Name: Key Date: _____

Line of Best Fit – Linear and Exponential

1. Students in Ms. Garth's Algebra II class wanted to see if there are correlations between test scores and time spent watching television. The students created a table in which they recorded 13 student's average number of hours per week spent watching television and scores on a test. Use the actual data collected by the students in Ms. Garth's class, as shown in the table below, to answer the following questions.

TV hrs/week (average)	30	12	30	20	10	20	15	12	15	11	16	20	19
Test Scores	60	80	65	85	100	78	75	95	75	90	90	80	75

a) Find the best fitting linear model that represents the data and the correlations coefficient.

$f(x) = -1.43x + 105.98$ $r = -0.82$

b) Identify the y-intercept. What does it represent in the context of the problem?

y-int = (0, 105.98) The anticipated test score of someone who watches NO TV.

c) Using this model, what is the estimated test score of a student who watches TV for 35 hours?

$f(35) = 55.8\ \%$

d) Using this model, what is the highest number of hours a student can watch TV and still pass the test (make a 70)?

$70 = -1.43x + 105.98$ $x = 25.16$

2. A rapidly growing bacterium has been discovered. The data in the following chart represents the number of bacteria in a sample each hour.

Hours	Bacteria Present
0	20
1	40
2	75
3	150
4	297
5	510

a) Write the linear model that represents the data and the correlation coefficient.

$f(x) = 94.17x - 53.43$

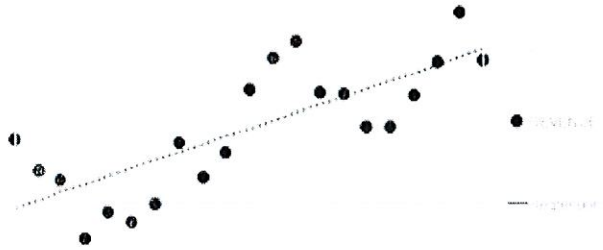
b) How much bacteria is present after 10 hours?

14,245,420

c) How much bacteria is present after one day?

135,520,033.1

3. Jerry, a barista at Starbucks, recorded his sales when he's on the clock. Each week, Jerry calculated the total revenue for all of his sales. The graph is a scatter plot from the given data.



a. Determine if the correlation is positive, negative, or none. Positive

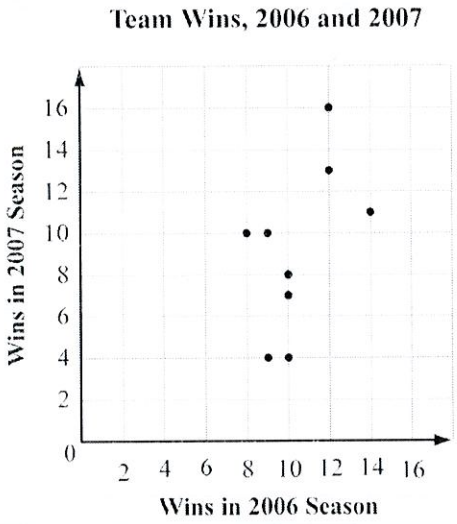
b. Estimate the correlation coefficient.

0.5 weak correlation +

c. Is there causation? Why or why not? Probably Not, weeks don't ↑ sales

4. Using the graph, the linear regression model for these data is $y = 1.10x - 2.29$. Based on this model, what is the predicted number of 2007 wins for a team that won 5 games in 2006?

(A.) 3
B. 4
C. 5
D. 6



5. The table shows the total outstanding consumer debt (excluding home mortgages) in billions of dollars in selected years. (Data is from the Federal Reserve Bulletin.)

Year	1985	1990	1995	2000	2003
Consumer Debt	585	789	1096	1693	1987

Let x = 0 correspond to 1985.

a) Find the regression equation appropriate for this data set. Round values to two decimal places.

$y = 79.86x + 463.35$

b) Find the approximate consumer debt in 1998 1501.53 billion

c) Find the approximate consumer debt in 2008 2300.13 billion

d) Using the regression equation, predict the year when consumer debt will reach 2,500 billion dollars. 25.5 years -or- 2010 (and ½ year)