Stat 401, HW 9

Problems on the Paired t-test

Do the following problems from the text.

§9.3 - 39(b), 40(a),(b)

For 39(b) enter the differences in L1 and do a 1-sample t-test on L1.

For 40 enter the pipe data in L1 and the brush data in L2. Put the cursor at the very top of L3 (on the name L3). Then enter L1-L2. This will store the differences between the entries in L1 and L2 in the column L3.

Problems on ANOVA

Do §10.1 - 9.

Enter the data in L1,L2,L3,L4 then

STATS → TESTS → F:ANOVA → ENTER →
ANOVA(L1,L2,L3,L4) → ENTER.

An extra good citizen's problem (Problem 2 from Midterm 2 in spring 2004).

2. Specimens of milk from four diaries in each of three different districts were analysed and the concentration of the radioactive isotope strontium-90 measured in each specimen. The following results were obtained.

District 1	6.4	5.8	6.5	7.7
District 2	7.1	9.9	11.2	10.5
District 3	9.5	9.0	9.0	12.1

Determine whether we can accept the hypothesis that the three districts have identical concentrations of strontium-90. Take $\alpha = .05$.

Two Harder Extra Problems

1. Assume the following

Theorem 1. *If all the means are equal (H_0 is true) then the random variable $F = \frac{MSTr}{MSE}$ has F distribution with $I - 1$ numerator degrees of freedom and $I(J_1)$ denominator degrees of freedom.*

Prove that the ANOVA F-test has significance level α (i.e. Type I error probability equal to α.

2. Let $\Psi(x)$ be the cdf for a random variable F with $I - 1$ numerator degrees of freedom and $I(J - 1)$ denominator degrees of freedom. Assume that we have taken samples from each population and we have obtained the number $f = mstr/mse$. Find a formula for the $P - value$ for the ANOVA F-test in terms of $\Psi(f)$.