Your name(s):

Day 13: One and Two Sample Hypothesis Tests
Sec 4.4-4.5

1. Suppose you have a sample of size 9 from a normal distribution with variance 25. You want to test the null hypothesis that the mean is 20 against the alternative hypothesis that the mean is not 20. If you obtain a sample mean of 19, Is there evidence to support the claim that the mean is not 20, using $\alpha = .05$? What is the p-value of this test?

2. Strings!

   (a) For both the male and female string-length data collected in class (dig out your Excel files), determine a 95% two-sided confidence interval for the mean μ of the population from which these samples were drawn.

   (b) Test the hypotheses that these mean's are equal to 12 inches in the following way: test $H_0 : \mu = 12$ versus the one-sided alternative $H_a : \mu > 12$. Record the p-values for your test. What do you conclude?

   (c) For both the male and female string-length data collected in class, determine a 95% two-sided confidence interval for the *difference in population means* for the populations from which these samples were drawn. What do you infer?

   (d) Test the hypothesis that the variances are equal between the male and female string-length data, against the two-sided alternative that they are not equal. What do you conclude?

   (e) Test the hypothesis that the means are equal between the male and female string-length data, against the two-sided alternative that they are not equal. What assumptions are you making? What do you conclude?

3. The performance between two sections of physics on an examination were compared. The following data was collected:

Group	n	$\bar{x}$	s
Section 1	54	58	15
Section 2	30	53	13

   Test the hypothesis that these two means are the same by working through the following parts.

   (a) List the assumptions that you must make to perform the test and assess their plausibility.

   (b) Compute the relevant test statistic and its p-value for the two-sided test of the hypothesis that the difference of means is zero.

   (c) Do you accept or reject the hypothesis at the 95% significance level?

4. One might hypothesize that performance on exams will be better in the 10:00 section of a course than the 8:00 section because more students attend the later section and are (presumably) more awake. The following data presents the cumulative performance on the first three exams in a certain course with multiple sections ($\bar{x}$ is the average of the total score across three examinations):

Group	n	$\bar{x}$	s
8:00	23	223	34
10:00	30	238	35

Test the hypothesis that these two means are the same by working through the following parts:

(a) List the assumptions that you must make to perform the test and assess their plausibility.

(b) Compute the relevant test statistic and its p-value for the one-sided test of the hypothesis that the difference of means is zero, against the alternative that the mean at 10:00 is greater than that at 8:00.

(c) Do you accept or reject the hypothesis at the 95% significance level?