STAT 516 - Spring 2003 - Homework 1
Due: Wednesday, January 29th

1) *(2 points)* In each case remember to correct the statement if it is false.

Page 152-153: 1, 2, 6
Page 213-214: 8

2) *(3 points)* A 1995 study of language impaired children compared the deviation intelligence quotient of a sample of 5 year old specifically language impaired (SLI) children and 5 year old normally developing (ND) children. It resulted in the data:

SLI: 86   86   94   98   89   84   110   107   87   95
ND   110   113   113   109   92   108   95   87   94   98

Use SAS to conduct a two-sample t-test of H_0: $\mu_{sli}=\mu_{nd}$ vs. H_A: $\mu_{sli} < \mu_{nd}$ at $\alpha=0.05$.   Make sure to give the SAS code, report the p-value for testing these hypotheses (you need to adjust the one SAS gives you), state your conclusion, check the assumptions, and say whether you can trust your conclusion.

3) *(5 points)* One of the earliest places that regression was discussed was in a paper entitled "Typical Laws of Heredity" that was delivered by Sir Francis Galton in 1877. Galton categorized his sweet pea plants by the size of the seeds they produced (measuring the diameter in hundredths of an inch). Using parent pea plants of several different sizes, he arranged for 90 pea plants to be grown from each size (by forcing several friends to help). Although several of the offspring didn't make it, he measured the average diameter of the peas for the plants that did survive.   A portion of this data was:

Diameter of Parent Peas	Mean Diameter of Offspring Peas
19	16.37
18	16.40
17	16.13
16	16.17
15	15.98

Both by hand and SAS, calculate the estimated regression line and $\sqrt{MSE}$ for predicting the mean offspring diameter from that of the parent. Briefly interpret the estimated slope and the estimated $\sqrt{MSE}$. Also say whether or not you would expect the $\sqrt{MSE}$ to be larger or smaller if you had all 450 individual measurements for the peas and briefly (in a sentence or two) say why.