

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Solve the problem.

- 1) The table shows the number satisfied in their work in a sample of working adults with a college education and in a sample of working adults without a college education. Assume that you plan to use a significance level of $\alpha = 0.05$ to test the claim that $p_1 > p_2$. Find the critical value(s) for this hypothesis test. Do the data provide sufficient evidence that a greater proportion of those with a college education are satisfied in their work? 1) _____

	College Education	No College Education
Number in sample	143	133
Number satisfied in their work	71	66

- A) $z = -1.645$; yes B) $z = 1.645$; no C) $z = \pm 1.96$; no D) $z = 1.96$; yes

- 2) The table shows the number of pitchers with E.R.A's below 3.5 in a random sample of sixty pitchers from the National League and in a random sample of fifty-two pitchers from the American League. Assume that you plan to use a significance level of $\alpha = 0.05$ to test the claim that $p_1 \neq p_2$. Find the critical value(s) for this hypothesis test. Do the data support the claim that the proportion of National League pitchers with an E.R.A. below 3.5 differs from the proportion of American League pitchers with an E.R.A. below 3.5? 2) _____

	National League	American League
Number of pitchers in sample	60	52
Number of pitchers with E.R.A. below 3.5	10	10

- A) $z = \pm 2.575$; no B) $z = \pm 1.96$; no C) $z = \pm 1.645$; yes D) $z = 1.645$; yes

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Use the traditional method to test the given hypothesis. Assume that the samples are independent and that they have been randomly selected

- 3) Use the given sample data to test the claim that $p_1 > p_2$. Use a significance level of 0.01. 3) _____

Sample 1	Sample 2
$n_1 = 85$	$n_2 = 90$
$x_1 = 38$	$x_2 = 23$

- 4) A marketing survey involves product recognition in New York and California. Of 558 New Yorkers surveyed, 193 knew the product while 196 out of 614 Californians knew the product. At the 0.05 significance level, test the claim that the recognition rates are the same in both states. 4) _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Construct the indicated confidence interval for the difference between population proportions $p_1 - p_2$. Assume that the samples are independent and that they have been randomly selected.

- 5) $x_1 = 61$, $n_1 = 105$ and $x_2 = 82$, $n_2 = 120$; Construct a 98% confidence interval for the difference between population proportions $p_1 - p_2$. 5) _____

- A) $-0.252 < p_1 - p_2 < 0.047$ B) $0.432 < p_1 - p_2 < 0.730$
 C) $-0.228 < p_1 - p_2 < 0.707$ D) $0.456 < p_1 - p_2 < 0.707$

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Construct the indicated confidence interval for the difference between the two population means. Assume that the two samples are independent simple random samples selected from normally distributed populations. Do not assume that the population standard deviations are equal.

- 9) Two types of flares are tested and their burning times are recorded. The summary statistics are given below. 9) _____

Brand X	Brand Y
$n = 35$	$n = 40$
$\bar{x} = 19.4$ min	$\bar{x} = 15.1$ min
$s = 1.4$ min	$s = 0.8$ min

Construct a 95% confidence interval for the differences between the mean burning time of the brand X flare and the mean burning time of the brand Y flare.

- A) $3.2 \text{ min} < \mu_X - \mu_Y < 5.4 \text{ min}$ B) $3.6 \text{ min} < \mu_X - \mu_Y < 5.0 \text{ min}$
 C) $3.8 \text{ min} < \mu_X - \mu_Y < 4.8 \text{ min}$ D) $3.5 \text{ min} < \mu_X - \mu_Y < 5.1 \text{ min}$
- 10) A researcher was interested in comparing the amount of time spent watching television by women and by men. Independent simple random samples of 14 women and 17 men were selected, and each person was asked how many hours he or she had watched television during the previous week. The summary statistics are as follows. 10) _____

Women	Men
$\bar{x}_1 = 12.5$ hrs	$\bar{x}_2 = 14.3$ hrs
$s_1 = 3.9$ hrs	$s_2 = 5.2$ hrs
$n_1 = 14$	$n_2 = 17$

Construct a 99% confidence interval for $\mu_1 - \mu_2$, the difference between the mean amount of time spent watching television for women and the mean amount of time spent watching television for men.

