

1. Below is a table showing the temperature of soup heating in a pot over time.

a. Complete the table below.

Time (minutes)	0	1	2	3	4	T
Temperature (in degrees Fahrenheit)	60	66	72	78	84	S

b. Write a linear equation relating time T and temperature of the soup S .

• Slope: 6
• Y-int: 60

$$S = 6T + 60$$

c. Write a NOW - NEXT equation that shows how the temperature changes with each additional minute.

NEXT = NOW + 6
starting at 60

> Must include both parts

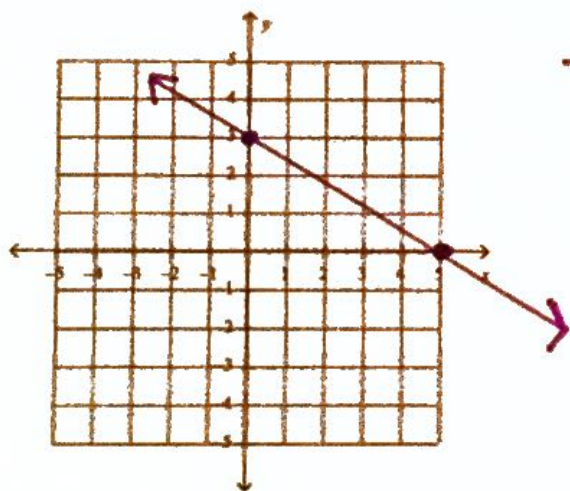
2. A local carnival charges an entrance fee of \$14. In addition, they charge \$0.25 for each ride. Which of the following equations could be used to determine the cost C of attending the carnival if you plan to ride r rides?

$$C = 14.25r$$

$$C = 14 + 0.25r$$

$$C = 14r + 0.25$$

3. Graph the equation. $3x + 5y = 15$



$$3x + 5y = 15 \rightarrow y = mx + b$$

$$-3x \quad -3x$$

$$\frac{5y}{5} = \frac{15 - 3x}{5}$$

$$y = 3 - \frac{3}{5}x$$

$$\text{or } y = 3 + \frac{-3}{5}x$$

y-int: (0, 3)
slope: $-\frac{3}{5}$

4. Consider the line with a graph containing the points (-2, 3) and (3, 8).

a) Write the equation in slope-intercept form.

Slope: $\frac{8-3}{3-(-2)} = \frac{5}{5} = 1$

$$y = 1x + b$$

$$3 = 1(-2) + b \rightarrow b = 5$$

$$y = x + 5$$

b) Is the point (-4, -1) on the graph of the line? Explain.

Plug in and check! $-1 = -4 + 5$
 $-1 = 1$ X $-4 + 5 = 1$
The point is (-4, 1) NOT (-4, -1).

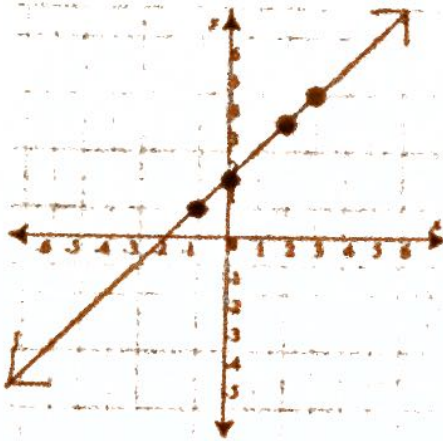
c) Give the coordinates of one other point (one that has not been used already) that will also be on this line. Explain how you know your point will be on the line.

$x = 2$
 $y = 2 + 5 = 7$

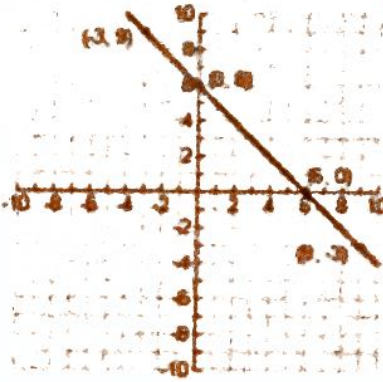
I chose $x = 2$ and plugged it into the equation to get the point (2, 7)

5. Describe a similarity and a difference between the graphs?

Slope: +1
y-int: 2
 $y = x + 2$



Slope: -1 y-int: 6 $y = -x + 6$



Both are linear, but have different slopes and y-intercepts.

