Day 1 Homework Answers:

1. C - both are approx. linear. 2 is strong and 4 is weaker
2. D - Strong relationship doesn't have to mean linear
3. B

7 - on next slide

10. Scatterplots.

a) None of the scatterplots show little or no association, although # 4 is very weak.

b) #3 and #4 show negative association. Increases in one variable are generally related to decreases in the other variable.

c) #2, #3, and #4 each show a straight association.

d) #2 shows a moderately strong association.

e) #1 and #3 each show a very strong association. #1 shows a curved association and #3 shows a straight association.

7. **Association.**

a) Price for each T-Shirt is the explanatory variable, and number of T-Shirts sold is the response variable. The association would be negative, straight (until the price became too high to sell *any* shirts), and moderate. A very low price would likely lead to very high sales, and a very high price would lead to low sales.

b) Depth of the water is the explanatory variable, and water pressure is the response variable. The deeper you dive, the greater the water pressure. The association is positive, straight, and strong. For every 33 feet of depth, the pressure increases by one atmosphere (14.7 psi).

c) Depth of the water is the explanatory variable, and visibility is the response variable. The deeper you dive, the lower the visibility. The association is negative, possibly straight, and moderate if a sample of different bodies of water is used. If the same body of water has visibility measured at different depths, the association would be strong.

d) At first, it appears that there should be no association between weight of elementary school students and score on a reading test. However, with weight as the explanatory variable and score as the response variable, the association is positive, straight, and moderate. Students who weigh more are likely to do better on reading tests because of the lurking variable of age. Certainly, older students generally weigh more and generally are better readers. Therefore, students who weigh more are likely to be better readers. This does not mean that weight causes higher reading scores.

Day 2 Homework Answers:

6. **Association.**

   a) Either weight in grams or weight in ounces could be the explanatory or response variable. Greater weights in grams correspond with greater weights in ounces. The association between weight of apples in grams and weight of apples in ounces would be positive, straight, and perfect. Each apple's weight would simply be measured in two different scales. The points would line up perfectly.

   b) Circumference is the explanatory variable, and weight is the response variable, since one-dimensional circumference explains three-dimensional volume (and therefore weight). For apples of roughly the same size, the association would be positive, straight, and moderately strong. If the sample of apples contained very small and very large apples, the association's true curved form would become apparent.

   c) There would be no association between shoe size and GPA of college freshmen.

   d) Number of miles driven is the explanatory variable, and gallons remaining in the tank is the response variable. The greater the number of miles driven, the less gasoline there is in the tank. If a sample of different cars is used, the association is negative, straight, and moderate. If the data is gathered on different trips with the same car, the association would be strong.

11. Scatterplots.

a) #1 shows little or no association.

b) #4 shows a negative association.

c) #2 and #4 each show a straight association.

d) #3 shows a moderately strong, curved association.

e) #2 and #4 each show a very strong association, although some might classify the association as merely "strong".

13. Correlation?

It would be inappropriate to calculate the correlation for the scatterplot (3), since the association is curved.

14. Matching.

a) 0.006 **b)** 0.777 **c)** - 0.923 **d)** - 0.487

17. Car thefts.

It might be reasonable to say that there is an **association** between the type of car you own and the risk that it will be stolen. The term correlation is reserved for describing linear associations between quantitative variables. Type of car is a categorical variable.

18. Roller coasters.

a) It is appropriate to calculate correlation. Both height of the drop and speed are quantitative variables, the scatterplot shows an association that is straight enough, and there are not outliers.

b) The correlation between height and drop speed would be positive and quite high, perhaps $r = 0.9$.

Finish A-C for HWK

Correlation/Scatterplot Activity

Go to: http://stat.istics.net/

A. Choose "Guessing Correlation" * Note: It is not set up for competition mode.

Match the four correlation value to the appropriate scatter plots, and press "Check Answers"

Run the simulation 10 times. If after 5 simulations you are not getting most of them correct, please let me know so I can help.

Record your final score here: _____

B. Scroll to the bottom and choose "Data Program"

For **each of the four set of data** listed below:

1. "Choose a data set" from the drop-down list. It will show a summary of the data. If you want to see the actual data table you can select "Display/Modify Data".
2. Select "Scatter Plots". Choose an appropriate X and Y axis category, paying attention to which variable is the response (y) variable and which is the explanatory (x) variable.
3. On the back, sketch the scatterplot, and write down the equation and the r value.
4. Explain **in context** what the scatterplot and r value are telling you in terms of form (linear?), direction (negative or positive?), and strength (weak, moderate, strong) of the correlation.
5. For any one of the data sets, switch the x and y axis and describe what happens to the r-value.

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The data sets are as follows:

Cricket Chirps 2007, IBM Stock Prices, NBA All Stars, Athletes Heights and Weights

1. Cricket Chirp 2007 Sketch: Equation: _____ r-value: _____ Explanation: _____ _____ _____ _____ _____	2. IBM Stock Prices Sketch: Equation: _____ r-value: _____ Explanation: _____ _____ _____ _____ _____

3. NBA Allstars Sketch: Equation: _____ r-value: _____ Explanation: _____ _____ _____ _____ _____	4. Athletes Heights and Weights Sketch: Equation: _____ r-value: _____ Explanation: _____ _____ _____ _____ _____

C. In "Data Program" again, select the data set "Survey 1". Choose "Modify/Display Data". Play around with the scatterplots by choosing different pairs of variables to plot. Which pair of variables show the strongest correlation and what is that r-value?
* Remember that the variables must both be quantitative to have a correlation.

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