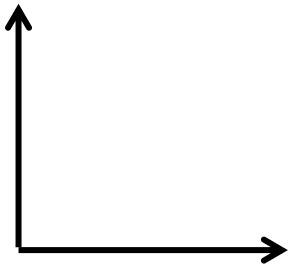
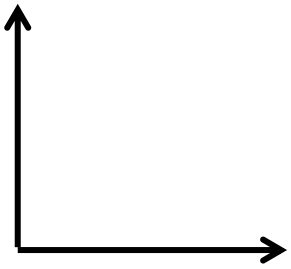
Name:_____ Date:_____

FINDING THE RIGHT REGRESSION MODEL

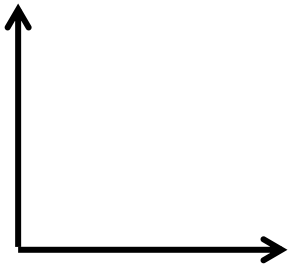
Sketch a positive linear graph



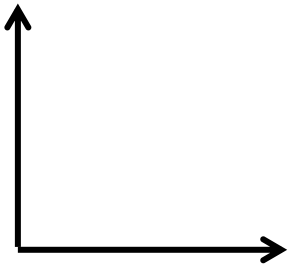
Sketch a negative linear graph



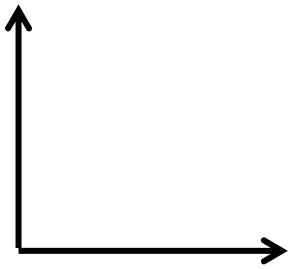
Sketch a positive exponential graph



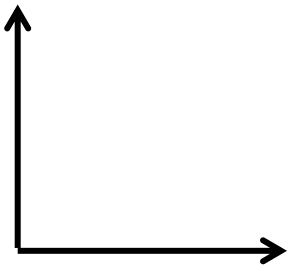
Sketch a negative exponential graph



Sketch a positive quadratic graph



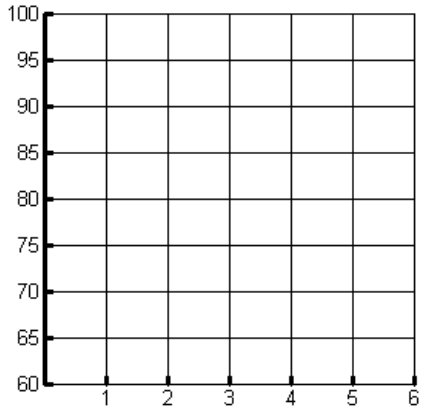
Sketch a negative quadratic graph



1. Cathy is studying for an upcoming test and noticed that there is a correlation between the number of hours she studies and the grades she gets,

a. Make a graph of the data using the table below to show what grade she earned on the first 4 tests.

Hours	Grade Earned
1	78
2	83
3	85
4	83



b. What kind of graph is this?

c. Use your calculator to determine the regression formula.

d. Using your formula what do you expect Cathy to get on her test if she studies for 5 hours?

e. How many hours do you suggest Cathy study for to maximize her grade?

2. Dr. Batman is researching different medicines to try and lessen the number of cancer cells in patients. He has been injecting injecting the patients with a specific formula and monitoring the number of cancer cells present

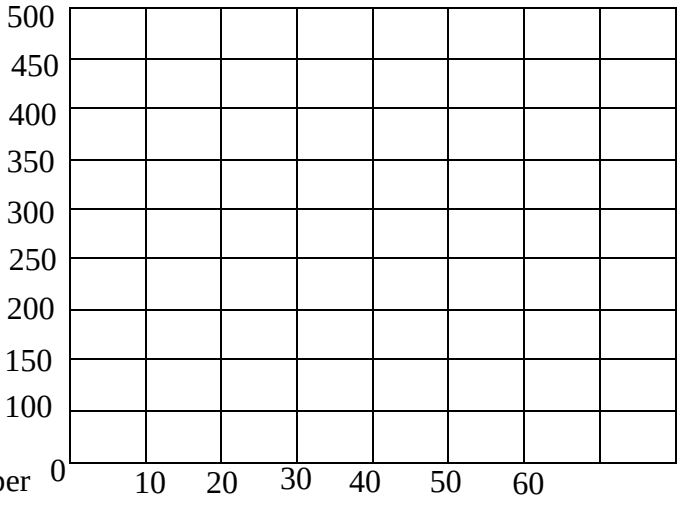
Medicine Dosage (mg)	0	10	20	30	40	50	60
# of cancer cells (in thousands)	500	412	338	225	131	112	108

a. Graph the function, what kind of graph is this?

b. Put it into your calculator and determine the regression formula

c. What is the correlation coefficient?

d. Use your regression model to determine the number of cancer cells if 80mg of medicine was used.



