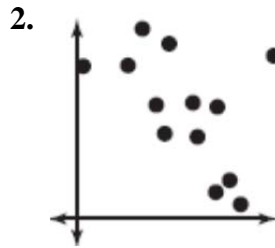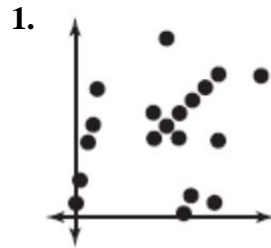Name_____ Date_____ Period_____

LINEAR REGRESSION WORKSHEET #2

Describe the scatterplots below. Make sure to discuss form, direction and strength.
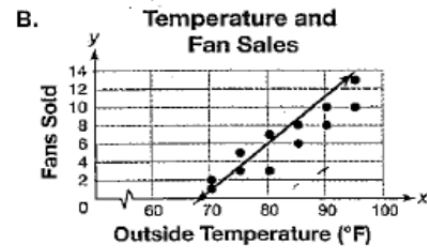
1.

2.

3.

Describe the association shown, if any, by the scatter plot in as many ways as possible, using terms such as linear or nonlinear and positive or negative. Identify any outlier(s).

4.

Trees per Acre and Oranges per Tree

5.

Outside Temperature and Lemonade Sales
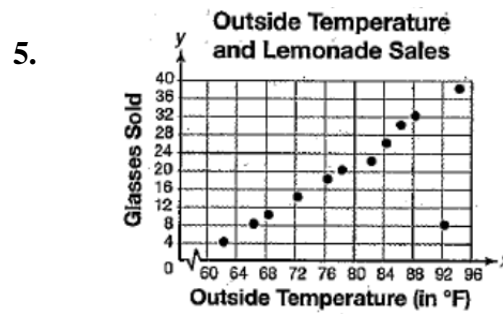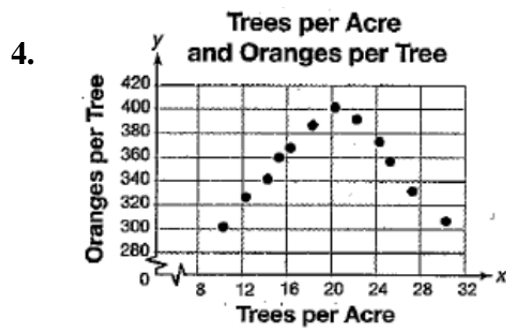
Is there a **causal relationship** in the following situations?

6. The depth of a snowfall and the amount of time spent clearing the driveway

7. The number of cavities and the size of an elementary student's vocabulary

Consider each pair of identical scatter plots. Circle the letter of the plot that shows the better trend line. **Explain your choice and determine the equation for the line. Tell what the slope and** *y*-**intercept represent in terms of the data it models.**

8.

A. Temperature and Heater Sales

9.

A. Temperature and Fan Sales

B. Temperature and Heater Sales


B. Temperature and Fan Sales
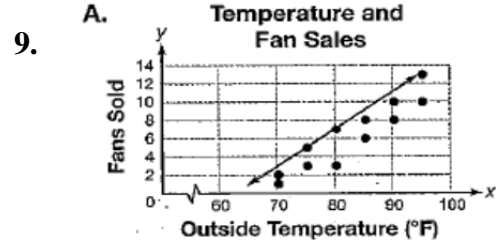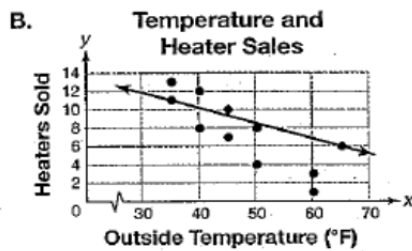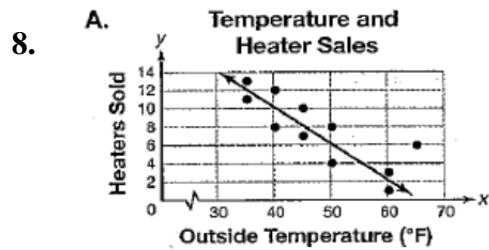
10. Megan and Bryce opened a new store called the Donut Pit. Their goal is to reach a profit of $20,000 in their 18th month of business. The table and scatter plot below represent the profit, P, in thousands of dollars, that they made during the first 12 months.

t (months)	1	2	3	4	5	6	7	8	9	10	11	12
P (profit, in thousands of dollars)	3.0	2.5	4.0	5.0	6.5	5.5	7.0	6.0	7.5	7.0	9.0	9.5

Donut Pit Profits

2
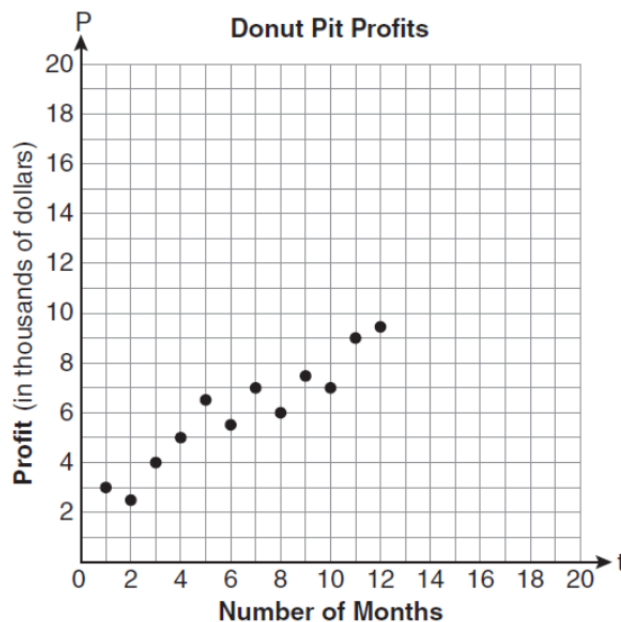
a)   Use the statistical features of your calculator to construct a scatter plot and fit a linear function to the data. Calculate and interpret the correlation coefficient.

b)   Use your equation to predict whether Megan and Bryce will reach their goal in the 18th month of their business. ***Show your work.*** Is this an example of interpolation or extrapolation?

11. The gestation time for a type of animal is the typical time between conception and birth for that type of animal. The longevity of an animal is the typical length of life for that animal. The gestation times (in days) and the longevities (in years) for 13 types of animals are shown in the table below.

Animal	Gestation Time (days)	Longevity (years)
Baboon	187	20
Black Bear	219	18
Beaver	105	5
Bison	285	15
Cat	63	12
Chimpanzee	230	20
Cow	284	15
Dog	61	12
Fox (Red)	52	7
Goat	151	8
Lion	100	15
Sheep	154	12
Wolf	63	5

a) Does it look like there is a relationship between gestation time and longevity for the animals?

b) Use the statistical features of your calculator to construct a scatter plot and fit a linear function to the data. Calculate and interpret the correlation coefficient.

3

c) Suppose that these 13 animals can be considered as representative of mammals in general. Based on the linear regression, what would you predict for the longevity of an ocelot whose gestation time is known to be 85 days?

d) Provide an interpretation of the slope of the linear regression.

e) Does it make sense to interpret the y-intercept in this context? Explain why or why not.

f) Use the equation to predict the gestation period of a human knowing the average lifespan (longevity) is 72 years. Is this reasonable? Explain.

g) Graph the residual plot in your calculator and sketch it below. Comment on the appropriateness of the linear model using your residual plot.