

HW 1 - Linear Regression

1. Which type of correlation exists in the problems below? (*positive, negative, or none*)

- a. pos The amount of time spent studying and your grade on a test
- b. none A person's height and the number of letters in the person's first name
- c. none A person's shoes size and their salary
- d. negative The price of hamburger meat at Harris Teeter and the amount of hamburger meat sold.

2. The following table represents the money spent at a gas station and the number of gallons bought.

- a. As the amount of money increases, the number of gallons will increase
- b. To 2 decimal places, what is the LSRL?

Dollars Spent	8	9	10	11	13
Gallons Bought	2.2	2.4	2.6	3	3.5

- c. What is the value of "r" to 4 decimal places? .9942 What does this tell us? strong positive
- d. Explain the meaning of the slope. .27 gallons per dollar spent E. Explain the meaning of the y-intercept. you get .01 gallons if you spend no money
- f. Find the gallons if you spent \$27. 7.3 gallons G. If I bought 10 gallons, how much money did I spend? \$37

3. The height of a candle, in inches, as a function of time, in hours, when burning is modeled by the function:

$$\hat{y} = 12 - 0.2t$$

slope → decreases in height by 0.2 inches per hour
y-int → original height of 12 inches

Interpret the meaning of the slope and the y-intercept.

4. Olivia is studying for a test, and she wonders if her friend, Laney, is also studying for the test. She calls Laney and asks her how long she has been studying. Laney has been studying for her test all week, approximately 8 hours total. Olivia has only been studying for her test for a couple of hours. The next week, Olivia and Laney get their test scores back. Laney got an A on her test, and Olivia got a C. Olivia wonders if there is a correlation between the number of hours spent studying and the grade a student earns. Take a look at the data Olivia collected from her classmates, and see if you can find a correlation.

- a. Find the equation of the LSRL. $y = 4x + 65$
- b. What is the value of "r"? .9909 What does this tell us? strongly positive
- c. Explain the meaning of the slope. 4 more points for each hour that you study D. Explain the meaning of the y-int. you'll get a 65 if you don't study
- d. If a student studies for 5 and a half hours, what score would you expect him to get?

$$y = 4(5.5) + 65$$

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Hours	Grade
8	98
2	74
6	87
4	82
2	72

5. Students were given a collection of number cubes. The instructions were to roll all of the number cubes, let them land on the floor, and then remove the number cubes showing FIVE. The students were told to repeat this process, each time removing all the Five's, until there were fewer than 50 number cubes left. The results are shown below:

Roll	1	2	3	4	5	6	7	8	9	10
Number Cubes Remaining	252	207	170	146	123	100	85	67	56	48

- a. Find the equation of the LSRL to the nearest whole number. $y = -22x + 246$
- b. What is the value of "r"? -0.9754 What does this tell us? Strongly negative
- c. Explain the meaning of the slope. you take out 22 dice each roll D. Explain the meaning of the y-int. you started out with 246 dice
- d. According to your model, after how many rolls will there be only 10 number cubes left? $10.7 \sim 11$ rolls
- e. How many number cubes will be left after 12 rolls?
 -18
- F. Can this model go on forever? Explain.
 no! its not possible to have a negative # of cubes