

Name: Key

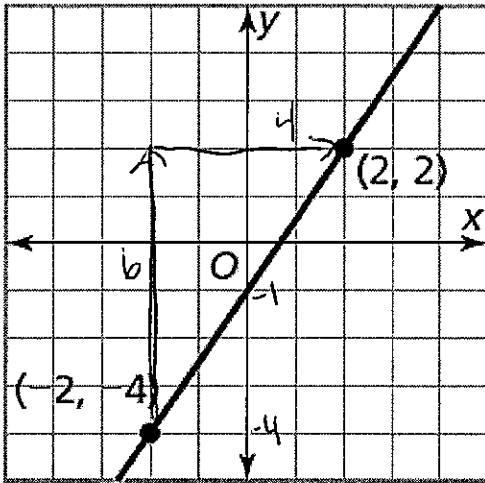
Class: \_\_\_\_\_

M8-U9: Notes #3 – Writing Equations from Trend Lines

Date: \_\_\_\_\_

**Warm-Up:**

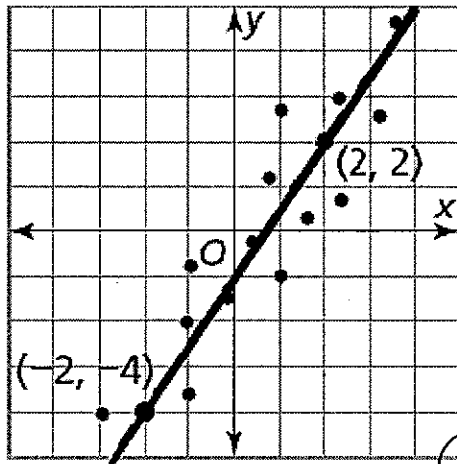
Write the equation of the line for the following graph.



$$y = \frac{3}{2}x - 1$$

**Writing Equations of Trend Lines:**

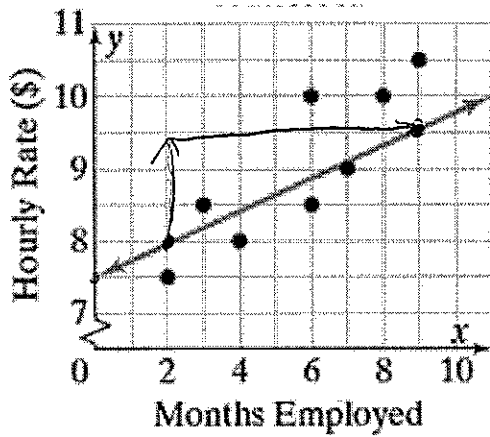
**Example #1**



$$y = \frac{3}{2}x - 1$$

⊙ outlier (5, -5)

**Example #2 - Write the Equation of the Trend Line**



$$m = \frac{\text{rise}}{\text{run}} = \frac{1.5}{7} = .214285714$$

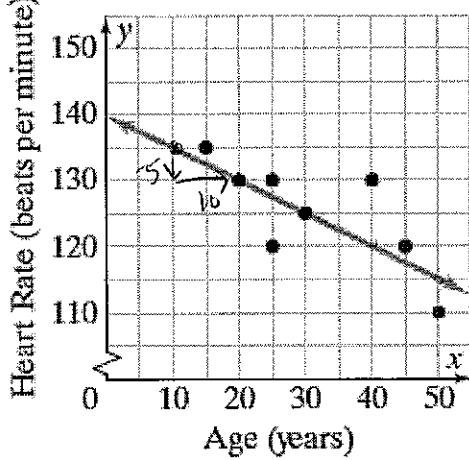
$$b = (0, 7.50) \approx .21$$

$$y = .21x + 7.50$$

↑ amount of money increase starting salary.