6. Jessica got her uncle to sponsor her for the swim-a-thon to raise money for her swim club. He said he would use the equation $A = 10 + 0.5s$, where A is the amount he will pay if Jessica swims s yards.

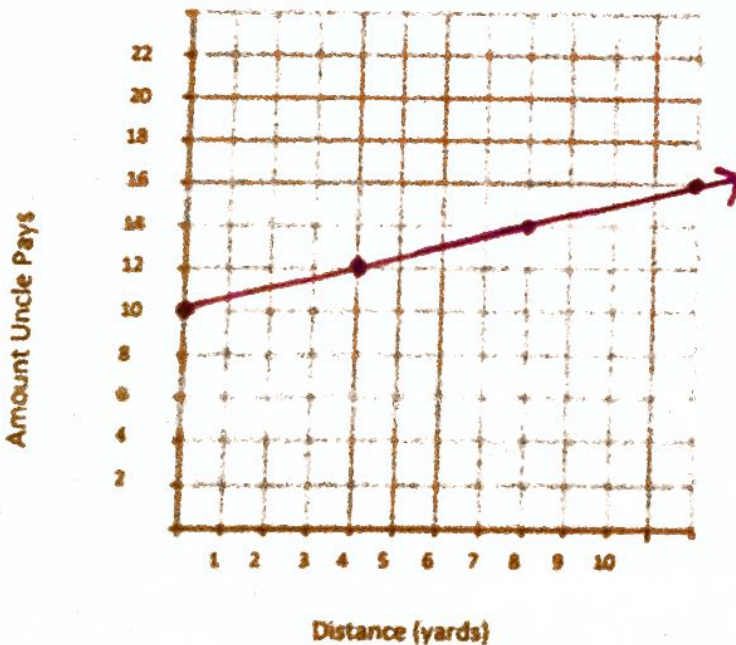
a. Identify the slope and y-intercept.

Slope: 0.5

Y-intercept: 10

b. Explain the meaning of the slope and the y-intercept in this equation in terms of distance swam and the amount Jessica's uncle will pay. Her uncle will give her \$10 upfront and 50¢ per yard swam.

c. On the grid below, sketch a graph that indicates how much her uncle will pay as a function of the distance that she swims.



Tip: get some points first!

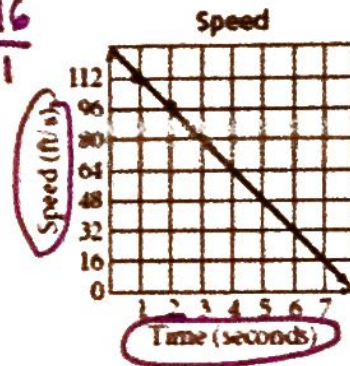
(0, 10)
(4, 12)
(8, 14)

7. Find the rate of change. Explain what the rate of change means for this problem.

Rate of Change: -16 Ex: $\frac{96-112}{2-1} = \frac{-16}{1}$

Explanation:

For every second that passes, the speed decreases by 16 ft/s.



Identify the following tables as linear or nonlinear. If linear, write the equation for the table of values in slope-intercept form.

