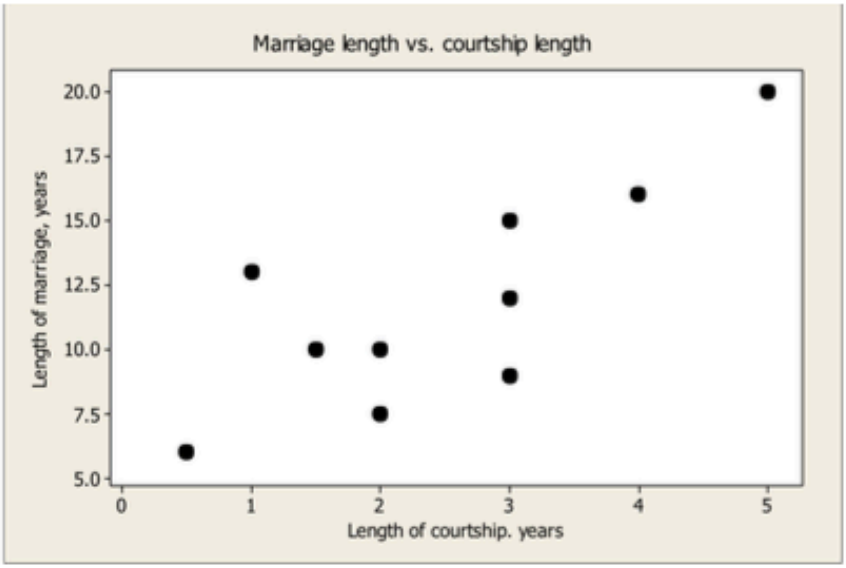
AP Statistics Ch. 3 Test 1718 _____ is correlated with _____
Congress/Renazco
Calculators and Green Packets required Period:

Part II: Free Response. You will be graded on the clarity and completeness of your answers.

1. A certain psychologist counsels people who are getting divorced. A random sample of ten of her patients provided the data in the following scatterplot, where x = number of years of courtship before marriage, and y = number of years of marriage before divorce.



(a) Describe what the scatterplot reveals about the relationship between length of courtship and length of marriage. [5 pts]

(b) Suppose a new point at (4.5, 8), that is, years of courtship = 4.5 and years of marriage = 8, were added to the plot. What effect, if any, will this new point have on the correlation between courtship duration and marriage duration? Explain. [3 pts]

Problem #2 continued below:

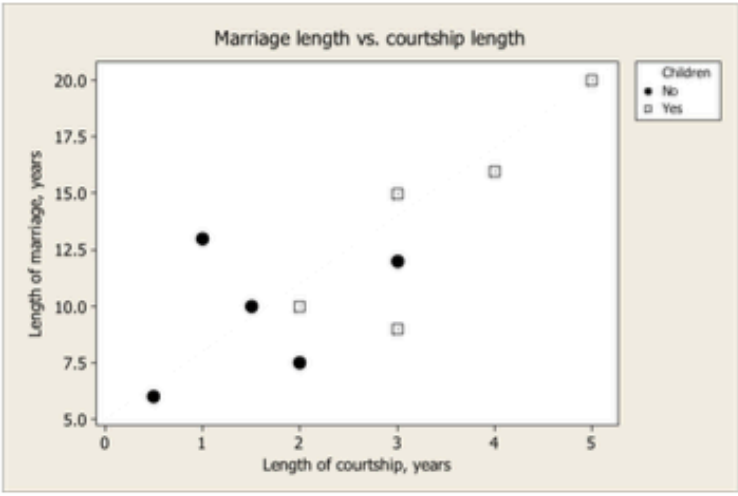
Below is the computer output for the regression of length of marriage *versus* length of courtship.

Predictor	Coef	SE Coef	T	P
Constant	5.710	1.880	3.04	0.016
courtship	2.4559	0.6669	3.68	0.006

S = 2.74982 R-Sq = 62.9% R-Sq(adj) = 58.3%

(c) What is the slope of the regression line? Interpret the slope in the context of this problem. [3 pts]

(d) The psychologist is curious about whether having children has an impact on this relationship. She draws a second scatterplot, with those couples who have children as open squares and couples without children as closed circles.



Comment on the impact that having children has on the relationship between length of courtship and length of marriage for these patients. [3 pts]

2. One weekend, a statistician notices that some of the cars in his neighborhood are very clean and others are quite dirty. He decides to explore this phenomenon, and asks 15 of his neighbors how many times they wash their cars each year and how much they paid in car repair costs last year. His results are in the table below:

	Mean	Standard deviation
x = number of car washes per year	6.4	3.78
y = repairs costs for last year	$955.30	$323.50

The correlation for these to two variables is $r = -0.71$, and a scatterplot reveals a roughly linear relationship.

(a) Find the equation of the least-squares regression line (with y as the response variable).

[4 pts]

(b) What percentage of the variation in repair costs can be explained by the number of times per year a car is washed?

[3 pts]

(c) Based on these data, can we conclude that washing your car frequently will reduce repair costs? Explain.

[2 pts]

3. One of the biggest factors in determining the value of a home is the square footage. The following data represent the square footage and asking price (in thousands of dollars) for a random sample of homes for sale in Naples, Florida, in December 2010.

Square Footage (x)	1148	1096	1142	1288	1322	1466	1344	1544	1494
Asking Price ($000s), y	154	159.9	169	169.9	170	179.9	180	189	189.9

Would it be reasonable to use the least-squares regression line to predict the asking price of a house based on its square footage? Include a graph in your answer.

[4 pts]