Chapters 9 & 10 Worksheet

Math 160

Name____________________________________

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

Section 9.2

Find the number of successes x suggested by the given statement.

1) Among 1430 randomly selected car drivers in one city, 8.74% said that they had been involved in an accident during the past year. 1) ________________

Assume that you plan to use a significance level of $\alpha = 0.05$ to test the claim that $p_1 = p_2$. Use the given sample sizes and numbers of successes to find the z test statistic for the hypothesis test.

2) A report on the nightly news broadcast stated that 11 out of 132 households with pet dogs were burglarized and 24 out of 194 without pet dogs were burglarized. 2) ________________

H0: ___________________________________

H1: ___________________________________

Test Statistic: __________________________

P–value: __________________________

Critical value(s): ____________________

Conclusion on Null Hypothesis:

Conclusion on Claim:

Solve the problem.

3) 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? 3) ______________

	College Education	No College Education
Number in sample	147	142
Number satisfied in their work	78	70

H0: ______________________________

H1: ______________________________

Test Statistic: ______________________

P–value: ______________________

Critical value(s): __________________

Conclusion on Null Hypothesis:

Conclusion on Claim:

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

4) A researcher finds that of 1000 people who said that they attend a religious service at least once a week, 31 stopped to help a person with car trouble. Of 1200 people interviewed who had not attended a religious service at least once a month, 22 stopped to help a person with car trouble. At the 0.05 significance level, test the claim that the two proportions are equal. 4) ______________

H0: ______________________________

H1: ______________________________

Test Statistic: ______________________

P–value: ______________________

Critical value(s): __________________

Conclusion on Null Hypothesis:

Conclusion on Claim:

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

Section 9.3

Determine whether the samples are independent or dependent.

5) The effectiveness of a new headache medicine is tested by measuring the amount of time before the headache is cured for patients who use the medicine and another group of patients who use a placebo drug. 5) ________

A) Dependent samples B) Independent samples

6) The effectiveness of a headache medicine is tested by measuring the intensity of a headache in patients before and after drug treatment. The data consist of before and after intensities for each patient. 6) ________

A) Independent samples B) Dependent samples

7) The accuracy of verbal responses is tested in an experiment in which individuals report their heights and then are measured. The data consist of the reported height and measured height for each individual. 7) ________

A) Dependent samples B) Independent samples

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

Test the indicated claim about the means of two populations. 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. Use the traditional method or P–value method as indicated.

8) A researcher was interested in comparing the amount of time (in hours) 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. 8) ______________

Women	Men
$\bar{x}_1 = 12.7$ hr	$\bar{x}_2 = 13.9$ hr
$s_1 = 3.9$ hr	$s_2 = 5.2$ 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.

H0: ______________________________

H1: ______________________________

Test Statistic: ______________________

P–value: ______________________

Critical value(s): __________________

Conclusion on Null Hypothesis:

Conclusion on Claim:

9) A researcher was interested in comparing the salaries of female and male employees at a particular company. Independent simple random samples of 8 female employees and 15 male employees yielded the following weekly salaries (in dollars). 9) ________________

Female	Male	
495	722	518
760	562	904
556	880	1150
904	520	805
520	500	480
1005	1250	970
743	750	605
660	1640	

Use a 0.05 significance level to test the claim that the mean salary of female employees is less than the mean salary of male employees. Use the traditional method of hypothesis testing.

(Note: $\bar{x}_1$ = \$705.375, $\bar{x}_2$ = \$817.067, s_1 = \$183.855, s_2 = \$330.146.)

H0: ______________________________

H1: ______________________________

Test Statistic: ______________________

P-value: ______________________

Critical value(s): __________________

Conclusion on Null Hypothesis:

Conclusion on Claim:

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

Section 9.4

The two data sets are dependent. Find $\bar{d}$ to the nearest tenth.

10)

X	8.4	6.9	5.1	5.3	6.8	5.7
Y	8.8	7.8	9.2	8.1	8.1	9.3

10) _______

A) −1.3 B) −13.2 C) −2.9 D) −2.2

Assume that you want to test the claim that the paired sample data come from a population for which the mean difference is $\mu_d = 0$. Compute the value of the t test statistic. Round intermediate calculations to four decimal places as needed and final answers to three decimal places as needed.

11) The following table shows the weights of nine subjects before and after following a particular diet for two months. You wish to test the claim that the diet is effective in helping people lose weight. What is the value of the appropriate test statistic? 11) _______

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

A) 9.468 B) 0.351 C) 1.052 D) 3.156

H0: ______________________

H1: ______________________

Test Statistic: ______________________

P–value: ______________________

Critical value(s): ______________________

Conclusion on Null Hypothesis:

Conclusion on Claim:

Determine the decision criterion for rejecting the null hypothesis in the given hypothesis test; i.e., describe the values of the test statistic that would result in rejection of the null hypothesis.

12) Suppose you wish to test the claim that μ_d, the mean value of the differences d for a population of paired data, is greater than 0. Given a sample of n = 15 and a significance level of $\alpha = 0.01$, what criterion would be used for rejecting the null hypothesis? 12) _______

A) Reject null hypothesis if test statistic > 2.624.
B) Reject null hypothesis if test statistic > 2.977 or < –2.977.
C) Reject null hypothesis if test statistic < 2.624.
D) Reject null hypothesis if test statistic > 2.602.

