Algebra 2 Name _____

2-5 Using Linear Models Date _____ **A#9**

Goal: To write linear equations that model real world data.

Activity: Is there a relationship between the length one's index finger to the length of one's foot?

Step 1: Carefully measure the length of your right index finger (from the crease to the tip) in centimeters. Then carefully measure the length of your right foot with your shoe off. Record results in the table.

Length of right index finger (cm)	Length of right foot (cm)

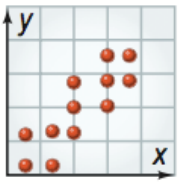
Step 2: Use the graph paper to make a scatter plot of the collected data. Record the finger length values on the horizontal axis and foot length values on the vertical axis.

Step 3: Using the ruler, draw a line that goes through the data. This line has a few names: *regression line* or *trend line*. The line that is best is called the *line of best fit*.

Step 4: Pick two points and write an equation in slope-intercept form of the line you drew.

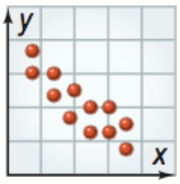
Step 5: Based on the scatter plot above, which of these correlations best describes your graph.

A



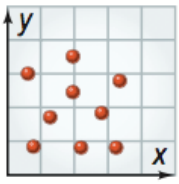
Positive Correlation

B



Negative Correlation

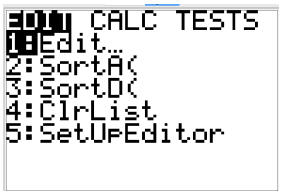
C

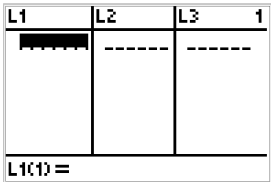


No Correlation

Step 5: Let's graph the data using our graphing calculators.

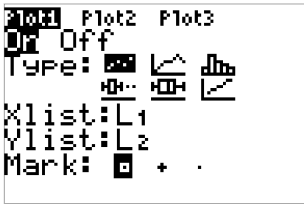
a. Enter data into calculator: STAT→Edit…

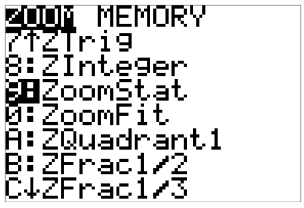




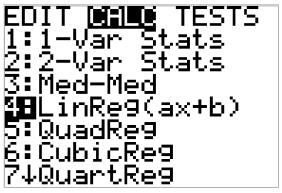
Enter the finger length data into L1 and foot length in L2.

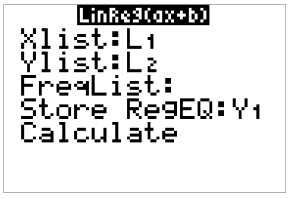
b. View scatterplot: Press STAT PLOT (above Y=). Turn Plot1 On, choose scatter plot, choose L1 as Xlist and L2 as Ylist. Then select GRAPH. If scatterplot does not show up, then select ZOOM→ 9.





c. Graph the *trend line*: Select STAT → CALC → 4: LinReg(ax+b). Choose L1, L2 and Y1 in menu

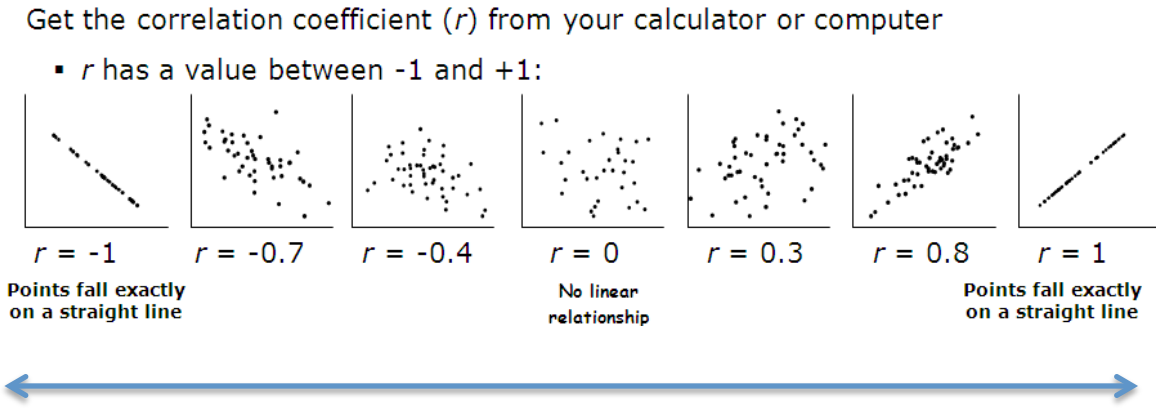




d. *r* = _____ Y1 = _____

e. If your teacher's index finger is 7.5cm long, predict the foot size. _____. Enter Y1(7.5)

Correlation
The line of best fit will have a special number associated with it. This number is called the **correlation coefficient**, *r*. The closer *r* is to -1 or 1, the stronger correlation the data has.



Example: Write the equation of the trend line of the data below. Based on the correlation coefficient, determine the correlation.

{(1, 2.1), (3, 3.1), (5, 4.0), (7, 5.2), (9, 5.9)}

Practice: Write the equation of the trend line of the data below. Based on the correlation coefficient, determine the correlation.

{(–2, 3.9), (–1, 1.8), (0, 0.1), (1, –1.9), (2, –3.8)}

Practice: Write the equation of the trend line of the data below. Based on the correlation coefficient, determine the correlation. If possible, predict the price of oranges for 2018.

Florida Oranges						
Year	2001	2002	2003	2004	2005	2006
Price Per Box	$6.39	$6.99	$7.78	$6.07	$9.27	$8.40

Linear models are good for _____ (predicting missing data *within* domain) but not for _____ (predicting data *beyond* the domain).