

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.

$$m = \frac{2000}{2} = 1000 \text{ ft/min}$$

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

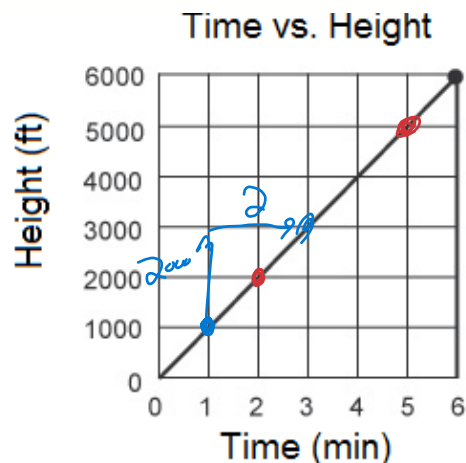
The speed of how fast the balloon is climbing.

c. When is the balloon at 5000 ft? Show this on your graph. 5 min

d. How high is the balloon off the ground at 2 minutes? Show this on your graph 2000 ft.

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

$$\frac{10000 \text{ ft}}{1000} = 10 \text{ minutes}$$



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

a. Find the slope of the graph.

$$m = \frac{\$1200}{12 \text{ months}} = \$100/\text{month}$$

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

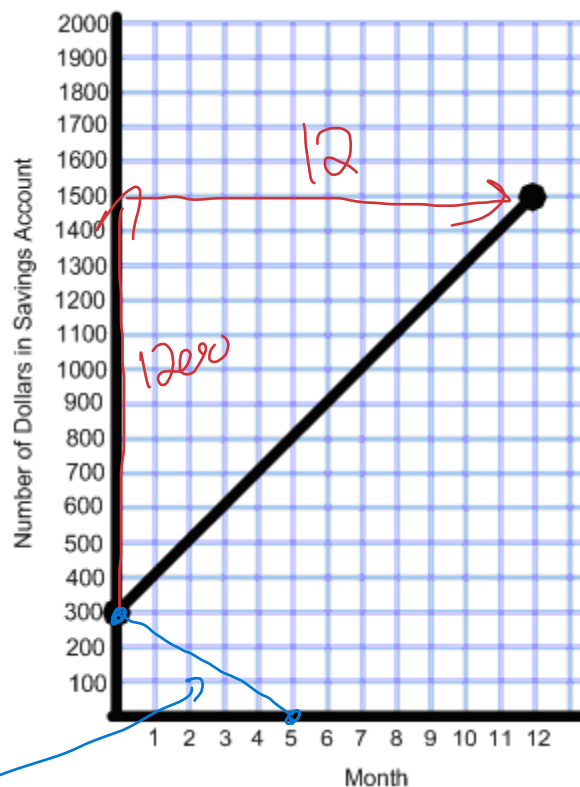
Monthly increase in savings

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.

$$\begin{aligned} \$100 \times 15 &= \$1500 \\ + \$300 \\ \hline &\$1800 \end{aligned}$$



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?

$$m = \frac{-300}{5} = -\$60/\text{month}$$

money spent.

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.

$x = \text{years}$

$y = \text{membership cost.}$

$(1992, \$225)$

$(2002, \$319.50)$

$$m = \frac{319.5 - 225}{2002 - 1992}$$

$$m = \frac{94.5}{10} = \$9.45/\text{year}$$

\therefore the membership cost increased by \$9.45 per 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.

$x = \text{games}$

$y = \text{hits}$

$(30, 25)$

$(100, 80)$

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

$$m = \frac{55}{70} = 0.79 \text{ hits/game.}$$

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.

$x = \text{time (hours)}$

$y = \text{feet.}$

$(2, 3560)$

$(6, 2390)$

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

$$m = \frac{-1170}{4}$$

$$m = -292.5 \text{ ft/hour.}$$

\therefore they descended 292.5 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.

$x = \text{years}$

$y = \text{students}$

$(1971, 323000)$

$(1997, 544000)$

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

$$m = \frac{221000}{26}$$

$$m = 8500 \text{ students/year.}$$