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.

13) 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. 13) ______________

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

H0: ______________________________

H1: ______________________________

Test Statistic: ______________________

P–value: ______________________

Critical value(s): __________________

Conclusion on Null Hypothesis:

Conclusion on Claim:

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

Chapter 10

Section 10.2

Given the linear correlation coefficient r and the sample size n, determine the critical values of r and use your finding to state whether or not the given r represents a significant linear correlation. Use a significance level of 0.05.

14) $r = 0.41$, $n = 25$ 14) _______

A) Critical values: $r = \pm 0.487$, no significant linear correlation
B) Critical values: $r = \pm 0.396$, no significant linear correlation
C) Critical values: $r = \pm 0.396$, significant linear correlation
D) Critical values: $r = \pm 0.487$, significant linear correlation

15) $r = 0.855$, $n = 5$ 15) _______

A) Critical values: $r = \pm 0.950$, no significant linear correlation
B) Critical values: $r = \pm 0.878$, significant linear correlation
C) Critical values: $r = \pm 0.878$, no significant linear correlation
D) Critical values: $r = 0.950$, significant linear correlation

Find the value of the linear correlation coefficient r.

16) The paired data below consist of the costs of advertising (in thousands of dollars) and the number of products sold (in thousands): 16) _______

Cost	9	2	3	4	2	5	9	10
Number	85	52	55	68	67	86	83	73

A) 0.235 B) 0.246 C) –0.071 D) 0.708

Suppose you will perform a test to determine whether there is sufficient evidence to support a claim of a linear correlation between two variables. Find the critical values of r given the number of pairs of data n and the significance level α.

17) $n = 14$, $\alpha = 0.01$ 17) ________

A) $r = \pm 0.661$ B) $r = \pm 0.532$ C) $r = 0.661$ D) $r = 0.684$

18) $n = 25$, $\alpha = 0.05$ 18) ________

A) $r = \pm 0.505$ B) $r = \pm 0.396$ C) $r = 0.396$ D) $r = 0.444$

Section 10.3

Use the given data to find the best predicted value of the response variable.

19) Four pairs of data yield $r = 0.942$ and the regression equation $\hat{y} = 3x$. Also, $\bar{y} = 12.75$. What is the best predicted value of y for $x = 5.9$? 19) ________

A) 12.75 B) 2.826 C) 17.7 D) 0.942

20) The regression equation relating dexterity scores (x) and productivity scores (y) for the employees of a company is $\hat{y} = 5.50 + 1.91x$. Ten pairs of data were used to obtain the equation. The same data yield $r = 0.986$ and $\bar{y} = 56.3$. What is the best predicted productivity score for a person whose dexterity score is 34? 20) ________

A) 70.44 B) 58.20 C) 188.91 D) 56.30

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

Use the given data to find the equation of the regression line. Round the final values to three significant digits, if necessary.

21) Ten students in a graduate program were randomly selected. Their grade point averages (GPAs) when they entered the program were between 3.5 and 4.0. The following data were obtained regarding their GPAs on entering the program versus their current GPAs. 21) ______________

Entering GPA	Current GPA
3.5	3.6
3.8	3.7
3.6	3.9
3.6	3.6
3.5	3.9
3.9	3.8
4.0	3.7
3.9	3.9
3.5	3.8
3.7	4.0

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

Use the given information to find the coefficient of determination.

22) Find the coefficient of determination, given that the value of the linear correlation coefficient, r, is 0.376. 22) ________

A) 0.376 B) 0.859 C) 0.141 D) 0.624

23) The test scores of 6 randomly picked students and the numbers of hours they prepared are as follows: 23) ________

Hours	5	10	4	6	10	9
Score	64	86	69	86	59	87

The equation of the regression line is $\hat{y} = 1.06604x + 67.3491$. Find the coefficient of determination.

A) 0.6781 B) -0.2242 C) 0.0503 D) 0.2242

1) 125
2) z = –1.156
3) z = 1.645; no
4) H_0: $p_1 = p_2$. H_1: $p_1 \neq p_2$.
Test statistic: z = 1.93. Critical values: z = ±1.96.
Fail to reject the null hypothesis. There is not sufficient evidence to warrant rejection of the claim that the two proportions are equal.
5) B
6) B
7) A
8) H_0: $\mu_1 = \mu_2$
H_1: $\mu_1 < \mu_2$
Test statistic: t = –0.733
Critical value: t = –1.701
Do not reject H_0. At the 5% significance level, there is not sufficient evidence to support 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.
9) H_0: $\mu_1 = \mu_2$
H_1: $\mu_1 < \mu_2$
Test statistic: t = –1.042
Critical value: t = –1.725
Do not reject H_0. At the 5% significance level, there is not sufficient evidence to support the claim that the mean salary of female employees is less than the mean salary of male employees.
10) D
11) D
12) A
13) H_0: $\mu_d = 0$. H_1: $\mu_d \neq 0$.
Test statistic t = 2.894. Critical values: t = ±2.262.
Reject H_0. There is sufficient evidence to warrant rejection of the claim that the mean is the same before and after viewing.
14) C
15) C
16) D
17) A
18) B
19) A
20) A
21) $\hat{y} = 3.67 + 0.0313x$
22) C
23) C