Lab Assignment Math 220 (Two pages)

1. A study compared the breaking strength of fabrics treated by two commercial durable press processes. Five swathes of the same fabric were assigned at random to one process and the remaining seven swathes were assigned to the other process. Here are the data, in pounds of pull needed to tear the fabric.

Permafresh: 29.9, 30.7, 30.0, 29.5, 27.6

Hylite: 28.8, 23.9, 27.0,22.1, 24.2, 23.2, 25.5.

1). Get a 95% CI for the mean difference in breaking strength of this fabric treated by the two processes.

The CI for $\mu_1 - \mu_2$ is $(2.29, 6.88)$.

2). Test if the two processes produce different mean breaking strengths for this fabric. Write down H_0, H_1, the test statistic and the p-value. You can assume the two population variances are not equal.

$H_0 : \mu_1 = \mu_2$,

$H_1 : \mu_1 \neq \mu_2$.

The t test statistic is 4.497,

the p-value for this test is 0.001.

3). What the p-value would be if you want to test if the Permafresh process is more superior than the Hylite process?

$H_0 : \mu_1 = \mu_2$,

$H_1 : \mu_1 > \mu_2$.

For this one tailed test, the p-value would be 0.001/2=0.0005.

2. Matched pair design: A sample of 5 third-graders took a reading test. Then they participated in a reading improvement program and then took the reading test again. Below are the test scores for each of the 5 students both before and after the program.

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student 1     2     3     4     5
After   67    68    78    75    84
Before  59    63    81    74    78
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1). Get a 95% confidence interval for $\mu_1 - \mu_2$, where μ_1 indicates the mean score after the program, μ_2 indicates the mean score before the program.

The CI is (-2.05, 8.85).

2). Test if the program improves the mean reading score. Write down H_0, H_1, the test statistic and the P-value. What is your conclusion?

$H_0 : \mu_1 = \mu_2$,

$H_1 : \mu_1 > \mu_2$.

The test statistic is $t = 1.731$, p -value $= 0.159/2 = 0.08$.