

Disclaimer

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Final Exam



Final Exam

DIRECTIONS: For this multiple-choice test, select the most appropriate answer for each statement or question.

1. Which of the following is a main role of a statistician?
 - a) Enforce policies and programs
 - b) Use data to veto state laws
 - c) Analyze data to allow administrators to make informed decisions
 - d) Manipulating data to support propaganda

2. Mr. Jackson would like to select a group of students to participate in an activity. He places the names of all his students in a hat and randomly selects 10 names. Identify the sampling technique used.
 - a) Cluster sampling
 - b) Stratified sampling
 - c) Simple random sampling
 - d) Systematic sampling

3. A college president would like to gather the opinions of students regarding a new cafeteria. He divides the student population into freshman, sophomore, junior and senior classifications. Next, he randomly selects a few students from each classification and records their opinions. Identify the sampling technique used.
 - a) Systematic sampling
 - b) Simple random sampling
 - c) Convenience sampling
 - d) Stratified sampling



4. Which of the following is not a data collection technique?
 - a) Response bias
 - b) A personal interview
 - c) A survey of records
 - d) Direct observation

5. Which of the following variables is considered qualitative?
 - a) Ethnic background
 - b) Salary
 - c) Height
 - d) Number of computers

6. Which of the following variables is considered quantitative?
 - a) Weight
 - b) Hair color
 - c) Gender
 - d) Make of car

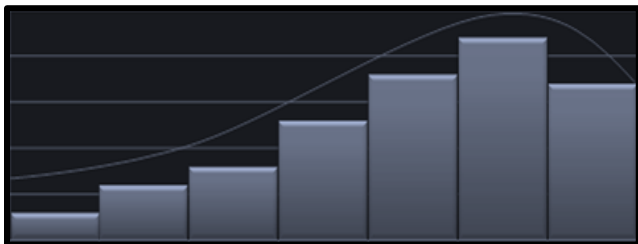
7. Which of the following variables can be classified as discrete?
 - a) Distance
 - b) Speed of a car
 - c) Number of desks
 - d) Volume



8. Which of the following variables can be classified as continuous?

- a) Number of fingers
- b) Number of homes
- c) Number of cats
- d) Miles per gallon

9. Given the following histogram, what is the shape of the distribution?



- a) Skewed left
- b) Uniform
- c) Symmetrical
- d) Skewed right

10. Given the following stem and leaf plot, what is the shape of the distribution?

1	3344567
2	111222557799
3	00000003455588999
4	22233444456
5	3557778



- a) Symmetrical
- b) Skewed left
- c) Skewed right
- d) Uniform

11. Compute the mean of the following data set:

13, 7, 21, 94, 70

- a) 41
- b) 203
- c) 5
- d) 21

12. Compute the median of the following data set:

16, 19, 21, 17, 25, 20

- a) 19
- b) 19.5
- c) 20
- d) 6

13. Compute the mode of the following data set:

16, 16, 17, 18, 18, 18, 19, 20

- a) 16
- b) 17
- c) 18
- d) 19



14. If 20 points are added to each score in a data set, what will happen to the mean?
- a) The mean will increase by 20 points
 - b) The mean will decrease by 20 points
 - c) The mean will remain the same
 - d) The mean will decrease by 2 points
15. Compute the range of the following data set:
6, 27, 103, 210, 97, 45
- a) 6
 - b) 204
 - c) 210
 - d) 103
16. Compute the sample variance of the following data set:
2, 3, 7, 8
- a) 8.66
 - b) 2.55
 - c) 2.94
 - d) 6.49
17. A set of test scores has a sample standard deviation of 8. If 10 points are added to each test score, what would be the value of the new sample standard deviation?
- a) 10
 - b) 8
 - c) 18
 - d) 8



18. What is the value of x that corresponds to a z -score of -2.75 given the mean = 86 and standard deviation = 8?
- a) 86
 - b) 64
 - c) 8
 - d) 108
19. A student took two tests. He scored an 85 on a history test that had a sample mean of 80 and a sample standard deviation of 4. He scored an 88 on a psychology test that had a sample mean of 84 and a sample standard deviation of 5. On which test did the student perform better? In other words, on which test did the student have a better relative position?
- a) History test
 - b) Psychology test
 - c) He performed the same on each test.
 - d) There is not enough information to answer the question.
20. A 50-question multiple-choice test has 5 options for each question. If answers are randomly selected, how many correct answers are expected?
- a) 5
 - b) 10
 - c) 25
 - d) 50



