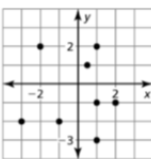


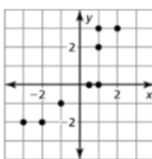
Grab a Week #7 Packet!

Monday 9/30

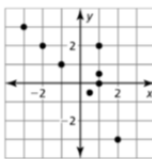
Tell whether x and y show a *positive*, a *negative*, or *no* correlation.

1. 

no

2. 

pos

3. 

neg

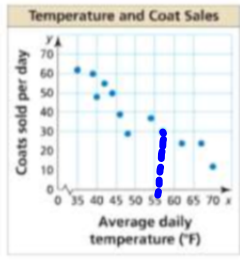
4. The scatter plot shows average daily temperature and the number of coats sold per day.

a. How many coats were sold when it was 35 degrees?
≈ 61 coats

b. How many coats were sold when it was 70 degrees?
≈ 11 coats

c. What was the temperature the day 30 coats were sold?
≈ 57 deg.

d. Is there any relationship between the average daily temperature and the number of coats sold? Explain.



**Yes, Temp ↑, coat ↓
neg**

Week #6 Packet due tomorrow

Ws Friday replaced Book
Assignment Friday FYI

HW ASSIGNED

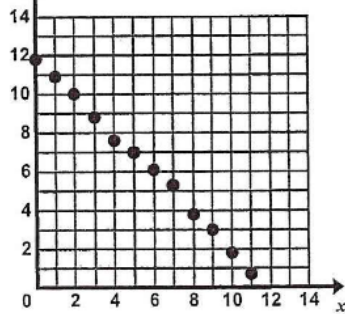
Fri 9/27

~~4.4Ws~~

Name _____ Date _____ Period _____

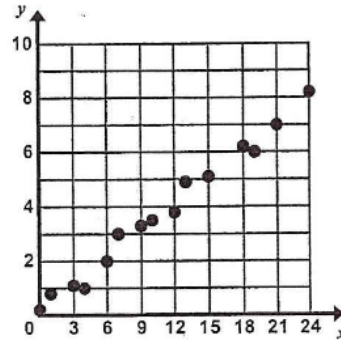
Directions: In #1 and 2, observe the data sets and take note of any associations you see, draw a line of best fit, write a prediction function, and use your function to predict the value of y when $x = 12$ and when $x = 100$.

Questions on 4.4 Day 1?



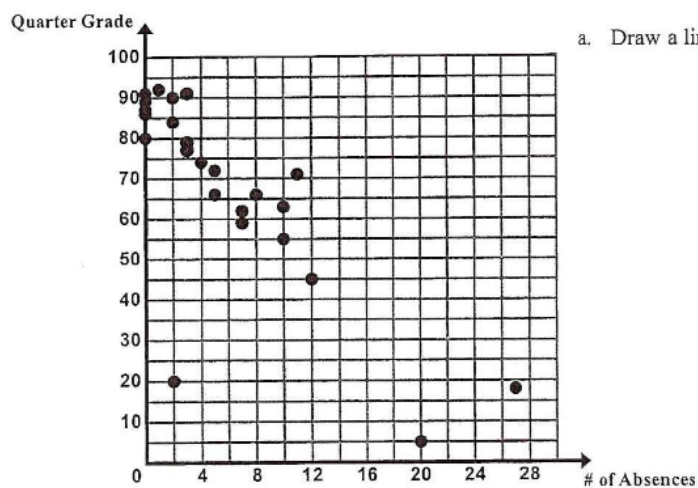
- Observations:
- Using a ruler, draw a line of best fit through the data points that captures the general trend of the data.
- Estimate the slope and y -intercept of your line.
 $m \approx$ _____ $b \approx$ _____
- Write a prediction function for the data set.
- Use your prediction function to find the value of y when $x = 12$ and when $x = 100$.

2.



- Observations:
- Using a ruler, draw a line of best fit through the data points that captures the general trend of the data.
- Estimate the slope and y -intercept of your line.
 $m \approx$ _____ $b \approx$ _____
- Write a prediction function for the data set.
- Use your prediction function to find the value of y when $x = 12$ and when $x = 100$.

3. The following scatter plot shows the final quarter grade in Ms. Gancho's math class for students vs. the number of times they are absent.



a. Draw a line of best fit on the scatter plot.

