

Name _____

There are fifteen (15) multiple choice questions. For questions with numerical answers, please select the value closest to the correct answer. Each question is worth three (3) points and you begin with five (5) points for a total of fifty (50) possible points.

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

Compute the test statistic used to test the null hypothesis that $p_1 = p_2$.

- 1) Information about movie ticket sales was printed in a movie magazine. Out of fifty PG-rated movies, 38% had ticket sales in excess of \$3,000,000. Out of thirty-five R-rated movies, 20% grossed over \$3,000,000. 1) _____
 A) 1.773 B) 2.837 C) 3.546 D) 5.496

Find the appropriate p-value to test the null hypothesis, $H_0: p_1 = p_2$, using a significance level of 0.05.

- 2) $n_1 = 100$ $n_2 = 140$ 2) _____
 $x_1 = 41$ $x_2 = 35$
 A) .4211 B) .0021 C) .0512 D) .0086

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.

- 3) 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. Construct a 99% confidence interval for the difference between the two population proportions. 3) _____
 A) $0.0247 < p_1 - p_2 < 0.0286$ B) $-0.0177 < p_1 - p_2 < 0.1243$
 C) $-0.0034 < p_1 - p_2 < 0.0566$ D) $-0.0443 < p_1 - p_2 < 0.0976$

Construct the indicated confidence interval for the difference between the two population means. Assume that the two samples are independent and that they have been randomly selected.

- 4) A researcher wishes to determine whether people with high blood pressure can reduce their blood pressure by following a particular diet. Use the sample data below to construct a 99% confidence interval for $\mu_1 - \mu_2$ where μ_1 and μ_2 represent the mean for the treatment group and the control group respectively. 4) _____

Treatment Group	Control Group
$n_1 = 85$	$n_2 = 75$
$\bar{x}_1 = 189.1$	$\bar{x}_2 = 203.7$
$s_1 = 38.7$	$s_2 = 39.2$

- A) $-30.7 < \mu_1 - \mu_2 < 1.5$ B) $-1.3 < \mu_1 - \mu_2 < 30.5$
 C) $-26.7 < \mu_1 - \mu_2 < -2.5$ D) $-29.0 < \mu_1 - \mu_2 < -0.2$

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.

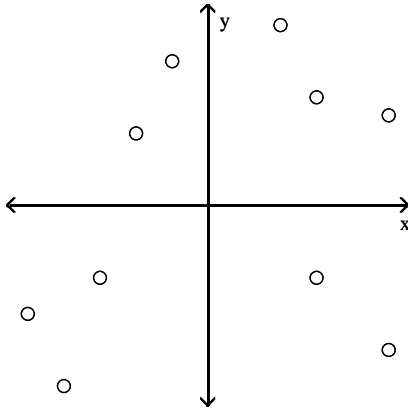
- 5)
$$\begin{array}{r} x | 5.9 \ 7.1 \ 5.7 \ 10.2 \ 3.7 \ 12 \ 8.1 \ 7 \\ y | 4.1 \ 6.8 \ 6.8 \ 5.5 \ 4.1 \ 6.7 \ 4.2 \ 5.3 \\ \hline \end{array}$$
 5) _____
 A) $t = 0.998$ B) $t = 0.845$ C) $t = 6.792$ D) $t = 2.391$

Determine which plot shows the strongest linear correlation.

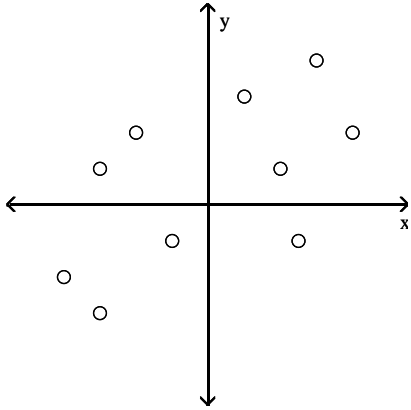
6)

6) _____

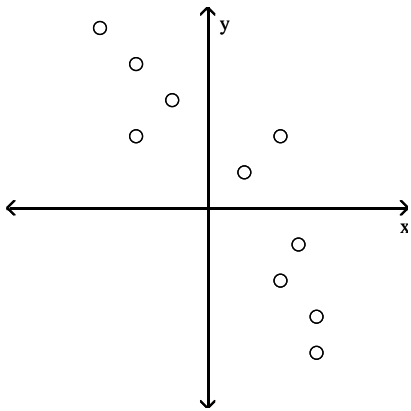
A)



B)



C)



Find the value of the linear correlation coefficient r .

