

Stat 145 (Multivariate Statistics)

Laboratory Exercise No. 2

INSTRUCTIONS: Answer the following as indicated.

1. The scores obtained by college students on the College Level Examination Program (CLEP) subtest X_1 and the College Qualification Test (CQT) subtests X_2 and X_3 are given in the file *College Test Data.xlsx*. X_1 for science and history, X_2 = verbal, and X_3 = science. Suppose $\boldsymbol{\mu}_0 = [500 \ 50 \ 30]'$ represents average scores for thousands of college students over the last 10 years. At the 5% level of significance, is there reason to believe that the recent cohort of students are scoring differently in these three tests? Explain.
2. Using the same data set in (1), test if male and female students score differently in these tests. Use a 5% level of significance.
3. To compare two types of coating for resistance to corrosion, 15 pieces of pipe were coated with each type of coating. Two pipes, one with each type of coating, were buried together and left for the same length of time at 15 different locations. Corrosion for the first type of coating was measured by two variables: Y_1 = maximum depth of pit in thousandths of an inch, and Y_2 = number of pits. The variables X_1 and X_2 are defined analogously for the second coating. The data is stored in the file *Coating.xlsx*. Test the appropriate hypothesis at the 5% level of significance. Draw the appropriate conclusion.