21. Which of the following can represent a value of a probability?
- a) 0.35
 - b) 3.24
 - c) -0.76
 - d) -0.91
22. If $P(A) = 0.60$ and $P(B) = 0.27$, what is $P(A \text{ or } B)$ considering the two events are mutually exclusive?
- a) 0.87
 - b) 0.60
 - c) 0.17
 - d) 0.43
23. At a country club, 20% of the members own a boat. 60% of the members play golf. 35% of the members own a boat and play golf. If a member is selected at random, what is the probability that the member owns a boat or plays golf?
- a) 0.64
 - b) 0.80
 - c) 0.35
 - d) 0.45
24. If $P(A) = 0.30$ and $P(B) = 0.35$, what is $P(A \text{ and } B)$ considering the two events are independent?
- a) 0.552
 - b) 0.650
 - c) 0.105
 - d) 0.351



25. An assorted box of candy has 6 chocolate covered caramels, 3 chocolate covered cherries and 4 chocolate truffles. If 2 pieces of candy are randomly selected without replacement, what is the probability that both pieces are chocolate truffles?
- a) 0.623
 - b) 0.077
 - c) 0.561
 - d) 0.095
26. If a student is selected at random, what is the probability that a student did not take Calculus?

	Greek	Calculus	French	Art
Men	33	34	40	11
Women	23	37	41	6

- a) 0.316
 - b) 0.289
 - c) 0.684
 - d) 0.107
27. In how many ways can a 6-question true-false quiz be answered?
- a) 12
 - b) 720
 - c) 6
 - d) 64



28. In how many ways can 5 runners finish a race?
- a) 5
 - b) 50
 - c) 190
 - d) 120
29. If 5 players out of 11 are selected to be on a basketball team, how many different teams can be formed?
- a) 462
 - b) 55440
 - c) 55
 - d) 120
30. Which of the following is a discrete random variable?
- a) Temperature
 - b) Time
 - c) Weight
 - d) Number of computers
31. What is the mean and standard deviation of the following discrete probability distribution?

x	1	2	3	4
P(x)	0.25	0.10	0.15	0.50

- a) 2.9, 10
- b) 2.9, 1.26
- c) 2.5, 10
- d) 2.5, 1.6



32. The probability of Christopher making a 3-point field goal is 0.70. Find the probability that he makes exactly four 3-point field goals out of twelve attempts.
- a) 0.5087
 - b) 0.0625
 - c) 0.2141
 - d) 0.0078
33. According to a study, the average height of adult females in the United States is 63.8 inches with a standard deviation of 3 inches. Assume the distribution is normal. What is the probability that a randomly selected woman is shorter than 65 inches? Use the Standard Normal Table to determine the probability.
- a) 0.8413
 - b) 0.1587
 - c) 0.6812
 - d) 0.6554
34. Given $\sigma = 22$ and $n = 100$, compute the standard error of the mean.
- a) 2.2
 - b) 0.4545
 - c) 22
 - d) 0.8921
35. According to a study, the average height of adult males in the United States is 69.2 inches with a standard deviation of 2.5 inches. Assume the distribution is normal. Suppose 25 males are randomly selected. What is the probability that the average height is more than 70 inches? Use the Standard Normal Table to determine the probability.



- a) 0.8484
 - b) 0.0548
 - c) 0.6847
 - d) 0.5096
36. Construct a 95% confidence interval for the population mean given the following: sample mean = 125, population standard deviation = 10 and sample size = 100.
- a) (123, 125)
 - b) (120, 126)
 - c) (121, 129)
 - d) (123, 127)
37. A confidence interval resulted in the following: 85 ± 3.9 . What is the margin of error?
- a) 85
 - b) 3.9
 - c) 81.1
 - d) 88.9
38. What common confidence level was most likely used to create the confidence interval (10, 18) given $n = 36$ and $\sigma = 12$?
- a) 99%
 - b) 90%
 - c) 98%
 - d) 95%



39. Construct a 90% confidence interval for the population mean given the following: sample mean = 40, sample standard deviation = 3 and sample size = 16. Assume the sample was taken from a normal population.
- a) (36.3, 46.7)
 - b) (37.8, 42.2)
 - c) (36.3, 43.9)
 - d) (38.7, 41.3)
40. Construct a 99% confidence interval for the population proportion given the following: number of successes = 222 and sample size = 750.
- a) (0.256, 0.569)
 - b) (0.253, 0.339)
 - c) (0.778, 0.987)
 - d) (0.125, 0.452)
41. What minimum sample size is needed to estimate the population mean to within 12 units with 99% confidence given the population standard deviation = 20?
- a) 15
 - b) 12
 - c) 19
 - d) 4



