<u>Ch10</u>

1) Assume that you have a sample of n1=9, with the sample mean X_1=45, and a sample standard deviation of S_1=6, and you have an independent sample of n2=12 from another population with a sample mean of X_2=31 and the sample standard deviation S_2=8. Complete parts (a) through (d).

a. What is the value of the pooled-variance t_{STAT} test statistic for testing H_0: μ1=μ2?

t_{STAT}= [ ]

(Type an integer or a decimal rounded to four decimal places as needed.)

b. In finding the critical value $t_{\alpha/2}$, how many degrees of freedom are there?

degrees of freedom [ ]

c. Using a significance level of α=0.005, what is the critical value for a one-tail test of the hypothesis H_0: μ1≤ μ2 against the alternative H_1: μ1>μ2?

The critical value is [ ]

(Type an integer or a decimal rounded to four decimal places as needed.)

d. What is your statistical decision?

A. Reject H_0 because the computed t_{STAT} test statistic is less than the upper-tail critical value.
B. Do not reject H_0 because the computed t_{STAT} test statistic is greater than the upper-tail critical value.
C. Reject H_0 because the computed t_{STAT} test statistic is greater than the upper-tail critical value.
D. Do not reject H_0 because the computed t_{STAT} test statistic is less than the upper-tail critical value.

---

2)Assume that you have a sample of n_1=8, with the sample mean X_1=42, and a sample standard deviation of S_1=4, and you have an independent sample of n_2=15 from another population with a sample mean of X_2=34 and a sample standard deviation of S_2=5. What assumptions about the two populations are necessary in order to perform thepooled-variance t test for the hypothesis H0: μ1=μ2 against the alternative H1: μ1>μ2 and make a statistical decision?

<u>Choose the correct answer below</u>:

A.It is necessary to assume that the populations from which you are sampling have unequal variances and equal sizes.
B.It is necessary to assume that the populations from which you are sampling have negative t_{STAT} test statistics and unequal sample means.
C.It is necessary to assume that the populations from which you are sampling have equal population means and positive standard deviations.
D.It is necessary to assume that the populations from which you are sampling have independent normal distributions and equal variances.

---

3)Assume that you have a sample of n_1=9,with the sample mean X_1=47, and a sample standard deviation of S_1=7, and you have an independent sample of n_2=13 from another population with a sample mean of X_2=30, and the sample standard deviationS_2=8. Construct a 95% confidence interval estimate of the population mean difference between μ1 and μ2.

[ ] ≤μ1−μ2≤ [ ]

(Type an integer or decimal rounded to two decimal places as needed.)

4)A survey of 700 adults from a certain region asked, "What do you buy from your mobile device?" The results indicated that 52% of the females and 40% of the males answered clothes. The sample sizes of males and females were not provided. Suppose that of 300 females, 156 reported they buy clothing from their mobile device, while of 400 males, 160 reported they buy clothing from their mobile device. Complete parts (a) through (d) below.

a. Is there evidence of a difference between males and females in the proportion who said they buy clothing from their mobile device at the 0.1 level of significance?

*State the null and alternative hypotheses, where $\pi 1$ is the population proportion of females who said they buy clothing from their mobile device and $\pi 2$

A. $H0: \pi 1=\pi 2$ $H1: \pi 1>\pi 2$
B. $H0: \pi 1=\pi 2$ $H1: \pi 1<\pi 2$
C. $H0: \pi 1=\pi 2$ $H1: \pi 1\neq\pi 2$
D. $H0: \pi 1\neq\pi 2$ $H1: \pi 1=\pi 2$
E. $H0: \pi 1\neq\pi 2$ $H1: \pi 1<\pi 2$
F. $H0: \pi 1\neq\pi 2$ $H1: \pi 1=\pi 2$

*Determine the value of the test statistic.

Z_{STAT} = ☐

(Type an integer or a decimal. Round to two decimal places as needed.)

*Determine the critical value(s) for this test of hypothesis.

The critical value(s) is (are) ☐

(Type integers or decimals. Round to two decimal places as needed. Use a comma to separate answers as needed.)

*State the conclusion:

Reject the null hypothesis. There is sufficient evidence to support the claim that there is a difference between males and females in the proportion who said they buy clothing from their mobile device

b. Find the p-value in (a).

The p-value in part (a) is ☐

(Type an integer or a decimal. Round to three decimal places as needed.)

c. Construct and interpret a 90% confidence interval estimate for the difference between the proportion of males and females who said they buy clothing from their mobile device .

The confidence interval is ☐ to ☐

(Type integers or decimals. Round to four decimal places as needed. Use ascending order.)

*What does the confidence interval mean?

A researcher can be 90% confident that the difference in the population proportions of males and females who said they buy clothing from their device is 95%, contained in less than the lower bound of greater than the upper bound of the interval.

5)The following information is available for two samples selected from independent normally distributed populations.

Population A: n1=25 S^2_1=36

Population B: n2=25 S^2_2=9

a. Which sample variance do you place in the numerator of F_{STAT}?

A. S^2_2=9

B. S^2_1=36

b. What is the value of F_{STAT}?

F_{STAT} = [ ]

(Round to two decimal places as needed.)

---

6)An experiment has a single factor with six groups and two values in each group. In determining the among-group variation, there are 5 degrees of freedom. In determining the within-group variation, there are 6 degrees of freedom. In determining the total variation, there are 11 degrees of freedom.

a. If SSA=200 and SST=248 , what is SSW?

SSW= [48] (Type an integer or a decimal.)

b. What is MSA?

MSA= [40] (Type an integer or a decimal.)

c. What is MSW?

MSW= [88] (Type an integer or a decimal.)

d. What is the value of F_{STAT}?

F_{STAT}= [5] (Type an integer or a decimal.)

---

7)An experiment has a single factor with six groups and two values in each group. In determining the among-group variation, there are 5 degrees of freedom. In determining thewithin-group variation, there are 6 degrees of freedom. In determining the total variation ,there are 11 degrees of freedom. Also, note that: SSA=105, SSW=42, SST=147, MSA=21, MSW=7, and F_{STAT}=3. Complete parts (a) through (d).

a. Construct the ANOVA summary table and fill in all values in the table.

Source	Degrees of Freedom	Sum of Squares	Mean Square (Variance)	F
Among groups	5	105	21	3
Within groups	6	42	7	
Total	11	147		

(Simplify your answers.)

b. At the 0.025 level of significance, what is the upper-tail critical value from the F distribution?

$F_{0.025}$= [5.99]

(Round to two decimal places as needed.)

c. State the decision rule for testing the null hypothesis that all six groups have equal population means Reject H_0 if **F_{STAT}>5.99**

d. What is your statistical decision?

Since F_{STAT} is **less than** the upper-tail critical value, **do not reject** H_0 There is **insufficien**t evidence to conclude there is a difference in the population means for the six groups.