Homework Chapter 13

Due Monday, April 9, 2012

1. **Your are given the following information for the variables Y and X: n=8,**
   $\sum x = 770, \sum y = 635, \sum yx = 61650, \sum x^2 = 74900, \sum y^2 = 51225$
   a. **Compute the correlation coefficient. Test to determine whether the correlation is significant at 5% level.**
   b. **Compute the regression equation and interpret the regression coefficients.**
   c. **Test to determine whether the true value of the slope is equal zero using 5% level of significance.**
   d. **Find the value of the coefficient of determination and interpret it.**
   e. **Construct a 90% confidence interval for the true value of the slope.**
   f. **Construct a 95% confidence interval for average value of y if x=100.**

2. **At a University, study was done to establish whether a relationship existed between student's GPA when graduating and SAT score when entering the university. The sample data are reported as follows:**

GPA	2.5	3.2	3.5	2.8	3.0	2.4	3.4	2.9	2.7	3.8
SAT	640	700	550	540	620	490	710	600	505	710

   a. **Develop a scatter plot for these data and describe what, if any relationship exists.**
   b. **Compute the correlation coefficient. Test to determine whether the correlation is significant at 5% level.**
   c. **Compute the regression equation and interpret the regression coefficients.**
   d. **Test to determine whether the true value of the slope is equal zero using 1% level of significance.**
   e. **Use the F test to test the hypothesis in part d, using 10% level of significance.**
   f. **Consider the Decision you made in part d. Describe the type of hypothesis test error that you could have been made.**
   g. **Find the value of the coefficient of determination and interpret it.**
   h. **Construct a 90% confidence interval for the true value of the slope.**
   i. **Construct a 95% predication interval estimate for individual value of y if x=650.**

You may use the following computer output to answer the above the questions.

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The regression equation is
GPA = 0.977 + 0.00337 SAT


Predictor       Coef   SE Coef      T      P
Constant      0.9772    0.9123   1.07  0.315
SAT         0.003368  0.001492   2.26  0.054


S = 0.374380   R-Sq = 38.9%   R-Sq(adj) = 31.3%


Analysis of Variance

Source           DF      SS      MS     F      P
Regression        1  0.7147  0.7147  5.10  0.054
Residual Error    8  1.1213  0.1402
Total             9  1.8360
```

3. **A company recently did a study of its customers. A random sample of 50 customer accounts was pulled from computer records. Two variables were observed. The following statistics were computed.**

$$\hat{y} = 2140.23 - 10.12x$$

$$s_{b_1} = 3.12$$

   a. **Interpret the regression coefficients**.
   b. **Using a significance level of 1%, test to determine whether there is a linear relationship between the two variables.**
   c. **Test the hypothesis that the value of the slope is more than 2.5.**
   d. **Construct a 95% confidence interval for the true values of the slope.**