Practice for Chapter 9 and 10

The acutal exam differs.

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

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

1) Among 1400 randomly selected car drivers in one city, 8.29% 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 pooled estimate $\overline{p}$. Round your answer to the nearest thousandth.

2) $n_1 = 100$ $n_2 = 100$

   $x_1 = 32$ $x_2 = 33$

2) _____

3) $n_1 = 100$ $n_2 = 100$

   $\hat{p_1} = 0.18$ $\hat{p_2} = 0.12$

3) _____

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.

4) $n_1 = 155$ $n_2 = 146$

   $x_1 = 68$ $x_2 = 59$

4) _____

5) A report on the nightly news broadcast stated that 10 out of 108 households with pet dogs were burglarized and 20 out of 208 without pet dogs were burglarized.

5) _____

Solve the problem.

6) 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?

6) _____

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

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

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

7) _____

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

Solve the problem.

8) The table shows the number of smokers in a random sample of 500 adults aged 20–24 and the number of smokers in a random sample of 450 adults aged 25–29. Assume that you plan to use a significance level of $\alpha = 0.10$ to test the claim that $p_1 \neq p_2$. Find the critical value(s) for this hypothesis test. Do the data provide sufficient evidence that the proportion of smokers in the 20–24 age group is different from the proportion of smokers in the 25–29 age group?

8) _____

	Age 20–24	Age 25–29
Number in sample	500	450
Number of smokers	110	63

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

9) Use the given sample data to test the claim that $p_1 < p_2$. Use a significance level of 0.10.

9) _____

Sample 1	Sample 2
$n_1 = 462$	$n_2 = 380$
$x_1 = 84$	$x_2 = 95$

10) In a random sample of 360 women, 65% favored stricter gun control laws. In a random sample of 220 men, 60% favored stricter gun control laws. Test the claim that the proportion of women favoring stricter gun control is higher than the proportion of men favoring stricter gun control. Use a significance level of 0.05.

10) _____

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.

11) $x_1 = 22$, $n_1 = 38$ and $x_2 = 31$, $n_2 = 52$; Construct a 90% confidence interval for the difference between population proportions $p_1 - p_2$.

11) _____

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

12) _____

Determine whether the samples are independent or dependent.

13) 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.

13) _____

14) 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.

14) _____

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

15)

A	58	62	64	63	51
B	27	26	20	25	22

15) _____

16) $\dfrac{X \mid 248 \ 192 \ 220 \ 182 \ 267 \ 274 \ 302}{Y \mid 192 \ 138 \ 195 \ 153 \ 235 \ 251 \ 284}$

16) _____

Find s_d.

17) The differences between two sets of dependent data are 2, 6, 6, 8, 18. Round to the nearest tenth.

17) _____

18) The differences between two sets of dependent data are 0.24, 0.34, 0.3, 0.38, 0.4. Round to the nearest hundredth.

18) _____

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.

19) 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.

19) _____

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

20) A researcher obtained independent random samples of men from two different towns. She recorded the weights of the men. The results are summarized below:

20) _____

Town A	Town B
n_1 = 41	n_2 = 21
x_1 = 165.1 lb	x_2 = 159.5 lb
s_1 = 29.8 lb	s_2 = 26.1 lb

Use a 0.05 significance level to test the claim that there is more variation in weights of men from town A than in weights of men from town B.

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.

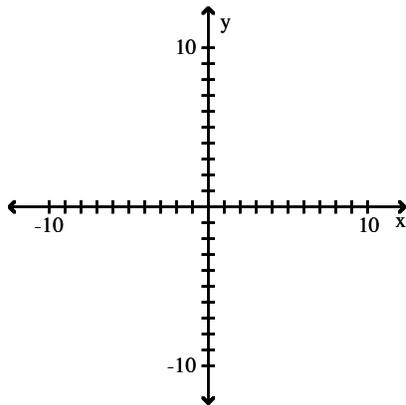21) r = 0.523, n = 25

21) _____

22) r = 0.105, n = 15

22) _____

23) r = 0.843, n = 5

23) _____

Construct a scatterplot for the given data.

24)

x	1	-7	-2	-4	1	5	-6	7	-4	-2
y	7	-1	-7	5	2	3	-2	1	-5	-3

24) _____

25)

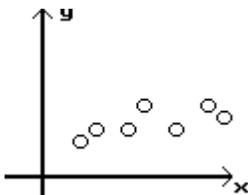| x	11	-5	-19	4	-17	2
y	-93	-37	27	-49	55	3

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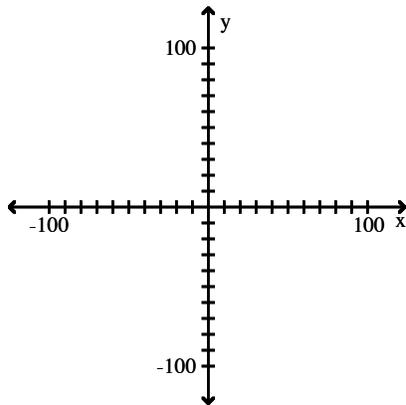
MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

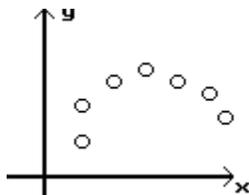**Determine which scatterplot shows the strongest linear correlation.**

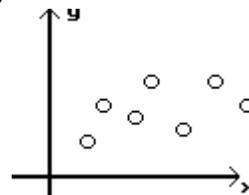26) Which shows the strongest linear correlation?