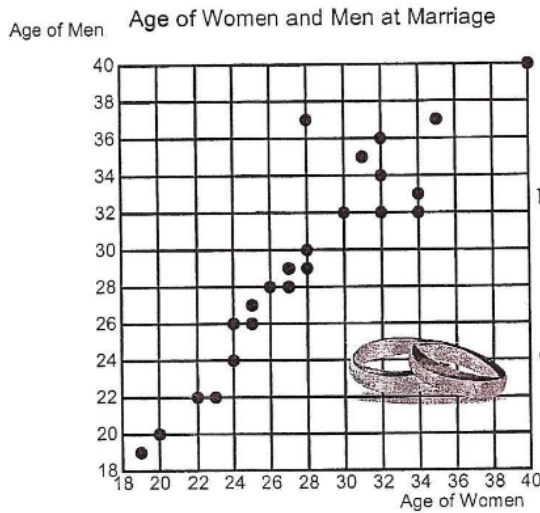
b. Write a prediction function for the line of best fit you drew.

c. Explain the meaning of the slope and y -intercept in the context.

d. Use your prediction function to predict the final grade of a student who is absent 16 times.

e. Use your prediction function to predict how many times a student is absent who receives a final grade of 5 in the class.

4. Bethany is interested in the relationship between the age of when men and women get married. She surveys 24 couples and asks them the age in which they got married for the first time. A scatter plot of her data is below.



a. Describe the association between the two variables. Circle any clusters in the data. Put a star by any points that appear to be outliers.

b. Provide an explanation for any clusters of data or outliers.

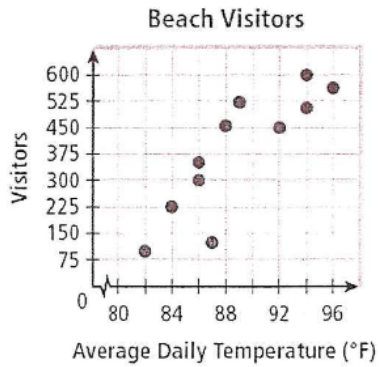
c. Draw a line of best fit on the scatter plot.

d. Write a prediction function for the line of best fit you drew.

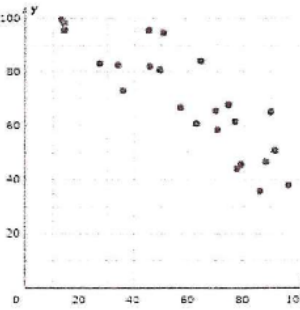
e. Use your prediction function to predict the age of a man when he gets married if the woman that he marries is 38.

Describe the correlation of each scatter plot and scenario.

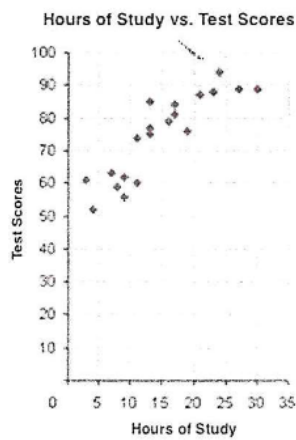
5.



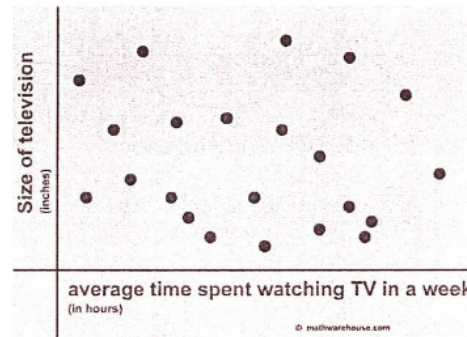
6.



7.



8.



9. Temperature and number of popsicles sold.

10. Number of books read and speeding tickets received.

11. Hours spent watching TV and test scores.

12. Number of times you complain each day and number of friends you have.

13. Hours spent working and money earned.

14. Number of hours spent practicing free throws and free throws made in a game.

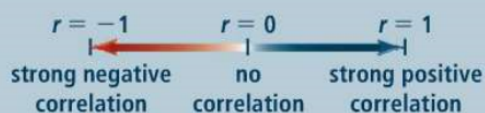
15. Hours spent on phone and number of shoes owned.

