# MA 2612 Test 2 B '03

**NAME:** _____

1. Figures 1 and 2 display SAS output from the regression of scores from the first test (test1) on scores from the first homework (hw1) for the 41 students in a statistics course.

   (a) **(10 points)** What is the response? The predictor? The regressor?

   (b) **(10 points)** Write out the equation of the fitted model. Interpret the slope.

   (c) **(10 points)** Is it wise to interpret the intercept? Why or why not? If it is, Interpret the intercept.

(d) **(10 points)** Construct a 95% confidence interval for the slope. Does the result indicate that there is a significant relationship between TEST1 and HW1?

(e) **(10 points)** By what proportion is the uncertainty in predicting the response reduced by using the regression model?

(f) **(10 points)** What is the Pearson correlation between TEST1 and HW1?

(g) **(10 points)** Evaluate the quality of the fit.

(h) **(10 points)** Estimate the standard deviation of the random errors.

(i) **(10 points)** Obtain a point estimate and a level 0.95 confidence interval for the mean response for a student having a 60 on the homework, if the mean and variance of the homework scores are 68.0304 and 310.9280, respectively.

2. **(10 points)** From the article "Study Says Rigor of High-School Course Work Is the Best Predictor of College Graduation," by Ben Gose, Chronicle of Higher Education, XLV, 39, June 4, 1999, p. A46, which details a study conducted by the U¿S¿ Dept. of Education purporting to show that the rigor of a student's high school curriculum is a better predictor of whether the student will graduate from college than either test scores or high school grades. The following is a quote from the article:

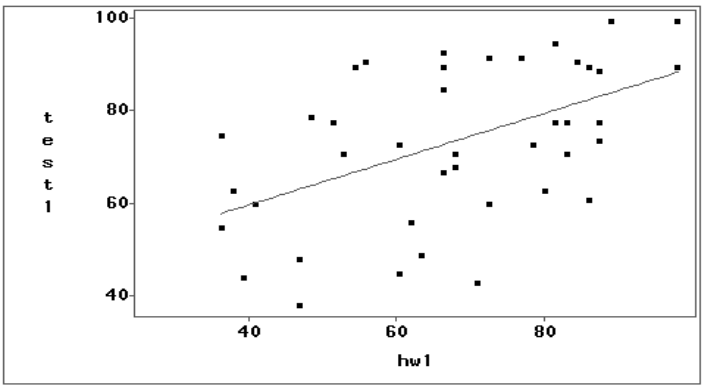
   *Clifford Adelman, the senior research analyst who led the study, spent two years examining the transcripts and test scores of students who graduated from high school in 1982 to determine what contributes most to the completion of a bachelor's degree.*

   *Mr. Adelman established college graduation by the age of 30 as a benchmark. He then worked backward to see which measure of preparedness for college-the student's test scores, class rank, or course work- had the strongest correlation with the earning of a bachelor's degree.*

   *The study was reviewed by Alberto F. Cabrera, an associate professor and research associate at the Center for the Study of Higher Education at Pennsylvania State University. Mr. Cabrera says the study should pursuade high-school guidance counselors to encourage as many students as possible to take demanding courses. "The findings make a clear point that the type of courses a student takes has a long-term effect on the student's success," Mr. Cabrera says.*

   Do you agree with Mr. Cabrera? If so, what in the study's description substantiates his conclusion? If not, tell why his conclusion is unjustified.

| Model Equation | | | | |
|---|---|---|---|---|
| test1 | = | 39.7213 | + | 0.4942 hw1 |




| Parametric Regression Fit | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Model | | Error | | | | |
| Curve | Degree(Polynomial) | DF | Mean Square | DF | Mean Square | R-Square | F Stat | P |
| | 1 | 1 | 3037.1519 | 39 | 222.7197 | 0.2591 | 13.64 | |

| Summary of Fit | | | |
|---|---|---|---|
| Mean of Response | 73.3415 | R-Square | 0.2591 |
| Root MSE | 14.9238 | Adj R-Sq | 0.2401 |

| Parameter Estimates | | | | | | | |
|---|---|---|---|---|---|---|---|
| Variable | DF | Estimate | Std Error | t Stat | Pr >\|t\| | Tolerance | Var Inflation |
| Intercept | 1 | 39.7213 | 9.3979 | 4.23 | 0.0001 | . | 0 |
| hw1 | 1 | 0.4942 | 0.1338 | 3.69 | 0.0007 | 1.0000 | 1.0000 |