A)

B)

C)

26) _____

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

Find the value of the linear correlation coefficient r.

27)

x	23.6	35.3	18.3	49.0	13.2
y	4	9	3	3	8

27) _____

4

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.

28) $n = 17$, $\alpha = 0.05$ 28) _____

29) $n = 11$, $\alpha = 0.01$ 29) _____

30) $n = 14$, $\alpha = 0.05$ 30) _____

Find the value of the linear correlation coefficient r.

31) The paired data below consist of the test scores of 6 randomly selected students and the number of hours they studied for the test.   31) _____

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

32)

x	57	53	59	61	53	56	60
y	156	164	163	177	159	175	151

32) _____

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

33) 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 $x = 4.3$?   33) _____

34) Six pairs of data yield $r = 0.444$ and the regression equation $\hat{y} = 5x + 2$. Also, $\bar{y} = 18.3$. What is the best predicted value of y for $x = 5$?   34) _____

35) 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 $x = 6.8$?   35) _____

36) Nine pairs of data yield $r = 0.867$ and the regression equation $\hat{y} = 19.4 + 0.93x$. Also, $\bar{y} = 64.7$. What is the best predicted value of y for $x = 50$?   36) _____

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

37)

x	2	4	5	6
y	7	11	13	20

37) _____

38)

x	0	3	4	5	12
y	8	2	6	9	12

38) _____

39)

x	3	5	7	15	16
y	8	11	7	14	20

39) _____

40)

x	1.2	1.4	1.6	1.8	2.0
y	54	53	55	54	56

40) _____

41) 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.

| 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

1) 116
2) 0.325
3) 0.150
4) $z = 0.607$
5) $z = -0.102$
6) $z = 1.645$; no
7) $H_0: p_1 = p_2.$ $H_1: p_1 > p_2.$
   Test statistic: $z = 2.66.$ Critical value: $z = 2.33.$
   Reject the null hypothesis. There is sufficient evidence to support the claim that $p_1 > p_2.$
8) $z = \pm 1.645$; yes
9) $H_0: p_1 = p_2.$ $H_1: p_1 < p_2.$
   Test statistic: $z = -2.41.$ Critical value: $z = -1.28.$
   Reject the null hypothesis. There is sufficient evidence to support the claim that $p_1 < p_2.$
10) $H_0: p_1 = p_2.$ $H_1: p_1 > p_2.$
   Test statistic: $z = 1.21.$ Critical value: $z = 1.645.$
   Fail to reject the null hypothesis. There is not sufficient evidence to support the claim that the proportion of women favoring stricter gun control is higher than the proportion of men favoring stricter gun control.
11) $-0.190 < p_1 - p_2 < 0.156$
12) $-0.252 < p_1 - p_2 < 0.047$
13) Independent samples
14) Dependent samples
15) 35.6
16) 33.9
17) 6.0
18) 0.06
19) $H_0: \sigma_1^2 = \sigma_2^2$ $H_1: \sigma_1^2 \neq \sigma_2^2$

   Test statistic: $F = 3.0625.$
   Critical value: $1.8752 < F < 1.9429.$
   Reject the null hypothesis. There is sufficient evidence to warrant rejection of the claim that the burning times for Brand X flares have the same variance as the burning times for Brand Y flares.
20) $H_0: \sigma_1 = \sigma_2$ $H_1: \sigma_1 > \sigma_2$
   Test statistic: $F = 1.3.$
   Upper critical F value: 1.9938.
   Fail to reject the null hypothesis. There is not sufficient evidence to support the claim that there is more variation in weights of men from town A than in weights of men from town B.
21) Critical values: $r = \pm 0.396$, significant linear correlation
22) Critical values: $r = \pm 0.514$, no significant linear correlation
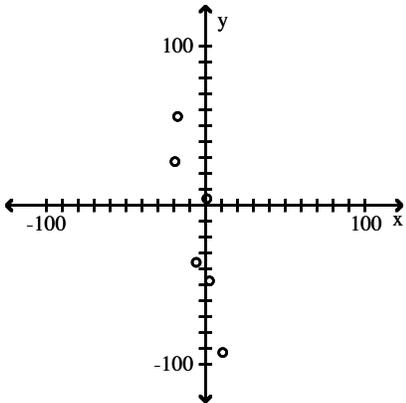23) Critical values: $r = \pm 0.878$, no significant linear correlation

24)
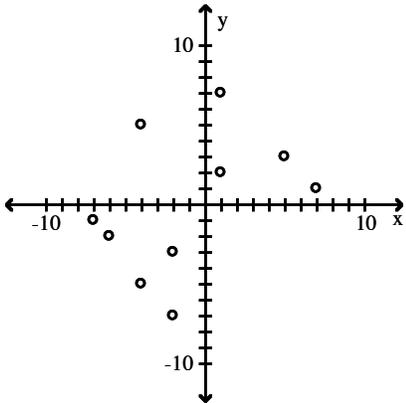
25)

26) A

27) –0.2

28) r = ±0.482

29) r = ±0.735

30) r = ±0.532

31) 0.224

32) 0.109

33) 12.75

34) 18.3

35) 74.77

36) 65.9

37) $\hat{y} = 3.0x$

38) $\hat{y} = 4.88 + 0.525x$

39) $\hat{y} = 5.07 + 0.753x$

40) $\hat{y} = 50.4 + 2.50x$

41) $\hat{y} = 3.67 + 0.0313x$