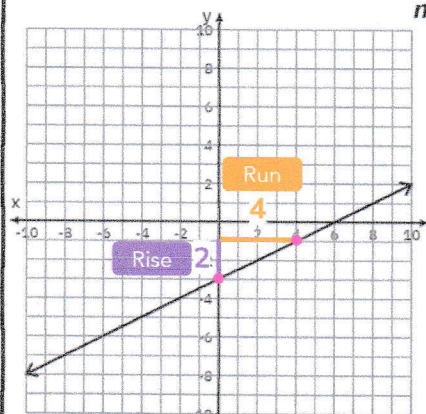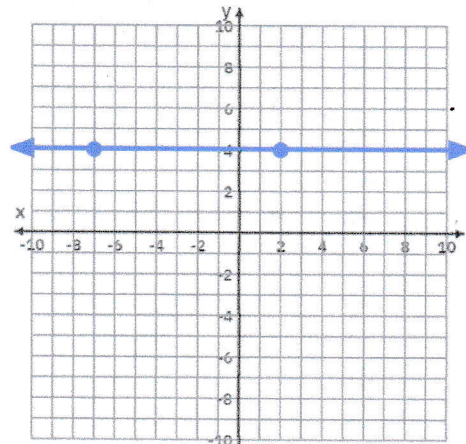
$$\frac{2}{4} = \frac{1}{2}$$

The slope is $\frac{1}{2}$.

Run 4

Rise 2.

Find the slope of each of the following graphs.
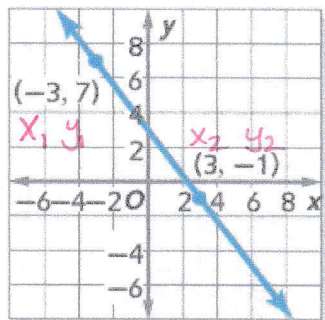
$$m = \frac{rise}{run} = \frac{-6}{2} = \boxed{-3}$$

$$m = \frac{rise}{run} = \boxed{\frac{1}{4}}$$

$$m = \frac{rise}{run} = \frac{0}{9} = \boxed{0}$$

Find the slope of each of the following graphs. Be careful of the scale.

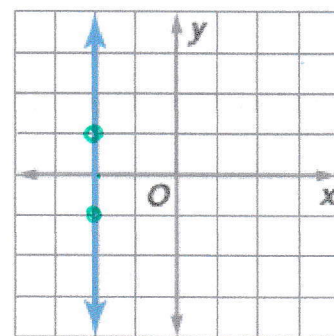Graph 1: Points $(-3, 7)$ labeled x_1, y_1 and $(3, -1)$ labeled x_2, y_2

$$m = \frac{-1 - 7}{3 - (-3)} = \frac{-8 \div 2}{6 \div 2}$$

$$m = -\frac{4}{3}$$

Graph 2: Points $(-4, -6)$ labeled x_1, y_1 and $(4, -2)$ labeled x_2, y_2

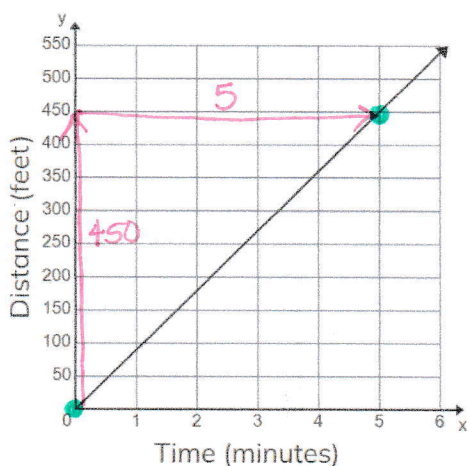$$m = \frac{-2 - (-6)}{4 - (-4)} = \frac{4 \div 4}{8 \div 4}$$

$$m = \frac{1}{2}$$

Graph 3: (vertical line)
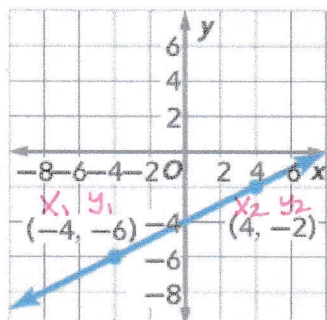
$$m = \frac{rise}{run} = \frac{2}{0} = \text{undefined}$$

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Sarah has a tricycle. The following graph shows the distance she pedals over time. What is her speed?
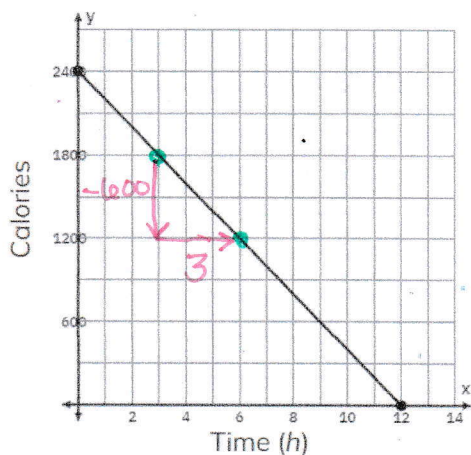
Graph: Distance (feet) vs Time (minutes), showing rise of 450 over run of 5.

$$m = \frac{rise}{run} = \frac{450}{5} = 90 \ \frac{feet (y)}{Min (x)}$$

A. 90 ft/min

B. 180 ft/min

C. 270 ft/min

D. 60 ft/min

>>> >>> >>> >>> >>> >>> >>> >>> >>> >>> >>>

Dalton is monitoring the amount of calories lost throughout a day. Which of these best represents the rate of change of the calories with respect to hours?

Graph: Calories vs Time (h), showing rise of -600 over run of 3.

$$m = \frac{rise}{run} = \frac{-600}{3} = -200 \ \frac{cal}{hr.}$$

A. −100 calories per hour

B. −200 calories per hour

C. −12 calories per hour

D. −300 calories per hour