- A) $-6.32 \text{ hrs} < \mu_1 - \mu_2 < 2.72 \text{ hrs}$ B) $-6.44 \text{ hrs} < \mu_1 - \mu_2 < 2.84 \text{ hrs}$
 C) $-6.45 \text{ hrs} < \mu_1 - \mu_2 < 2.85 \text{ hrs}$ D) $-6.31 \text{ hrs} < \mu_1 - \mu_2 < 2.71 \text{ hrs}$

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Perform the indicated hypothesis test. Assume that the two samples are independent simple random samples selected from normally distributed populations. Also assume that the population standard deviations are equal ($\sigma_1 = \sigma_2$), so that the standard error of the difference between means is obtained by pooling the sample variances.

- 11) A researcher was interested in comparing the amount of time spent watching television by women and by men. Independent simple random samples of 14 women and 17 men were selected, and each person was asked how many hours he or she had watched television during the previous week. The summary statistics are as follows. 11) _____

Women	Men
$\bar{x}_1 = 11.9$ hr	$\bar{x}_2 = 16.9$ hr
$s_1 = 4.1$ hr	$s_2 = 4.8$ hr
$n_1 = 14$	$n_2 = 17$

Use a 0.05 significance level to test the claim that the mean amount of time spent watching television by women is smaller than the mean amount of time spent watching television by men. Use the traditional method of hypothesis testing.

- 12) A researcher was interested in comparing the GPAs of students at two different colleges. Independent simple random samples of 8 students from college A and 13 students from college B yielded the following GPAs.

12) _____

College A	College B
3.7	3.8 2.8
3.2	3.2 4.0
3.0	3.0 3.6
2.5	3.9 2.6
2.7	3.8 4.0
3.6	2.5 3.6
2.8	3.9
3.4	

Use a 0.10 significance level to test the claim that the mean GPA of students at college A is equal to the mean GPA of students at college B. Use the traditional method of hypothesis testing.

(Note: $\bar{x}_1 = 3.1125$, $\bar{x}_2 = 3.4385$, $s_1 = 0.4357$, $s_2 = 0.5485$.)

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Construct a confidence interval for μ_d , the mean of the differences d for the population of paired data. Assume that the population of paired differences is normally distributed.

- 13) If $\bar{d} = 3.125$, $S_d = 2.911$, and $n = 8$, determine a 95 percent confidence interval for μ_d .

13) _____

A) $2.264 < \mu_d < 5.559$

B) $2.264 < \mu_d < 3.986$

C) $0.691 < \mu_d < 3.986$

D) $0.691 < \mu_d < 5.559$

- 14) The table below shows the weights of 9 subjects before and after following a particular diet for two months.

14) _____

Subject	A	B	C	D	E	F	G	H	I
Before	168	180	157	132	202	124	190	210	171
After	162	178	145	125	171	126	180	195	163

Construct a 99% confidence interval for the mean difference of the "before" minus "after" weights.

A) $2.8 < \mu_d < 17.0$

B) $2.4 < \mu_d < 17.4$

C) $4.51 < \mu_d < 15.7$

D) $-0.6 < \mu_d < 20.4$

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Use the traditional method of hypothesis testing to test the given claim about the means of two populations. Assume that two dependent samples have been randomly selected from normally distributed populations.

- 15) Five students took a math test before and after tutoring. Their scores were as follows.

15) _____

Subject	A	B	C	D	E
Before	71	66	75	78	66
After	75	75	73	81	78

Using a 0.01 level of significance, test the claim that the tutoring has an effect on the math scores.

- 16) Ten different families are tested for the number of gallons of water a day they use before and after viewing a conservation video. At the 0.05 significance level, test the claim that the mean is the same before and after the viewing.

16) _____

Before	33	33	38	33	35	35	40	40	40	31
After	34	28	25	28	35	33	31	28	35	33

Test the indicated claim about the variances or standard deviations of two populations. Assume that both samples are independent simple random samples from populations having normal distributions.

- 17) Two types of flares are tested and their burning times are recorded. The summary statistics are given below. Use a 0.05 significance level to test the claim that the burning times for Brand X flares have the same variance as the burning times for Brand Y flares. 17) _____

<u>Brand X</u>	<u>Brand Y</u>
$n = 35$	$n = 41$
$\bar{x} = 19.4$ min	$\bar{x} = 15.1$ min
$s = 1.4$ min	$s = 0.8$ min

- 18) Random samples of 13 women and 11 men yielded the following scores on a test: 18) _____

Women: 70, 78, 62, 96, 75, 68, 41, 74, 80, 47, 73, 94, 65
Men: 72, 60, 52, 87, 66, 74, 95, 50, 81, 70, 72

Use a 0.05 significance level to test the claim that test scores for women have a larger standard deviation than test scores for men.

(Note: $s_1 = 15.588$ and $s_2 = 13.754$).