Trendlines vs **Line of Best Fit...**
Eye ball it
Approximation
Exact
Calculate it

Line of BEST fit

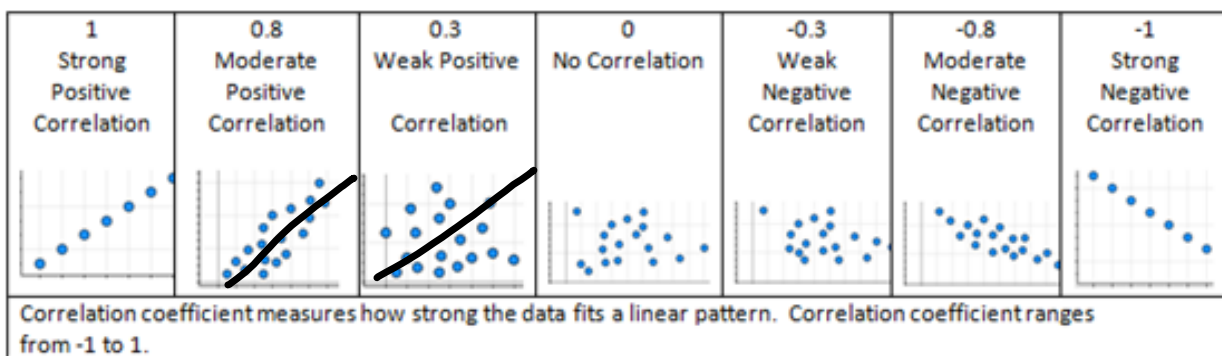
The trend line that shows the relationship between two sets of data **most accurately** is called the **line of best fit**. A graphing calculator computes the equation of the line of best fit using a method called linear regression.

The graphing calculator also gives you the **correlation coefficient** r , a number from -1 to 1 , that tells you how closely the equation models the data.



The nearer r is to 1 or -1 , the more closely the data cluster around the line of best fit. If r is near 1 , the data lie close to a line of best fit with positive slope. If r is near -1 , the data lie close to a line of best fit with negative slope.

Correlation coefficient, r



You can see a scatter plot and calculate a line of BEST fit by using the calculator...

1

MODE
Stat Diagnostics..... ON
Enter

2

y = delete everything

• **Entering a List**

[STAT] – [ENTER]

Enter data in to L1

• **Clearing a List**

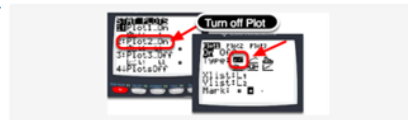
[STAT] – [ENTER]

Hover over L1, push [CLEAR] – [ENTER]

1- Enter x-values in L1 and y-values in L2
[STAT] - [EDIT]

2 - Press [2nd] [Y =] which takes you to "Stat Plot" Make sure Plot 1 is turned on and you've selected the scatter plot icon

Note: Be sure that the lists you will be using are indicated in the Xlist and the Ylist.



3 – Press [Y =] and clear any functions

4 – Press [ZOOM] and scroll down to "ZoomStat" or press [9]

• **Finding a Line of Best Fit Equation:**

1- Enter x-values in L1 and y-values in L2
[STAT] - [EDIT]

2- [STAT] – [CALC] – 4: LinReg(ax+b)

- Using given a and b, write equation in form $y = ax + b$

3 – Look at the correlation coefficient, r , to determine if the line is a good fit

The table shows the number of vehicles y that were cleaned at the car wash x hours since the car wash opened.

Hours, x	0	1	3	4	6	7	8	9	12
Vehicles, y	0	2	4	4	7	8	10	11	13

15 5 hrs

a. Using a scatter plot of the data, write an equation that models the number of vehicles as a function of the number of hours since the car wash opened.

$$y = 1.11x + .41$$

b. Interpret the slope and y -intercept of the line of fit.

1.11 vehicles per hour
at 0 hrs we'd washed .41 cars

c. Identify and interpret the correlation coefficient, r .

.99 - strong pos

d. Is the line a good fit for the data?

Yes!

The table shows the number of unemployed people, y (in thousands), x years since 1980.

