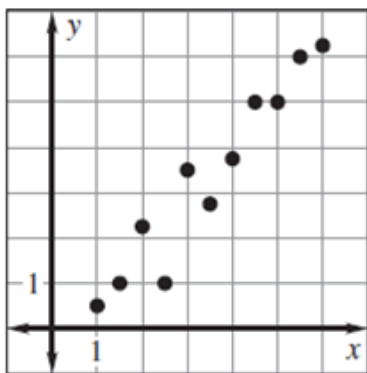


# Unit 11: Comparing Linear, Quadratic, & Exponential Functions

## Day 1 – Scatterplots

A **scatterplot** is a graph of data pairs  $(x, y)$ . Scatterplots are typically used to describe relationships, called **correlations**, between two variables (bi-variate). The **correlation coefficient** describes how well a line fits the data. A **trend line** can be drawn to help determine correlation.

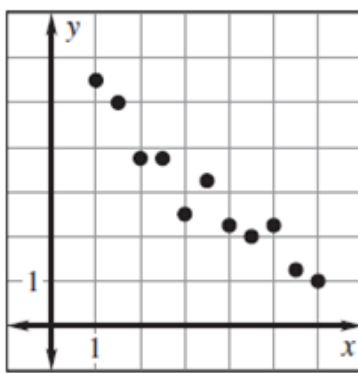


**Positive Correlation**

As  $x$  values increase,  $y$  values increase

Correlation Coefficient is close to 1

Positive Slope

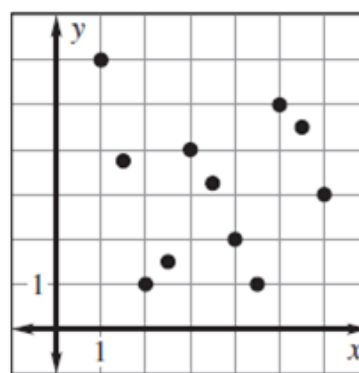


**Negative Correlation**

As  $x$  values increase,  $y$  values decrease

Correlation Coefficient is close to -1

Negative Slope



**No Correlation**

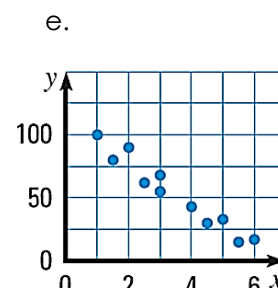
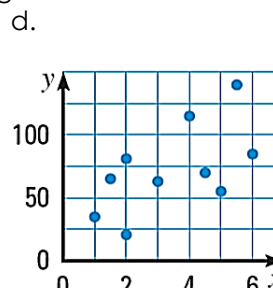
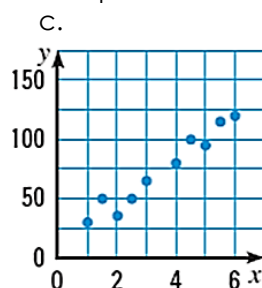
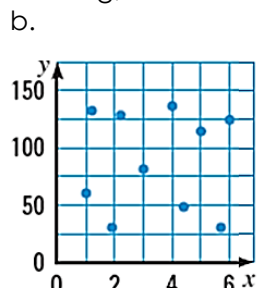
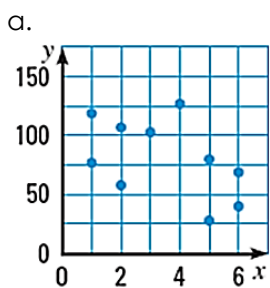
No relationship between  $x$  and  $y$

