Name Key Date Pd

CYU 1.3 Linear Regression

☑ Use when you get it right all by yourself

S Use when you did it all by yourself, but made a silly mistake

H Use when you could do it alone with a little help from teacher or peer

G Use when you completed the problem in a group

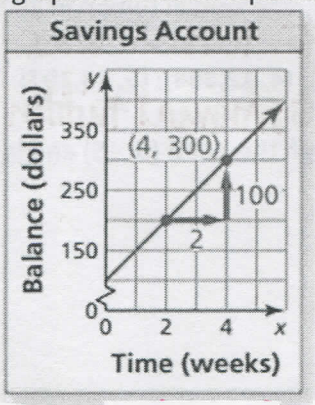
X Use when a question was attempted but wrong (get help)

N Use when a question was not even attempted

CONCEPTS	BASIC	INTERMEDIATE	ADVANCED
Writing the equation of a line	1a	1b,	1c, 2, 3, 6
Interpreting slope & y-intercept	1a	1b, 4	1c, 5, 6
Solution to a system	2, 7		
Extrapolation	4	5	
Using the calculator to write an linear equation	4	5	6
Determining if data has a constant linear slope	4	5	

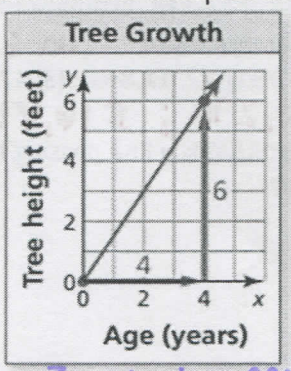
1. Use the graph to write an equation of the line and interpret the slope.

a.



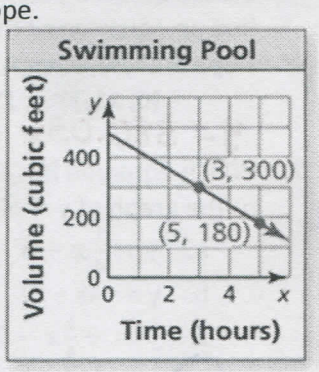
$y = 50x + 100$
The balance increases $50. each week

b.



$y = \frac{3}{2}x$ Ht increases 1.5 ft each year

c.



$y = -60x + 480$
Volume decreases 60 cubic ft per hour

2. Two newspapers charge a fee for placing an advertisement in their paper plus a fee based on the number of lines in the advertisement. The table shows the total costs for different length advertisements at the Daily Times. The total cost y (in dollars) for an advertisement that is x lines long at the Greenville Journal is represented by the equation y = 2x+ 20. Which newspaper charges less per line? How many lines must be in an advertisement for the total costs to be the same?

- Greenville Journal
- 5 lines

Daily Times	
Number of lines, x	Total cost, y
4	27
5	30
6	33
7	36
8	39

3. While on vacation in Canada, you notice that temperatures are reported in degrees Celsius. You know there is a linear relationship between Fahrenheit and Celsius, but you forget the formula. From science class, you remember the freezing point of water is 0°C or 32°F, and its boiling point is 100°C or 212°F.

   a. Write an equation that represents degrees Fahrenheit in terms of degrees Celsius. $y - 212 = \frac{9}{5}(x - 100)$ or $\frac{9}{5}x + 32$
   b. The temperature outside is 22°C. What is the temperature in degrees Fahrenheit? 71.6°F
   c. Rewrite your equation in part (a) to represent degrees Celsius in terms of degrees Fahrenheit. $x = \frac{5}{9}(y - 32)$
   d. The temperature of the hotel pool water is 83°F. What is the temperature in degrees Celsius? $C \approx 28.33°C$

4. Determine whether the data provided shows a linear relationship.

Minutes walking, x	1	6	11	13	16
Calories burned, y	6	27	50	56	70

   a. If yes the data is linear, then write an equation of a line of fit. yes $y = 4.25x + 1.75$
   b. Estimate y when x = 15. $y \approx 65.5$
   c. Explain the meaning in the context of the situation. After 15 mins, you've burned 65.5 calories.

5. Determine whether the data provided shows a linear relationship.

Months, x	9	13	18	22	23
Hair length (in.), y	3	5	7	10	11

   a. If yes the data is linear, then write an equation of a line of fit. yes $y = 0.55x - 2.25$
   b. Estimate y when x = 15. $y = 6$
   c. Explain the meaning in the context of the situation. After 15 months, the hair will be 6 inches in length.

6. The data pairs (x, y) represent the average annual tuition y (in dollars) for public colleges in the United States x years after 2005. Use the *linear regression* feature on a graphing calculator to find an equation of the line of best fit. Estimate the average annual tuition in 2020. Interpret the slope and y-intercept in this situation. in 2005 tuition was $11,290.

   (0, 11,386); (1, 11,731); (2, 11,848); (3, 12,375); (4, 12,804); (5, 13,297)

   $y = 380.03x + 11,290$; $16,990.45; Annual tuition increases ≈ $380 each year.

7. Which equation has a graph that is a line passing through the point (8, - 5) and is perpendicular to the graph of y = - 4x + 1?

   a. $y = \frac{1}{4}x - 5$
   b. y = - 4x + 27
   c. $y = -\frac{1}{4}x - 7$
   d. $y = \frac{1}{4}x - 7$

CYU Reflection: *How far can you go: basic, intermediate, or advanced?*

Rate your mastery level!

How confident are you with the skills this CYU covered? Circle the score you would give yourself.