3. Kim works as waitress. Below is a table of how many tables she works and what she makes in tips

Tables	0	2	6	10	12	13	15
Amount in tips	0	13	42	65	78	92	102

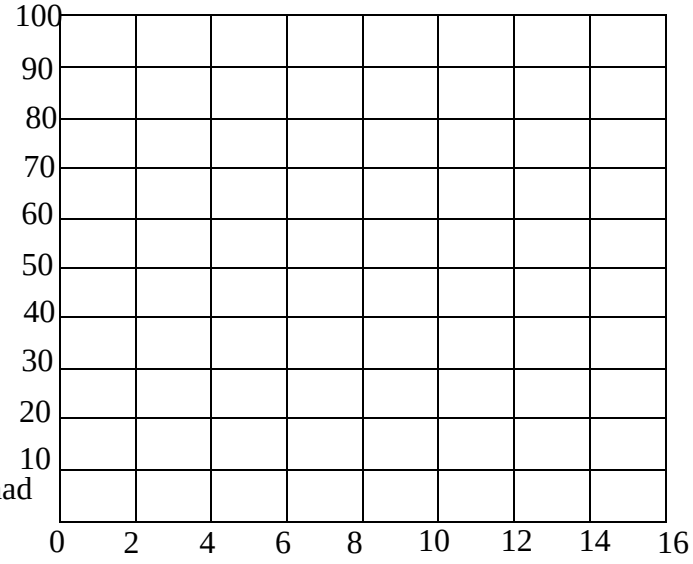
a. Graph the function, what kind of graph is this?

b. Put it into your calculator and determine the regression formula

c. What is the correlation coefficient?

d. How much money should she make in tips if she had 22 tables?

e. If she made $200 in tips how many tables did she wait?



4. Harley runs a salon and has been monitoring her revenue since she opened 5 months ago.

Month	0	1	2	3	4	5
Sales (in thousands)	5.6	5.8	6.2	5.9	7.9	9

a. Put the information in the graphing calculator and make a scatter plot. Sketch the graph below

b. This is very difficult to tell which model fits it the best. In order to tell which one fits the data better we need to compare the correlation coefficients. Find the correlation coefficient of each. Circle the one that should be the best fit.

Linear:_____ Quadratic:_____ Exponential:_____

c. Find the regression equation of each

Linear:_____ Quadratic:_____ Exponential:_____

d. Put all three equations into y= in the calculator. This will graph on top of the data you already have. Which graph matches the data best? Does this match with which one had a better correlation coefficient?

5. Rabbits were introduced to a remote island where they have been growing rapidly

Years since introduction	2	5	7	11	15
Population of rabbits	75	100	112	205	290

a. Graph the data in the graphing calculator
b. Find the correlation coefficient of the 3 main functions

Linear:_____ Quadratic:_____ Exponential:_____

c. Circle the one that should fit the data the best based on the correlation coefficient. Write the regression formula of the graph below.

d. Use your formula to predict the number of rabbits that will be on the island 20 years after their firstg introduction.

6. Below is a table of hours spent studying and the score the student received on the math section of the SAT

Hours Studying	**Math SAT score**
4	390
9	580
10	650
14	730
4	410
7	530
12	600
20	790
1	350
3	400
8	590
11	640
5	450
6	520
10	690
11	690
16	770
13	700
13	730
10	640

a. Graph the data and determine the best model to represent the model

b. Which model did you choose? Why?

c. Write the regression equation of the model you selected.

d. Is there a correlation between hours studying and SAT score?

e. Is this a cause and effect relationship or just an association? . Justify your response.

f. Using your model what is your expected SAT score if you study for 25 hours? Does that make sense? Why or why not?

g. At what x value does your function stop being a good predictor?

7. Below is a table that shows the number of songs on a student's MP3 player and their GPA

Songs on MP3	GPA
100	3.2
30	3.5
843	2.9
10	1.2
600	2.55
134	1.9
512	3.9
80	2.2
144	2.7
40	4.0
13	3.7

a. Put the data into the calculator and graph the scatter plot

b. Does there look like there is any correlation between the data?

c. Find the correlation coefficient for the 3 main functions and write them below

d. Are any of them higher than .5?

If there is nothing higher than .5 then there is no correlation at all between the variables.