7) The paired data below consist of the test scores of 6 randomly selected students and the number of hours they studied for the test. 7) _____

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

A) -0.678

B) 0.678

C) 0.224

D) -0.224

Find the best predicted value of y corresponding to the given value of x. Use a significance level of 0.05.

- 8) Eight pairs of data yield $r = 0.708$ and the regression equation $\hat{y} = 55.8 + 2.79x$. Also, $\bar{y} = 71.125$. What is the best predicted value of y for $x = 10$? 8) _____
 A) 83.7 B) 57.80 C) 560.79 D) 71.13

- 9) 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 $x = 5.4$? 9) _____
 A) 16.2 B) 0.942 C) 12.75 D) 2.826

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

- 10) 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. 10) _____

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

- A) $\hat{y} = 3.67 + 0.0313x$ B) $\hat{y} = 2.51 + 0.329x$
 C) $\hat{y} = 5.81 + 0.497x$ D) $\hat{y} = 4.91 + 0.0212x$

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

Perform the indicated goodness-of-fit test.

- 11) In studying the responses to a multiple-choice test question, the following sample data were obtained. At the 0.05 significance level, test the claim that the responses occur with the same frequency. 11) _____

Response	A	B	C	D	E
Frequency	12	15	16	18	19

Use a χ^2 test to test the claim that in the given contingency table, the row variable and the column variable are independent.

- 12) Tests for adverse reactions to a new drug yielded the results given in the table. At the 0.05 significance level, test the claim that the treatment (drug or placebo) is independent of the reaction (whether or not headaches were experienced). 12) _____

	Drug	Placebo
Headaches	11	7
No headaches	73	91

- 13) Responses to a survey question are broken down according to employment status and the sample results are given below. At the 0.10 significance level, test the claim that response and employment status are independent. 13) _____

	Yes	No	Undecided
Employed	30	15	5
Unemployed	20	25	10

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

Given below are the analysis of variance results from a Minitab display. Assume that you want to use a 0.05 significance level in testing the null hypothesis that the different samples come from populations with the same mean.

Source	DF	SS	MS	F	p
14) Factor	3	13.500	4.500	5.17	0.011
Error	16	13.925	0.870		
Total	19	27.425			

14) _____

Identify the p-value.

- A) 5.17 B) 0.870 C) 0.011 D) 4.500

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

Test the claim that the samples come from populations with the same mean. Assume that the populations are normally distributed with the same variance.

- 15) The data below represent the weight losses for people on three different exercise programs. 15) _____

Exercise A	Exercise B	Exercise C
2.5	5.8	4.3
8.8	4.9	6.2
7.3	1.1	5.8
9.8	7.8	8.1
5.1	1.2	7.9

At the 1% significance level, does it appear that a difference exists in the true mean weight loss produced by the three exercise programs?

Answer Key

Testname: UNIT 3 PRACTICE EXAM

- 1) A
- 2) D
- 3) D
- 4) A
- 5) D
- 6) C
- 7) C
- 8) A
- 9) C
- 10) A

11) H_0 : The proportions of responses are all equal.

H_1 : The proportions of responses are not all equal.

Test statistic: $\chi^2 = 1.875$. Critical value: $\chi^2 = 9.488$. Fail to reject the null hypothesis. There is not sufficient evidence to warrant rejection of the claim that the responses occur with the same frequency.

12) H_0 : Treatment and reaction are independent.

H_1 : Treatment and reaction are dependent.

Test statistic: $\chi^2 = 1.798$. Critical value: $\chi^2 = 3.841$.

Fail to reject the null hypothesis. There is not sufficient evidence to warrant rejection of the claim that treatment and reaction are independent.

13) H_0 : Employment status and response are independent.

H_1 : Employment status and response are dependent.

Test statistic: $\chi^2 = 5.942$. Critical value: $\chi^2 = 4.605$.

Reject the null hypothesis. There is sufficient evidence to warrant rejection of the claim that response and employment status are independent.

14) C

15) Test statistic: $F = 1.491$. Critical value: $F = 6.93$. p-value: 0.264.

Fail to reject the claim of equal means. The data do not provide sufficient evidence to conclude that there is a difference in the true mean weight loss produced by the three exercise programs.