Name: _____ Date: _____

Regression

A little vocab…

- The _____ is the line that lies as close as possible to all the data points.
- _____ is a method used to find the equation of the best fitting line or curve.
- _____ is the use of the regression curve to make predictions outside the domain of values of the independent variable.

Regression using the calculator:

1. 2^{ND}, +, 4, ENTER (this will clear all data already in the tables)
2. STAT, Enter (type in data)
3. STAT, select CALC
4. LinReg ax + b (for linear regression)
   ExpReg ab^x (for exponential regression)
   QuadReg ax^2 + bx + c (for quadratic regression)
   Enter, Enter, Enter, VARS, Select Y-VARS, Function, Y_1, ENTER, ENTER
5. a =
   b =
   c =
   r =
6. Correlation Coefficient is r (use r^2 for quadratic)

Ex 1: 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.)

Let x = 0 correspond to 1985.

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

a) Find the line of best fit. Round to two decimal places.

b) Find and interpret the slope of the line of best fit.

c) Find the approximate consumer debt in 1998.

d) Find the approximate consumer debt in 2008.

Ex 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.

b) Write the exponential model that represents the data and the correlation coefficient.

c) Which model is the best fitting model? Explain.

d) Using the best fitting model, how much bacteria is present after 10 hours?

e) Using the best fitting model, how much bacteria is present after one day?

Ex 3: For the following data, decide if it would be best modelled with a linear, a quadratic, or an exponential function. Find all three equations and explain your answer.

x	9	10	11	12	13	14
y	-1	5	23	78	200	500