Module 8 Regression RWS- Linear and Exponential Extensions Analyzer: _____

#1-5, With the data given and your handy graphing calculator, decide if the relationship is best described as a linear, exponential or neither. *If there is a relationship*, answer the questions.

1. The data at right shows the cooling temperature of a cup of coffee after being poured from brewing pot.

Time (min)	Temp (ºF)
0	179.5º
8	158.1º
11	149.2º
18	134.6º
22	125.4º
30	116.3º
38	109.1º
42	105.7º
50	100.5º

a. Make a quick sketch of shape graph from your calculator.

b. Type of relationship:

c. Best fitting equation:

d: Correlation coefficient:

e. Is this a strong relationship, why or why not?

f. Is this a correlation that demonstrates causation? Defend you answer.

2. The data at right compares the average diameter of granules of sand on a beach (mm) compared to the gradient slope of the beach (in degrees) for natural beaches.

Average diameter of a grain of sand on beach (mm)	Slope of beach (degrees)
0.17	0.63
0.19	0.7
0.22	0.82
0.235	0.88
0.235	1.15
0.3	1.5
0.35	4.4
0.42	7.3
0.85	11.3

a. Make a quick sketch of shape graph from your calculator

b. Type of relationship:

c. Best fitting equation:

d: Correlation coefficient:

e. Use your equation to predict the slope of beach if sand grains are .17 mm.

f. How far apart is the actual measurement from your prediction (called *deviation*)?

3. The data at right compares 10 friends' height and weight.

Name	Height (cm)	Weight (kg)
Albert	180	87
Beth	176	65
Cindy	144	52
David	195	94
Emily	159	87
Frank	185	79
Gary	166	59
Helen	173	64
Ida	149	45
Jeremy	168	77

a. Make a quick sketch of shape graph from your calculator

b. Type of relationship:

c. Best fitting equation:

d: Correlation coefficient:

e. Is this a strong relationship, why or why not?

4. A rapidly growing bacteria has been discovered. Its growth rate is shown on chart.

Hours since observation began	Number of bacteria in the sample
0	20
1	40
2	75
3	150
4	297
5	510

a. Make a quick sketch of shape graph from your calculator

b. Type of relationship:

c. Best fitting equation:

d: Correlation coefficient:

e. How many bacteria do you predict would be present in 10 hours?

5. A real estate agent recorded the price of six 3-bedroom homes and their distance from New York City (NYC).

Miles from NYC	Price of 3 bedroom home ($)
10	755,000
35	650,000
50	580,000
65	505,000
75	475,000
120	285,000

a. Make a quick sketch of shape graph from your calculator

b. Type of relationship:

c. Best fitting equation:

d: Correlation coefficient:

e. Is this a strong relationship, why or why not?

f. Woodstock, NY is 95 miles form NYC. Predict the price of a 3-bedroom home there.

g. Predict the price of a 3-bedroom home ***in*** NYC.

h. Determine the distance from NYC a home would be if its selling price was $500,000.

j. Determine the distance from NYC a home would be if its selling price were $0. Why is your answer unreasonable?

(note for 5j - When we use extrapolation with linear models we can sometimes get unreasonable answers. This is because we are using the model with independent variable values for which the model does not apply.