**Try It! - Write the equation of the given Trend Lines.**

**A. Line A**

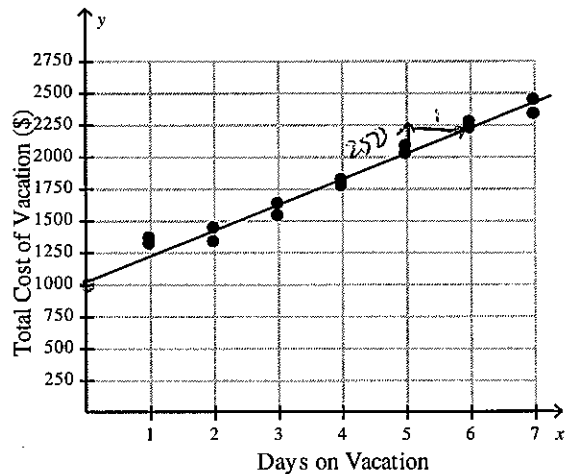


$$m = \frac{-5}{10} = -\frac{1}{2}$$

$$b = (0, 140)$$

$$y = -\frac{1}{2}x + 140$$

**B. Cost of Family Vacation**



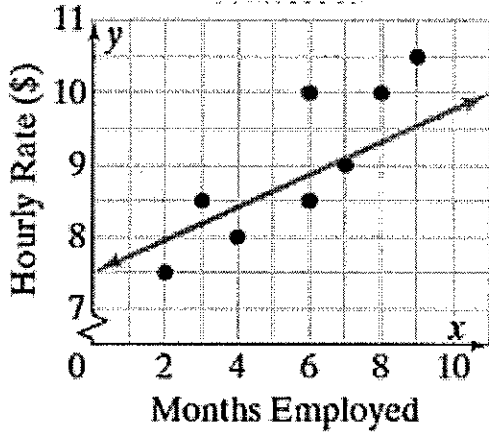
$$m = \frac{250}{1}$$

$$b = (0, 1000)$$

$$y = 250x + 1000$$

Explaining the equation of the trend line in context:

Example #3 - Tell what the slope and y-intercept represent in terms of the data it models.



$m = .21$

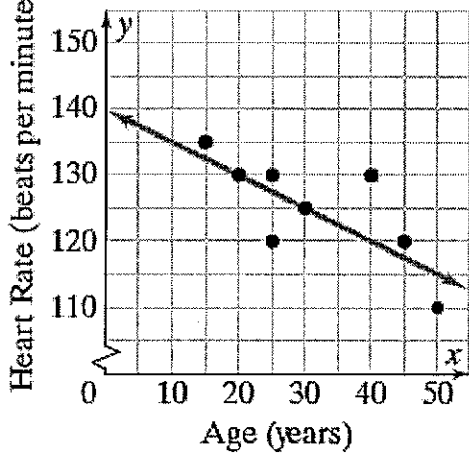
amount of money increasing each month someone is employed

$b = 7.50$  is the starting hourly rate of an employee

Try It! - Tell what the slope and y-intercept represent in terms of the data it models.

A.

Line A



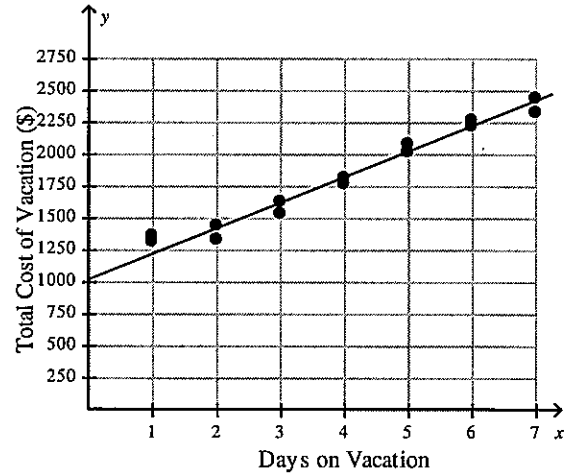
$m = -\frac{1}{2}$

the heart rate decreases  $\frac{1}{2}$  a beat per minute every year you age

$b = 140$  is the <sup>avg</sup> heart rate of a new born.

B.

Cost of Family Vacation



$m = 250$

the average of 250 per day of vacation w/ a start value of \$1000.

## Interpolation and Extrapolation of Data Sets:

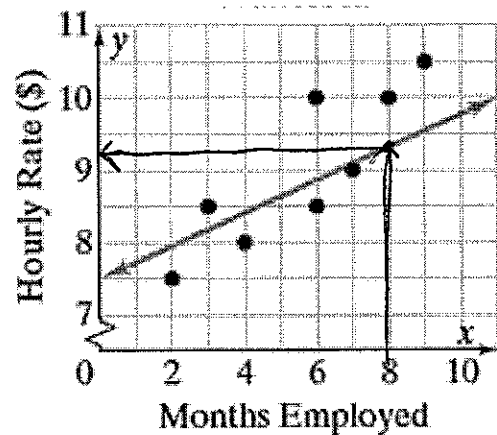
Example #4 – Answer the following questions.

- a) Francesca is employed for 8 months, what is her approximate hourly rate?

$$y = .21x + 7.50$$

$$\begin{aligned} y &= .21(8) + 7.50 \\ &= 1.68 + 7.50 \\ &= \$9.18 \end{aligned}$$

Interpolation or Extrapolation, why?



