Name _____ Date _____ Pd __

CYU 1.3 Linear Regression

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. **Savings Account**   b. **Tree Growth**   c. **Swimming Pool**
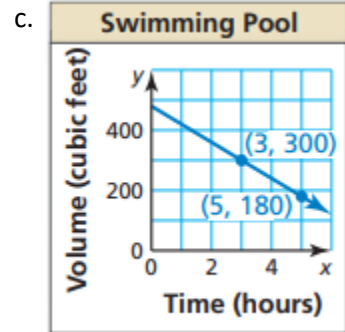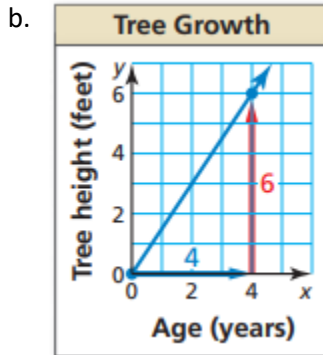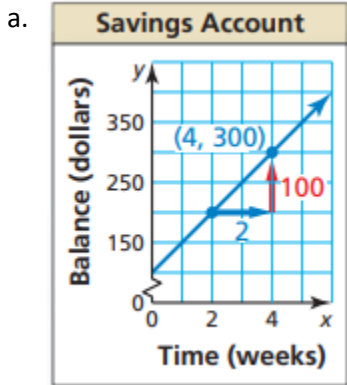
2. Two newspapers charge a fee for placing an advertisement in their paper plus a fee based on the number of lines in the advertisement. The table shows the total costs for different length advertisements at the Daily Times. The total cost y (in dollars) for an advertisement that is x lines long at the 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?

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.
    b. The temperature outside is 22°C. What is the temperature in degrees Fahrenheit?
    c. Rewrite your equation in part (a) to represent degrees Celsius in terms of degrees Fahrenheit.
    d. The temperature of the hotel pool water is 83°F. What is the temperature in degrees Celsius?

4.
    a. Assume the data is linear, and write an equation of a line of fit.
    b. Estimate y when x = 15.
    c. Explain the meaning in the context of the situation.

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

5.
    a. Assume the data is linear, and write an equation of a line of fit.
    b. Estimate y when x = 15.
    c. Explain the meaning in the context of the situation.

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

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

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. $y = \frac{1}{4}x - 7$