

Econ 120B  
Winter 1998

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Second Midterm (30%)

Your name (please print it) \_\_\_\_\_

Your Student Id. (NOT Soc. Sec. no.) \_\_\_\_\_

**DO NOT TURN THE PAGE UNTIL EVERYONE HAS RECEIVED THE EXAM AND YOU ARE GIVEN THE SIGNAL TO START. ALSO, YOU MUST STOP WRITING WHEN YOU ARE ASKED TO DO SO (YOU WILL BE GIVEN A 2 MINUTE WARNING). TEN POINTS WILL BE DEDUCTED FOR EACH MINUTE OF EXTRA TIME IT TAKES YOU TO STOP WRITING.**

**If you use a pencil, you forfeit the right to complain about grading UNLESS YOU PICK UP THE EXAM FROM THE TA FROM HIS/HER OFFICE AND LOOK AT THE GRADING BEFORE LEAVING THE OFFICE.**

**Make sure that all pages (1 through 4) are there. Read the questions carefully and make sure that you do not misunderstand them. If you get stuck somewhere, don't waste time but move on.**

**IN THE HYPOTHESIS TESTING PARTS, DON'T ASK ME WHETHER THE TEST IS ONE-SIDED OR TWO-SIDED. YOU HAVE TO FIGURE THAT OUT FOR YOURSELF FROM THE INFORMATION PROVIDED.**

**I CONSIDER CHEATING AS A VERY SERIOUS MATTER AND WILL GIVE AN F IN THE COURSE TO ANY ONE CHEATING AND ALSO REFER HIM/HER TO THE DEAN FOR DISCIPLINARY ACTION.**

**MAXIMUM NUMBER OF POINTS = 50**

**I.**

The Registrar's Office at UCSD supplied me with the data for 427 first year undergraduate students on the GPA in college (COLGPA, the dependent variable), GPA in high school (HSGPA), Verbal SAT scores (VSAT), and math SAT scores (MSAT). Three alternative models were estimated and the results are in the following table. Values in parentheses are standard errors. Model A used HSGPA for X, Model B used VSAT, and Model C used MSAT.

Variables	Model A	Model B	Model C
$\hat{\alpha}$ ) constant	0.921 (0.204)	1.997 (0.141)	1.628 (0.151)
$\hat{\beta}$ ) HSGPA	0.524 (0.057)		
$\hat{\beta}$ ) VSAT		0.00157 (0.00028)	
$\hat{\beta}$ ) MSAT			0.0020 (0.00026)
ESS	103.994	115.837	109.180
TSS	124.599	124.599	124.599

**I.a (6 points)** In a regression model of the type specified in Assumption 1, indicate two things that the goodness of fit ( $R^2$ ) measures.

**I.b (10 points)** For each model, compute the goodness of fit measure. Do the values indicate a good fit or not? Which model is the "best" and why?

I want to test Model A only for overall goodness of fit.

- I.c (2 points) State the null and alternative hypotheses.
- I.d (4 points) Compute the test statistic and state its distribution under the null, including the numerical value(s) of the degrees of freedom (d.f.).
- I.e (10 points) For Model A only test whether each of the regression coefficients is zero or not (use 1 percent level of significance). Be sure to state the null and alternative hypotheses, the test statistic and its distribution, including the d.f., the critical value (or range) and the criterion for rejection. Are the coefficients significantly different from zero or not?
- I.f (5 points) Suggest a more general multiple regression model that is likely to be better than all of the above models. Explain "better" in what sense.

**II.**

A company claims that the average breaking point ( $\mu$ ) of its suitcases is over 300 lbs. A random sample of 9 suitcases was tested and it was found that the sample average  $\bar{x}$  was 305 and the sample variance was 100. Assuming that the breaking strengths are normally distributed test the company's claim by following the steps given below.

**II.a (5 points) Compute the test statistic and state its distribution and d.f.**

**II.b (4 points) State the critical value at the 5 percent level of significance, carry out the test, and state whether the company's claim is valid or not.**

**II.c (4 points) Construct the 95 percent confidence interval for  $\mu$ .**