The point being discussed lies within the data.

- b) Julia is employed for 12 months, what is her approximate hourly rate?

$$\begin{aligned} y &= .21(12) + 7.50 \\ &= 2.52 + 7.50 \\ &= \$10.02 \end{aligned}$$

Interpolation or Extrapolation, why?

The point being discussed lies outside the data.

- c) Jimmy is employed for 1 month, what is his approximate hourly rate?

$$\begin{aligned} y &= .21(1) + 7.50 \\ &= \$7.71 \end{aligned}$$

Interpolation or Extrapolation, why?

Lies outside the data set

Try It! – Interpolation and Extrapolation of Data Sets, answer the following questions:

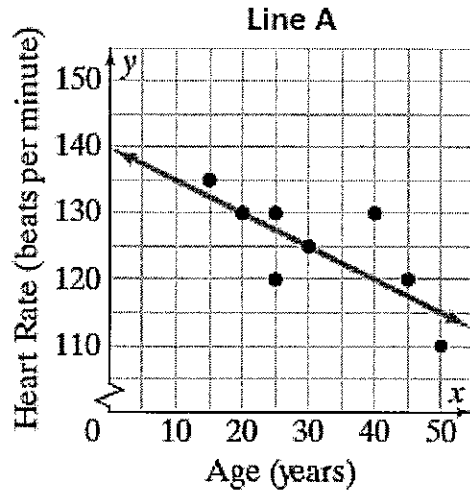
A.

- a) George is 35 years old, what is his approximate heart rate?

$$\begin{aligned}
 y &= -\frac{1}{2}x + 140 \\
 &= -\frac{1}{2}(35) + 140 \\
 &= -17.50 + 140 \\
 &= 122.5 \text{ beats/min}
 \end{aligned}$$

Interpolation or Extrapolation, why?

Lies between the data set of 15-50 yrs of age.



- b) Sally is 5 years old, what is her approximate heart rate?

$$\begin{aligned}
 y &= -\frac{1}{2}(5) + 140 \\
 &= -2.5 + 140 \\
 &= 137.5 \text{ beats/min}
 \end{aligned}$$

Interpolation or Extrapolation, why?

Lies outside the data set

- c) John has an approximate heart rate of 110 beats per minute, what is his approximate age?

$$\begin{array}{r}
 110 = -\frac{1}{2}x + 140 \\
 -140 \quad -140 \\
 \hline
 -30 = -\frac{1}{2}x \\
 \frac{-30}{-\frac{1}{2}} \quad \frac{-\frac{1}{2}x}{-\frac{1}{2}} \\
 60 = x
 \end{array}$$

60 yrs old = x

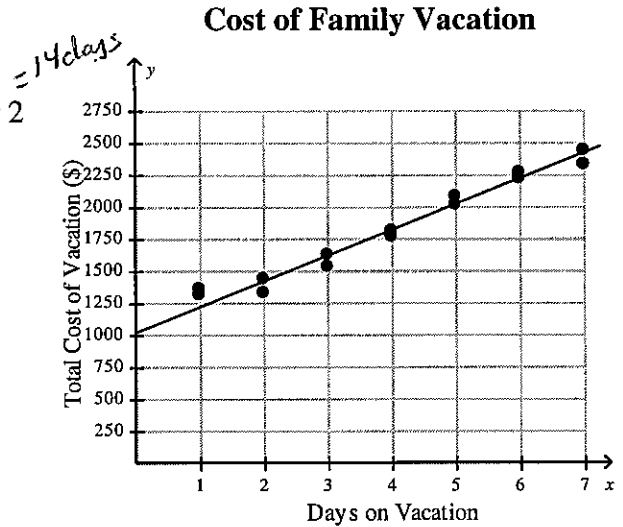
Interpolation or Extrapolation, why?

Lies outside the data set.

B.

- a) The Grimm Family goes on vacation for 2 weeks, what is the approximate cost?

$$\begin{aligned} y &= 250x + 1000 \\ &= 250(14) + 1000 \\ &= 3500 + 1000 \\ &= \$4500 \end{aligned}$$



Interpolation or Extrapolation, why?

Does Lines outside the given data set.

- b) The Griswold Family goes on vacation and spends \$3000, what is the approximate length of the trip?

$$\begin{aligned} 3000 &= 250x + 1000 \\ -1000 & \quad -1000 \\ \hline 2000 &= 250x \\ \frac{2000}{250} &= \frac{250x}{250} \\ \boxed{8 \text{ days} = x} \end{aligned}$$

Interpolation or Extrapolation, why?

Lines outside the given data set.