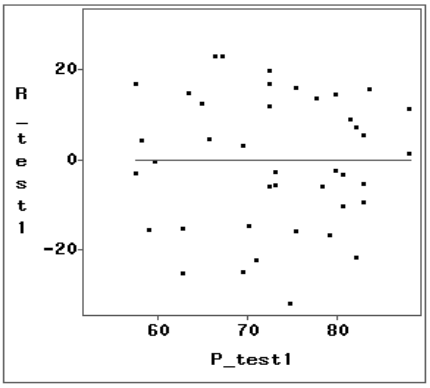
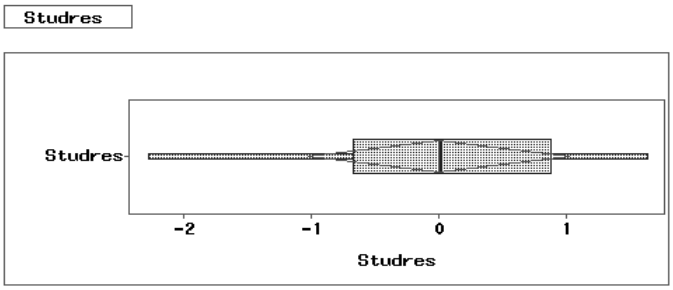
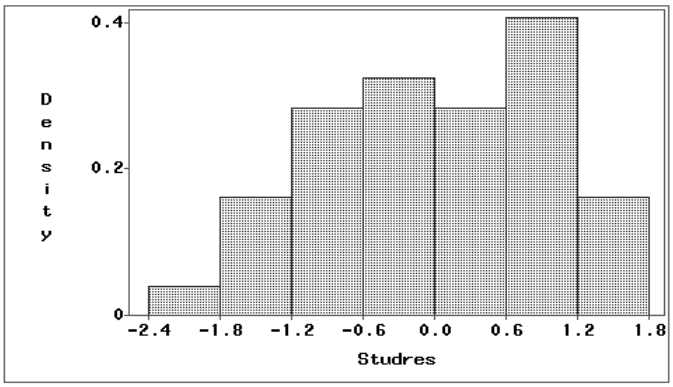
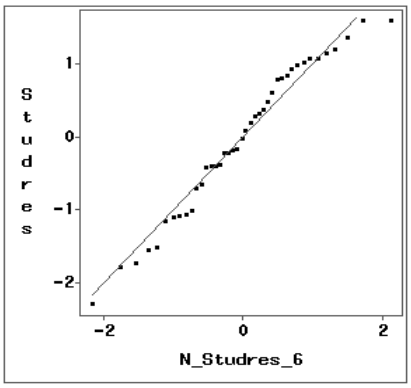



Figure 1: *Regression output 1.*




| Moments | | | |
|---|---|---|---|
| N | 41.0000 | Sum Wgts | 41.0000 |
| Mean | -0.0025 | Sum | -0.1032 |
| Std Dev | 1.0242 | Variance | 1.0490 |
| Skewness | -0.3060 | Kurtosis | -0.7831 |
| USS | 41.9594 | CSS | 41.9591 |
| CV | -40684.167 | Std Mean | 0.1600 |

| Quantiles | | | |
|---|---|---|---|
| 100% Max | 1.6436 | 99.0% | 1.6436 |
| 75% Q3 | 0.8772 | 97.5% | 1.6277 |
| 50% Med | 0.0043 | 95.0% | 1.3963 |
| 25% Q1 | -0.6735 | 90.0% | 1.1820 |
| 0% Min | -2.2793 | 10.0% | -1.4954 |
| Range | 3.9229 | 5.0% | -1.7190 |
| Q3-Q1 | 1.5507 | 2.5% | -1.7697 |
| Mode | . | 1.0% | -2.2793 |

| Normal QQ Ref Lines | | |
|---|---|---|
| Line | Intercept | Slope |
| | 0 | 1.0000 |

Figure 2: *Regression output 2.*