

Lesson #4: Rate of Change

Homework

Date: _____

1. The following represents the graph for a helium balloon's flight.

a. Determine the rate of change of the graph.

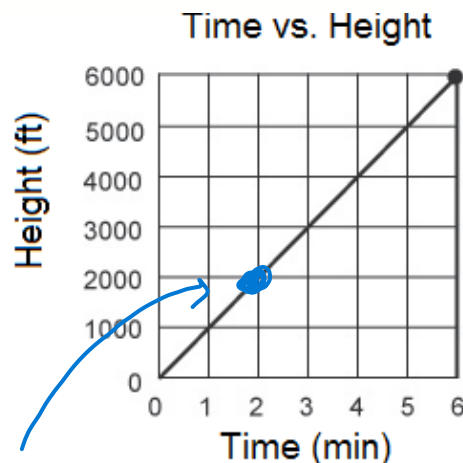
$$m = 1000 \text{ ft/min}$$

b. What does this slope (rate of change) mean?

It represents the rise in height per minute

c. When is the balloon at 5000 ft? Show this on your graph. 5 mind. How high is the balloon off the ground at 2 minutes? Show this on your graph

The balloon is 2000 ft off the ground.



e. Although not on the graph, when will the balloon reach 10 000 feet? Show your reasoning

$$\frac{10000}{1000} = 10 \quad \text{The balloon will reach 10,000 ft at 10 minutes.}$$

2. The following represents the balance in Brady's savings account.

a. Find the slope of the graph.

$$m = \frac{600-300}{3-0} = 100$$

b. What does the slope represent as a rate of change?

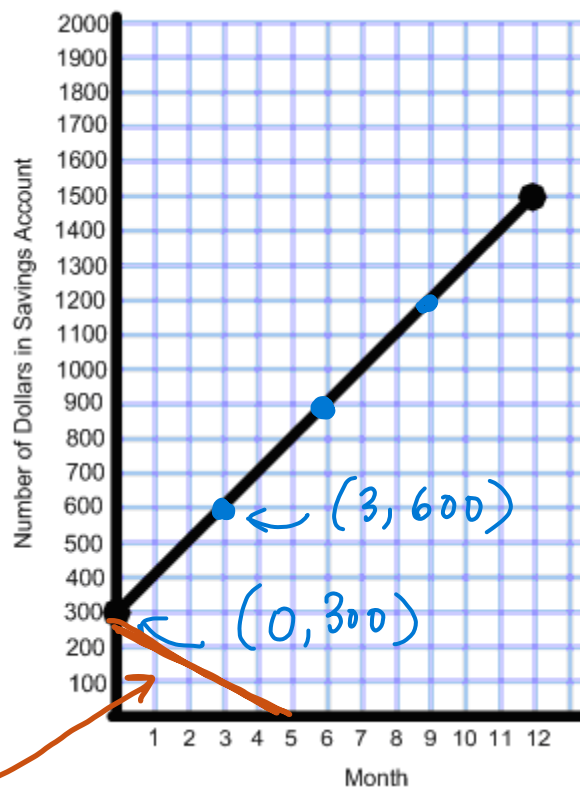
It represents how much he saves per month

c. How much did Brady deposit when he opened the account?

\$300

d. At this rate how much money will Brady have in his account after 15 months. Show your reasoning.

- At 12 months he has \$1,500.
- Each month he saves \$100
- So, at 15 months he'll have \$1800



f. If Brady deposited \$300 initially, but spent it all in five months show this on the graph?

g. What would the slope of this line be? What does the negative sign indicate?

$$\begin{matrix} (0,300) & (5,0) \\ x_1 & y_1 & x_2 & y_2 \end{matrix} \quad m = \frac{0-300}{5-0} = -60 \quad \text{The neg. indicates that he is spending \$}.$$

3. In 1992, the price of an annual membership at Mr. Jensen's health club was \$225. In 2002, the price of the same membership was \$319.50. Find the rate of change in the price of the annual membership between 1992 and 2002.

$$(x, y) = (\text{years}, \$)$$

$$\textcircled{1} (1992, 225)$$

$$\textcircled{2} (2002, 319.50)$$

$$m = \frac{\text{Change in } \$}{\text{change in year}}$$

$$m = \frac{319.50 - 225}{2002 - 1992}$$

$$m = \frac{\$94.50}{10 \text{ years}} = \$9.45/\text{year}$$

4. After 30 baseball games, Bo Bichette had 25 hits. If after 100 games he had 80 hits, what is his average hits per baseball game.

$$(x, y) = (\text{games}, \text{hits})$$

$$\textcircled{1} (30, 25)$$

$$\textcircled{2} (100, 80)$$

$$m = \frac{\text{change in hits}}{\text{change in game}}$$

$$m = \frac{80 - 25}{100 - 30}$$

$$m = \frac{55 \text{ hits}}{70 \text{ games}} = 0.8 \text{ hits/game}$$

5. Last Saturday Steve and Kelly went hiking in the mountains. When they started back at 2:00 P.M., their elevation was 3,560 feet above sea level. At 6:00 P.M., their elevation was 2,390 feet. Find the average rate of change of their elevation between 2:00 P.M. and 6:00 P.M.

$$(x, y) = (\text{time}, \text{ft})$$

$$\textcircled{1} (2, 3560)$$

$$\textcircled{2} (6, 2390)$$

$$m = \frac{\text{change in ft}}{\text{change in time}}$$

$$m = \frac{2390 - 3560}{6 - 2}$$

$$m = \frac{-1170 \text{ ft}}{4 \text{ hours}} = -292.5 \text{ ft/hour}$$

6. In 1971, there were 323,000 university students in Canada. In 1997, there were 544,000 students enrolled in a Canadian university. Find the average rate of change, to the nearest hundred students per year.

$$(x, y) = (\text{year}, \text{students})$$

$$\textcircled{1} (1971, 323000)$$

$$\textcircled{2} (1997, 544000)$$

$$m = \frac{\text{change in students}}{\text{change in year}}$$

$$m = \frac{544000 - 323000}{1997 - 1971}$$

$$m = \frac{221000}{26} = 8500 \text{ students/year}$$