

Unit 5 Test

(68 points possible)

Instructions: All work must be shown. Credit will not be provided for answers only. Be sure to use only formulas from your textbook. No credit will be provided for the use of outside sources.

Reminder: This must be mailed with your Unit 5 Homework Assignment and work.

Question 1 (2 points)

Classify the two given samples as independent or dependent. Explain your reasoning.

Sample 1: Pre-training weights of 19 people

Sample 2: Post-training weights of 19 people

Question 2 (8 points)

A study was conducted to determine if the salaries of elementary school teachers from two neighboring states were equal. A sample of 100 teachers from each state was randomly selected. The mean from the first state was \$29,100 with a population standard deviation of \$2300. The mean from the second state was \$30,500 with a population standard deviation of \$2100. Test the claim that the salaries from both states are equal. Use $\alpha = 0.05$.

Credit will be provided for the following:

- 1) null and alternative hypotheses
- 2) critical value
- 3) test statistic
- 4) decision
- 5) conclusion

Question 3 (8 points)

A study was conducted to determine if the salaries of elementary school teachers from two neighboring districts were equal. A sample of 15 teachers from each district was randomly selected. The mean from the first district was \$28,900 with a standard deviation of \$2300. The mean from the second district was \$30,300 with a standard deviation of \$2100. Test the claim that the salaries from both districts are equal. Assume the samples are random and independent, and the populations are normally distributed. Also, assume that $\sigma_1 = \sigma_2$. Use $\alpha = 0.05$.

Credit will be provided for the following:

- 1) null and alternative hypotheses
- 2) critical value
- 3) test statistic
- 4) decision
- 5) conclusion

Question 4 (8 points)

Test the claim that $\mu_d = 0$ using the sample statistics below. Assume the samples are random and dependent, and the populations are normally distributed. Use $\alpha = 0.05$. Sample statistics: $n = 12$, $d = 6.8$, $s_d = 1.4$

Credit will be provided for the following:

- 1) null and alternative hypotheses
- 2) critical value
- 3) test statistic
- 4) decision
- 5) conclusion

Question 5 (8 points)

In a recent survey of gun control laws, a random sample of 1000 women showed that 65% were in favor of stricter gun control laws. In a random sample of 1000 men, 60% favored stricter gun control laws. Test the claim that the percentage of men and women favoring stricter gun control laws is the same. Use $\alpha = 0.05$.

Credit will be provided for the following:

- 1) null and alternative hypotheses
- 2) critical value
- 3) test statistic
- 4) decision
- 5) conclusion

Question 6 (8 points)

To test the effectiveness of a new drug designed to relieve pain, 200 patients were randomly selected and divided into two equal groups. One group of 100 patients was given a pill containing the drug while the other group of 100 was given a placebo. What can we conclude about the effectiveness of the drug if 62 of those actually taking the drug felt a beneficial effect while 41 of the patients taking the placebo felt a beneficial effect? Use $\alpha = 0.05$.

Credit will be provided for the following:

- 1) null and alternative hypotheses
- 2) critical value
- 3) test statistic
- 4) decision
- 5) conclusion

Question 7 (2 points)

Given the length of a human's femur, x , and the length of a human's humerus, y , would you expect a positive correlation, a negative correlation, or no correlation? Explain your reasoning.

A) positive correlation B) negative correlation

Question 8 (4 points)

The data below are the gestation periods, in months, of randomly selected animals and their corresponding life spans, in years. Construct a scatter plot for the data. Determine whether there is a positive linear correlation, a negative linear correlation, or no linear correlation.

Gestation, x	8	2.1	1.3	1	11.5	5.3	3.8	24.3
Life span, y	30	12	6	3	25	12	10	40

Question 9 (5 points)

The data below are the final exam scores of 10 randomly selected statistics students and the number of hours they studied for the exam. Calculate the correlation coefficient r . Be sure to show all work.

Hours, x	Scores, y
4	61
6	76
3	56
9	84
3	62
5	74
5	81
6	86
7	86
4	67

Question 10 (5 points)

A manager wishes to determine the relationship between the number of miles (in hundreds of miles) the manager's sales representatives travel per month and the amount of sales (in thousands of dollars) per month. Calculate the correlation coefficient, r .

Miles traveled, x	6	7	14	11	12	19	7	5	15
Sales, y	24	26	71	55	58	54	41	48	113

Question 11 (2 points)

Given a sample with $r = 0.321$, $n = 30$, and $\alpha = 0.10$, determine the standardized test statistic t necessary to test the claim $\rho = 0$. Round answers to three decimal places.

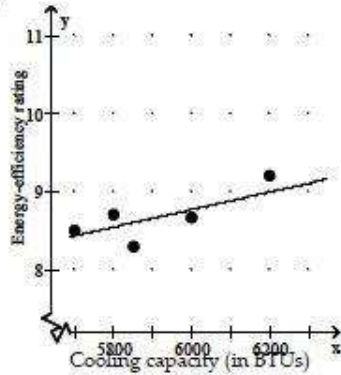
Question 12 (2 points)

$\hat{y} = 0.00114x + 0.57$ (Note that the x- and y-axes are broken.)

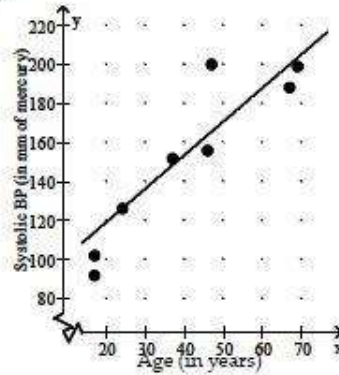
Match the regression equation with the appropriate graph. (Note that the x- and y-axes are broken.)

$\hat{y} = 0.00114x + 0.57$

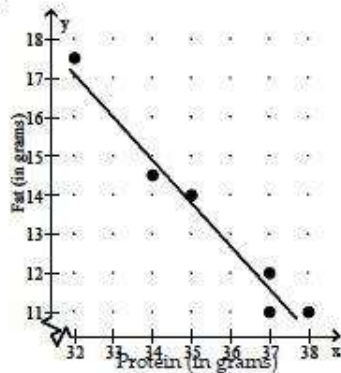
A)



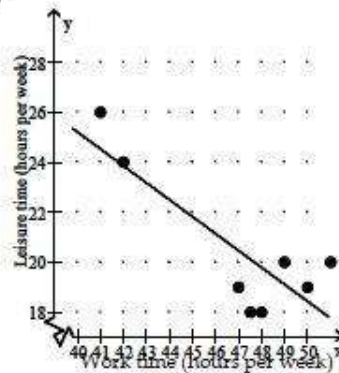
B)



C)



D)



Question 13 (6 points)

The data below are the final exam scores of 10 randomly selected statistics students and the number of hours they studied for the exam. What is the best predicted value for y given $x = 5$? Assume that the variables x and y have a significant correlation.

Hours, x	3	5	2	8	2	4	4	5	6	3
Scores, y	65	80	60	88	66	78	85	90	90	71

- Determine the linear regression equation.
- Predict the score on the exam if the hours that were spent was 5.