This is an open book quiz. You are allowed to use your text, handouts and notes. Other books, laptops, PDA's and text messaging devices are prohibited. Calculators are permitted. Be sure to give complete explanations to receive full credit. There are [30] total points.



Difference between two population means. Enterprise Enterprises manufactures microchips. Fifty of their new computer chips were tested for speed in a certain application. The average speed in GHz for the new chip was 4.956 and the standard deviation was 0.194. A sample of 60 older chips had an average speed of 3.908 GHz with a standard deviation of 0.172 GHz. Does the data provide convincing evidence that the new chip averages more than 1.000 GHz faster than the old one?

a. [6] State the appropriate null and alternative hypotheses. Give the formula for the computed value of the test statistic. What assumptions are you making on the data that makes your choice of test statistic appropriate?

b. [16] Find the P-value. What conclusions do you reach if the significance level is $\alpha = .05$?

c. [8] If a level $\alpha = .05$ test is used, estimate the probability of a Type II error when actually the new chip is on average 1.100 GHz faster than the old one?