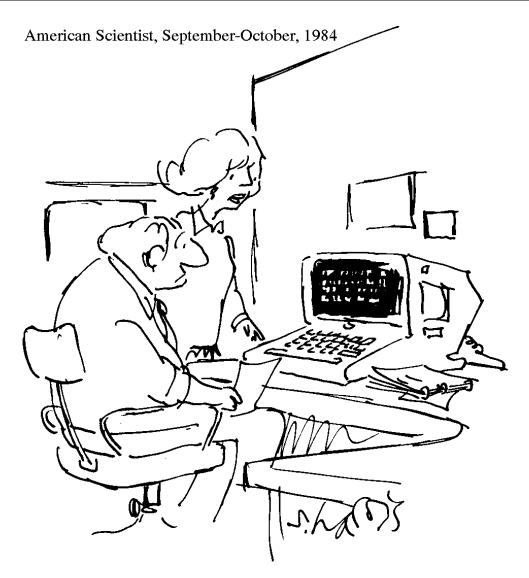
HOMEWORK ASSIGNMENT 5	Assigned: October 27, 2005
	Due: November 3, 2005
	10 Points – 1 point each day late

Steroid use problem from chapter 8.				
The data is in dataset ''http://www.stat.lsu.edu/EXSTWeb/statlab/datasets/nknwdata/CH08PR06.txt''.				
A) 8.6	All parts			
B) 8.7	All parts			



"It figures. If there's artificial intelligence, there's bound to be some artificial stupidity."

EXST7034 - Regression Techniques Fall 1998

8.6. **Steroid level.** An endocrinologist was interested in exploring the relationship between the level of a steroid (Y) and age (X) in healthy female subjects whose ages ranged from 8 to 25 years. She collected a sample of 27 healthy females in this age range. The data are given below:

i:	1	2	3	 25	26	27
X_i :	23	19	25 21.9	 13	14	18

- a. Fit regression model (8.2). Plot the fitted regression function and the data. Does the quadratic regression function appear to be a good fit here? Find R^2 .
- b. Test whether or not there is a regression relation; use $\alpha = .01$. State the alternatives, decision rule, and conclusion. What is the *P*-value of the test?
- c. Obtain joint interval estimates for the mean steroid level of females aged 10, 15, and 20, respectively. Use the most efficient simultaneous estimation procedure and a 99 percent family confidence coefficient. Interpret your intervals.
- d. Predict the steroid levels of females aged 15 using a 99 percent prediction interval. Interpret your interval.
- e. Test whether the quadratic term can be dropped from the model; use $\alpha = .01$. State the alternatives, decision rule, and conclusion.
- f. Express the fitted regression function obtained in part (a) in terms of the original variable X.
- 8.7. Refer to Steroid level Problem 8.6.
 - a. Obtain the residuals and plot them against the fitted values and against *x* on separate graphs. Also prepare a normal probability plot. What do your plots show?
 - b. Test formally for lack of fit. Control the risk of a Type I error at .01. State the alternatives, decision rule, and conclusion. What assumptions did you make implicitly in this test?