Years since 1980, x	0	5	10	15	20	25	30	35
People unemployed (in thousands), y	20	19	16	13	12	10	8	7

40

- a. Using a scatter plot of the data, write an equation that models the number of unemployed people as a function of the number of years since 1980.

$$y = -.39x + 20 \quad (0, 20)$$

- b. Interpret the slope and y -intercept of the line of fit.

unemployment goes down 390 ppl per year
20,000 unemployed in 1980

- c. Identify and interpret the correlation coefficient, r .

$$r = .991$$

- d. Is the line a good fit for the data?

Yes

The table shows the number y of pineapple plants in a garden x years since 2004.

x	2	3	4	7	8	9
y	4	7	9	15	16	19

- a. Write an equation that models the approximate number of pineapple plants as a function of the number of years since 2004.
- b. Interpret the slope and y -intercept of the line of fit.
- c. Identify and interpret the correlation coefficient, r .
- d. Is the line a good fit for the data?

Correlation = Causation...???

Correlation describes the relationship between two or more variables. **A correlation between variables, however, does not automatically mean that the change in one variable is the cause of the change in the values of the other variable.**

Causation indicates that **one event is the result of the other event**; i.e. there is a causal relationship between the two events. This is also referred to as cause and effect.

Theoretically, the difference between the two types of relationships are easy to identify — an action can cause another (e.g. smoking causes an increase in the risk of developing lung cancer), or it can correlate with another (e.g. smoking is correlated with alcoholism, but it does not cause alcoholism). In practice, however, it remains difficult to clearly establish cause and effect, compared with establishing correlation.

-Australian Bureau of Statistics

due Wednesday

Name _____ Hour _____ 4.4 Day 2 Lines of Best Fit

1. Explain the difference between a trend line and a line of best fit.

2. The table shows number of hours spent studying for a science test and final test score.

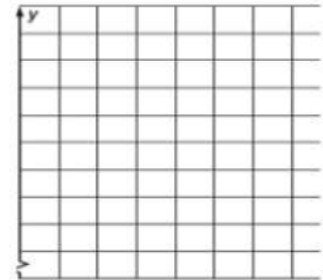
Study Hours	3	2	5	1	0	4	3
Grade	84	77	92	70	60	90	75

a. Draw a scatter plot of the data and a line of fit (trend line).

b. Write a linear function for the line of BEST fit and interpret The correlation coefficient. Is the line a good fit? Explain.

c. Predict the grade of a student who studied 6 hours.

d. Is this interpolation or extrapolation?



3. The table shows the average and maximum longevity of various animals in captivity.

Longevity (years)								
Avg.	12	25	15	8	35	40	41	20
Max.	47	50	40	20	70	77	61	54

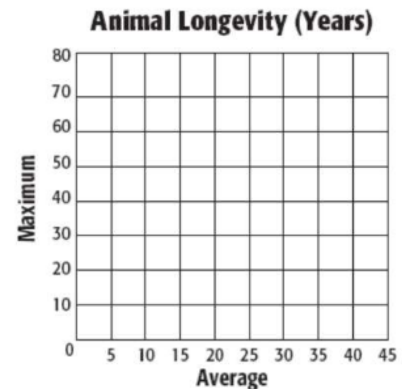
a. Draw a scatter plot and determine what relationship, if any, exists in the data.

b. Draw a line of fit (trend line) for the scatterplot, then use your calculator to write the linear function of the line of BEST fit and interpret the correlation coefficient.

c. Is the line a good fit? Explain.

d. Predict the maximum longevity for an animal with an average longevity of 33 years.

e. Is this interpolation or extrapolation?



4. A herd of caribou moved to a small remote island where they had no predators. Data on the population of the herd was collected for 6 years.

Time (years)	0	1	2	3	4	5	6
Population	24	35	51	74	104	151	225



- Write the equation for the **line** of best fit.
- Identify and interpret the correlation coefficient, r .
- Is the line a good fit for the data? Explain
- Using the equation that best fits the data, predict how many caribou there will be in 9 years.
- Is this interpolation or extrapolation?

5. Use the data in the table to answer the questions.

x	1	1	2	5	4	4	3	6
y	9	3	8	4	3	2	6	8

- Write the equation for the **line** of best fit.
- Identify and interpret the correlation coefficient, r .
- Is the line a good fit for the data? Explain
- Using the equation that best fits the data, predict y when x is 3.
- Is this interpolation or extrapolation?