<p>8.</p> <p>Circle one: Linear <u>Nonlinear</u></p> <p>If linear, equation _____</p> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <thead> <tr> <th style="width: 50%;">x</th> <th style="width: 50%;">y</th> </tr> </thead> <tbody> <tr><td>-2</td><td>4</td></tr> <tr><td>-1</td><td>5</td></tr> <tr><td>0</td><td>4</td></tr> <tr><td>1</td><td>5</td></tr> </tbody> </table>	x	y	-2	4	-1	5	0	4	1	5	<p>9.</p> <p>Circle one: <u>Linear</u> Nonlinear</p> <p>If linear, equation <u>$y = x + 1$</u></p> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <thead> <tr> <th style="width: 50%;">x</th> <th style="width: 50%;">y</th> </tr> </thead> <tbody> <tr><td>4</td><td>5</td></tr> <tr><td>3</td><td>4</td></tr> <tr><td>0</td><td>1</td></tr> <tr><td>-6</td><td>-5</td></tr> </tbody> </table>	x	y	4	5	3	4	0	1	-6	-5
x	y																				
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1	5																				
x	y																				
4	5																				
3	4																				
0	1																				
-6	-5																				



Slope = $\frac{5-4}{4-3} = 1$

Slope = $\frac{4-1}{3-0} = 1$

Slope = $\frac{1-5}{0-6} = 1$

10. Explain the error in the student's work below and then find the correct equation.

Find the equation of a line that goes through the points (2, 5) and (-3, 15)

$$\frac{15-5}{-3-2} = -2$$

$$\frac{15-5}{-3+2} = \frac{10}{-5} = -2$$

$$y = mx + b$$

$$-3 = -2(15) + b \rightarrow y = 15, x = -3$$

$$-3 = -30 + b$$

$$b = 27$$

$$y = -2x + 27$$

Error: Did not correctly plug in (-3, 15) to find b.

Correct Equation:

$$15 = -2(-3) + b \rightarrow 15 = 6 + b \rightarrow b = 9$$

$y = -2x + 9$

Sample 1: Using purple #s for x

You may round to the nearest hundredth. ☺

Regression Line Worksheet

1. The table gives the Olympic pole vault records in the twentieth century.

(a) Find the regression line for the data

Equation: $y = .03x + 3.40$

Year	Height (m)	
0	1900	3.30
4	1904	3.50
6	1906	3.50
8	1908	3.71
12	1912	3.95
20	1920	4.09
24	1924	3.95
28	1928	4.20
32	1932	4.31
36	1936	4.35
48	1948	4.30
52	1952	4.55
56	1956	4.56
60	1960	5.10
64	1964	5.64
68	1968	5.40
72	1972	5.64
76	1976	5.64
80	1980	5.78
84	1984	5.75
88	1988	5.90
92	1992	5.87
96	1996	5.92
100	2000	5.90

(b) Find the r value and explain what it means.

~~Make a scatter plot of the data on your calculator and graph the regression line. Does the regression line appear to be a suitable model for the data?~~

Yes or No $r = .97$ Because this is close to +1, there is a very strong, positive correlation.

(c) Use the model to predict the record pole vault height for the 2004 Olympics. Find the actual record height and by whom. Is this a good prediction?

You can use your table, graph, or equation.

$\rightarrow x = 104$
 $.03(104) + 3.4 = 6.52$
 Our model predicts the record height to be approximately 6.52 m.

(d) Use the model to predict the record pole vault height for the 2008 Olympics. What was the actual gold medal height and by whom? Is this a good prediction?

$\rightarrow x = 108$
 $.03(108) + 3.4 = 6.64$
 Our model predicts the record height to be approximately 6.64 m.

(We are pretending the Olympics is every year)

~~Use the model to predict the record pole vault height for the 2012 Olympics. Do you think the actual record in 2012 will be higher or lower than this prediction? Why?~~

Predict when the record height would be 6 m.

$6 = .03x + 3.4$
 $-3.4 \quad -3.4$
 $2.6 = .03x$
 $x = 86.\bar{6} \approx 87$

We predict in 1987. The record height in 1988 was close to 6 so this could be accurate BUT we notice the height did not get to 6 m!

Explanation: This last problem was meant to give students the opportunity to practice creating lists, calculating linear regression, then use their model to predict both x and y values. Please don't let the problem itself get in the way of student learning. 😊

♡ Ms. Bishop