Name __KEY__

**Instructions:** Show all work. You may use your calculator rather than compute formulas by hand, but if you do, 'show work' by saying which program you used to obtain the result and what information you entered. Round measures of center to one decimal place more than the data, and variance/standard deviation to two decimal places more than the original data. Round probabilities to three decimal places (or percent plus one decimal place).

1. Consider the paired data for 8 test subjects (the subjects were concrete blocks).

	1	2	3	4	5	6	7	8
Normal	42.8	49.0	44.1	50.1	51.4	43.1	46.8	47.7
High	93.1	90.3	88.1	93.2	90.1	88.2	91.0	90.1

a. Construct a comparative boxplot for the data.

normal

 high
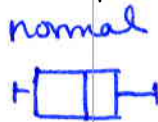
b. Estimate the true average peak stresses for the two types of concrete being measured. Does it appear plausible that the two average tolerance levels are the same?

$\bar{X}_1 = 46.875$

$S_{x_1} = 3.265$

$\bar{X}_2 = 90.513$

$S_{x_2} = 1.916$

no it does not
St. dev's are much smaller than difference between them

2. In an experiment to compare the tensile strengths of I=5 different types of copper wire, J=4 samples of each type were used. The between-samples and within-samples estimates of σ^2 were computed to be MSTr=3388.9 and MSE=1348.2, respectively. Use the F test at a level of $\alpha=0.05$ to test whether the sample means are all identical, or if at least one is unequal. Find the p-value for the test.

$$F = \frac{MSTr}{MSE} = 2.51$$

$$Fcdf(2.51, E99, 4, 3(5)) = .085855... > \alpha = .05$$

fail to reject H_0

all μ_i's are the "Same"