Correlation Coefficient is close to 0

No line

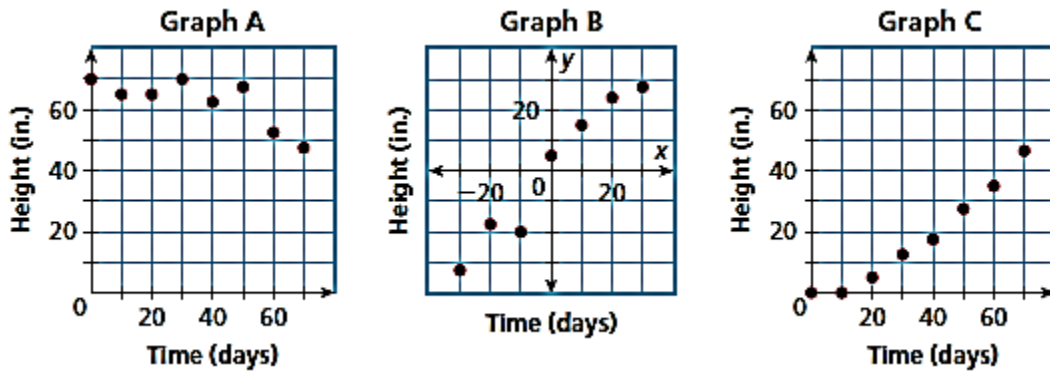
Correlation Coefficients			
0.70 to 1.00	Strong Positive	0.70 to 1.00	Strong Negative
0.30 to 0.69	Moderate Positive	0.30 to 0.69	Moderate Negative
0.00 to 0.29	None to Weak Positive	0.00 to 0.29	None to Weak Negative

**Example:** Determine if the following graphs have positive, negative, or no correlations. Then tell if the correlation coefficient is strong, moderate, or weak positive or negative.



**Example:** Describe the scatterplot that best describes the scenario below and explain why:

*The relationship between the number of days since a sunflower seed was planted and the height of the plant.*



**Example:** Describe the correlation you would expect to see between each pair of data sets. Explain your choice:

a. The number of hours you work vs the amount of money in your bank account:

b. The number of hours workers receive safety training vs the number of accidents on the job:

c. The number of students at Allatoona vs the number of dogs in Atlanta:

d. The number of heaters sold versus the months in order from April to September:

e. The number of rice dishes eaten vs the number of cars on I-75 throughout the day:

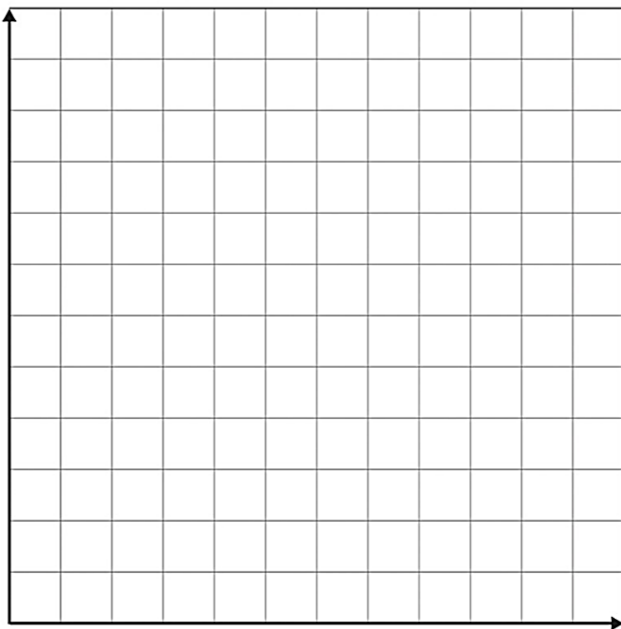
f. The number of calories burned/lost vs the amount of hours you worked out:

**Creating a Scatterplot**

Taylor had guests for dinner at her house eight times and has recorded the number of guests and the total costs for each meal in the table below:

<b>Guests</b>	3	4	4	6	6	7	8	8
<b>Cost (\$)</b>	30	65	88	90	115	160	150	162

a. Graph a scatterplot of the data.



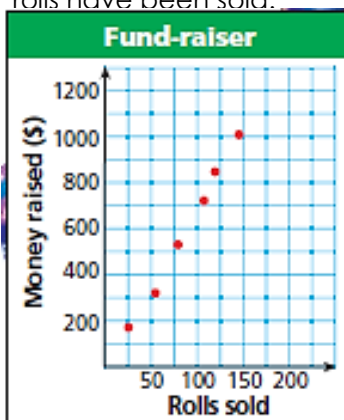
b. Describe the correlation.

c. Calculate the correlation coefficient and compare to your answer in part b.

d. Predict the cost of dinner for 11 guests.

**Predicting with Scatterplots**

A. The scatterplot shows a relationship between the total amount of money collected and the total number of rolls of wrapping paper sold as a school fund-raiser. Based on this relationship, predict how much money will be collected if 175 rolls have been sold.



B. The scatterplot shows a projection of the average ocelot population living in Laguna Atascosa National Wildlife Refuge. Based on this relationship, predict the number of ocelots in 2014 if nothing is done to help the ocelot population.

