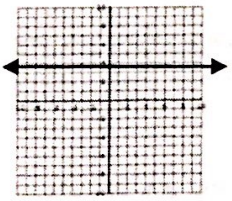
Lesson 1

Aim: I can determine rate of change.

Warm up:

1. What is true of the given graph?



A) The slope is positive
B) The slope is four
C) The slope equals zero
D) The slope is undefined

2. Write the function rule

x	y
5	8
7	12
9	16

+2, +2 ; +4, +4 ; $\frac{4}{2} = 2$

$y = 2x - 2$

Guided Practice:

Vocabulary:

Rate of change – A ratio that compares two quantities. On a linear graph, it is a comparison of the change in y-values of the line to the corresponding change in x-values.

The formula for rate of change is $\frac{y_2 - y_1}{x_2 - x_2}$, $\frac{\Delta y}{\Delta x}$, $\frac{\text{rise}}{\text{run}}$.

In a linear equation or a graph the rate of change is represented by the m value

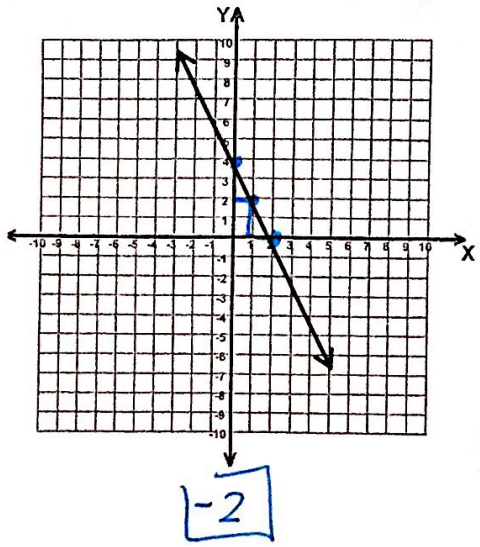
Review:

1) Find the rate of change: (1,1) and (3,7)

$\frac{7-1}{3-1} = \frac{6}{2} = 3$

2) Find the rate of change: $\frac{3y}{3} = \frac{2x}{3} + \frac{21}{3}$ $y = \frac{2}{3}x + 7$ $\frac{2}{3}$

3) Find the rate of change:



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4) Find the rate of change:

x	y
0	10
6	22
12	34
18	46

+6, +6 ; +12, +12 $\frac{12}{6} = 2$

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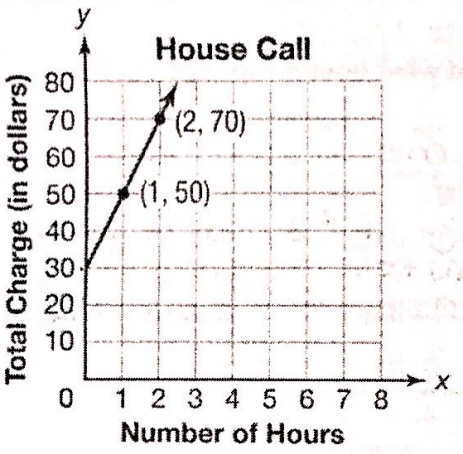
Examples:

1) A locksmith charges a flat fee for each house call plus an hourly rate, as shown by the graph below.



a) What does the x-axis represent? # of hours

b) What does the y-axis represent? Total charge

c) What is the rate of change? 20

d) What does the rate of change represent?
Amount charged per hour.

e) What is the flat fee that the locksmith initially charges? $30

f) What equation can we use to find how much an 8 hour job is going to cost? $y = 20x + 30$

2) The table shows how much money Tori has saved. Assume the relationship between the two quantities is linear. Find and interpret the rate of change and the initial value.

Number of Months, x	3	4	5	6
Money Saved, y	110	130	150	170

+1 +1

+20 +20

$\frac{20}{1} = 20$

$y = 20x + 50$

3) Mr. Murphy graphs his weight throughout the years in 1960 he weighed 120 lbs. (1960, 120) in 1980 he weighed 180 lbs. (1980, 180).

a) What is the rate of change of his weight throughout the years?

$\frac{180 - 120}{1980 - 1960} = \frac{60}{20} = 3$

b) What is the slope of this data?

3 → positive slope

c) How much did he weigh in 2010 if his weight continues at this rate?

270 pounds

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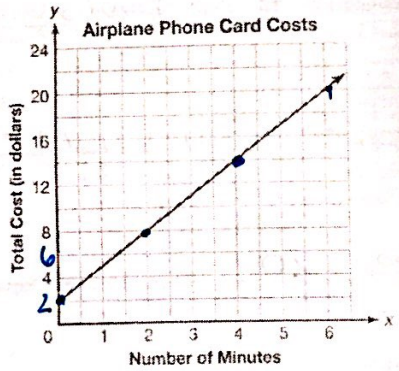
Problem Set:

1) Joanie bought an airplane phone card that charges her a connection fee plus an additional rate for each minute the call lasts. The graph below represents this situation.



What is the slope, and what does it represent?

$\frac{6}{2} = 3$, It means that you get charged $2 and then $3 per minute.

What is the equation of the graph? $y = 3x + 02$

2) Catherine has some photos in her album. Each week she plans to add 13 photos. Catherine had 120 photos after 8 weeks. Assume the relationship is linear, find and interpret the rate of change and the initial value.

$120 = 13(8) + b$

$120 = 104 + b$

$-104 \quad -104$

$16 = b$

$y = 13x + 16$

ROC (↑ 13) I.V. (↑ 16)

3) A machine salesperson earns a base salary of $40,000 plus a commission of $300 for every machine he sells.

a) Write an equation that shows the total amount of income the salesperson earns, if he sells *x* machines in a year. $y = 300x + 40{,}000$

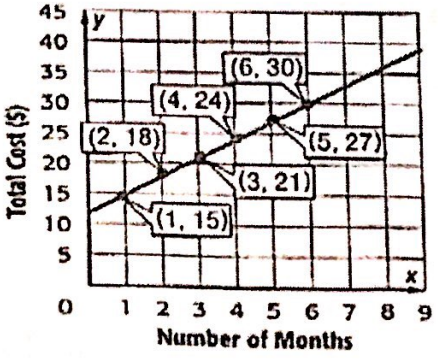
b) What does the slope represent?

300 → comission for every machine he sells.

c) What would be the salesperson's income if he sold 150 machines?

$y = 300(150) + 40000 \Rightarrow y = 45{,}000 + 40{,}000 \rightarrow \boxed{y = \$85{,}000}$

4) Sirius Radio charges a yearly subscription fee plus a monthly fee. The total cost for different numbers of months, including the yearly fee, is shown in the graph. Find and interpret the rate of change and the initial value.



(1, 15) (2, 18)

$\frac{18-15}{2-1} = \frac{3}{1} = 3$

$\boxed{y = 3x + 12}$

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