Pledge:

10/31/05 MATH 271 - Applied Stats Name: Solution
Dr. Lunsford Quiz 6 (20 points possible)

An English professor was curious to see if she could predict a student's grade in Composition I knowing their grade in Composition II. To answer this she took a random sample of eight students who had taken both Comp. I and Comp. II and recorded their grades (on a 100 point scale) in each class. The data is in the table to your right. A scatterplot of the data is also shown below. Please answer the following questions.

Comp I	Comp II
83	78
97	95
80	83
95	97
73	78
78	72
91	90
86	80

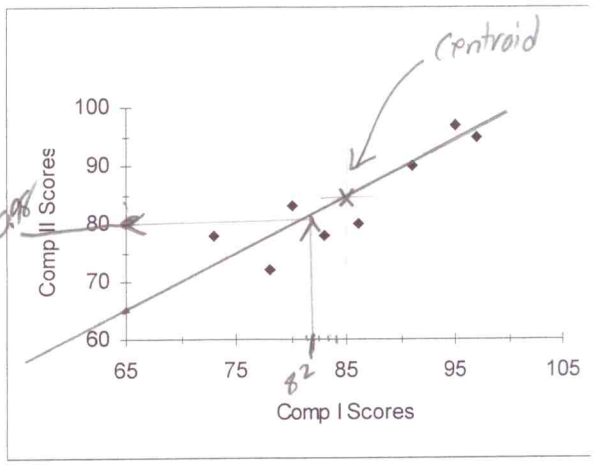
(a) Find the centroid of the data and plot it on the graph. Clearly indicate your answer below. (2 points)

$(\bar{x}, \bar{y}) = (85.375, 84.125)$

(b) Find the sample correlation coefficient of the data. (2 points)

$r = 0.881$

(c) From the scatterplot and value of the correlation coefficient, there appears to be a (circle one): positive negative linear relationship between the Comp. I and Comp. II scores. (1 point)



(d) Formulate a null and alternative hypothesis to test if there is a significant linear relationship between the two variables. Clearly indicate your hypotheses, the meaning of any parameters in the hypotheses, the value of the test statistic, the p-value of the test, and your conclusion (use an $\alpha = 0.05$ level for your test). You should use the word "significant" in your conclusion. (6 points)

$H_0: \rho = 0$
$H_1: \rho \neq 0$
ρ is population corr. coef.

$t = 4.56$
p-value = .0038
p-value $< \alpha \Rightarrow$ reject H_0 in favor of altern.
$\therefore$ there is a significant correlation (linear relationship) between the two variables.

(e) Find the equation of the regression line for the data and accurately plot it on the graph above. Clearly indicate the equation of the line below. Note that the vertical axis is at $x = 65$ points. (4 points)

$y = 4.746 + 0.9298x$ | $y = 65.183$ when $x = 65$

(f) Use the regression line to predict a student's Comp II score if their Comp I score is 82. Show this prediction on the graph. (3 points)

$y = 4.746 + 0.9298(82) = 80.9896$

(g) Complete the following sentence: If a student increases their Comp I score by one point then this model predicts an (circle one) increase decrease of 0.9298 points in their Comp II score. (2 points)

BONUS: What was the best Halloween costume you ever wore? (2 points) Bugs Bunny