42. Which of the following are the correct null and alternative hypotheses for testing the claim that the mean number of ounces of water Americans drink per day is less than 4L?

a) $H_0: \mu = 4$
 $H_A: \mu > 4$

b) $H_0: \mu = 4$
 $H_A: \mu \neq 4$

c) $H_0: \mu \neq 4$
 $H_A: \mu = 4$

d) $H_0: \mu = 4$
 $H_A: \mu < 4$

43. Test the following at $\alpha = 0.01$ and state the decision.

$$H_0: \mu = 34$$

$$H_A: \mu \neq 34$$

$$\bar{x} = 32$$

$$\sigma = 8$$

$$n = 75$$

a) Reject $H_0: \mu = 34$

b) Do not reject $H_0: \mu = 34$



44. If the null hypothesis is rejected, when in fact it is true, what type of error is made?
- a) Type I error
 - b) Type II error
 - c) Type III error
 - d) Type IV error

45. Assuming the sample was taken from a normal population, what type of test should be performed to test the following?

$$H_0: \mu = 4.89$$

$$H_A: \mu \neq 4.89$$

$$\bar{x} = 4.5$$

$$s = 0.2$$

$$n = 25$$

- a) Z-test
 - b) T-test
 - c) F-test
 - d) Chi-square test
46. Based on the following, should a left-tailed, right-tailed, or two-tailed test be performed?

$$H_0: \mu = 31$$

$$H_A: \mu \neq 31$$

$$\bar{x} = 36$$

$$s = 7$$

$$n = 72$$

- a) Cannot be determined
- b) Two-tailed
- c) Left-tailed
- d) Right-tailed



47. A meteorologist reported that the average number of rainy days in Seattle, Washington is 150 days per year. A resident believes the number of rainy days per year is much higher than this. She samples 10 years and determines the mean to be 155 days with a standard deviation of 15 days. Test at the 5% level of significance and state the decision. Assume the sample was taken from a normal population.
- Do not reject the null hypothesis
 - Reject the null hypothesis
48. According to a recent study, 10% of adults are left-handed. A research team believes the true proportion is different from what is reported. They sample 400 adults and find that 44 of them are left-handed. Test at the 1% level of significance and state the decision.
- Do not reject the null hypothesis
 - Reject the null hypothesis
49. When constructing a confidence interval for the difference between two population means with independent samples, the point estimate is the _____.
- difference between the two sample means
 - difference between the two sample proportions
 - difference between the two sample variances
 - difference between the two sample medians



50. Given the following statistical printout, what is the decision of the hypothesis test at $\alpha = 0.01$?

Two-Sample T-Test and CI: Cost, Pet

Two-sample T for Cost

Pet	N	Mean	StDev	SE Mean
Dog	50	501.4	40.3	5.7
Cat	50	443.5	36.3	5.1

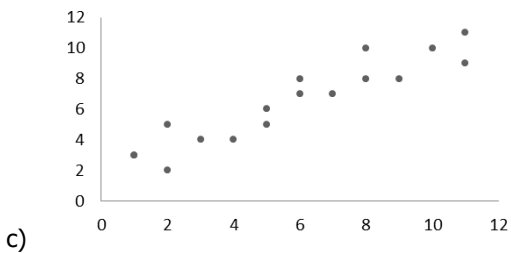
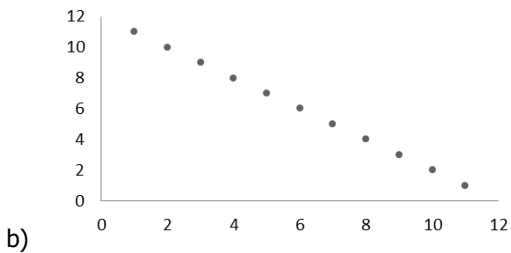
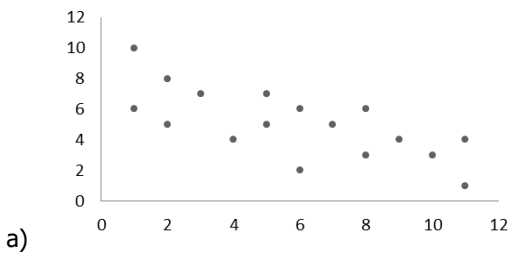
Difference = μ (Dog) - μ (Cat)
Estimate for difference: 57.95
95% CI for difference: (42.74, 73.17)
T-Test of difference = 0 (vs not =): T-Value = 7.56
P-Value = 0.000 DF = 98

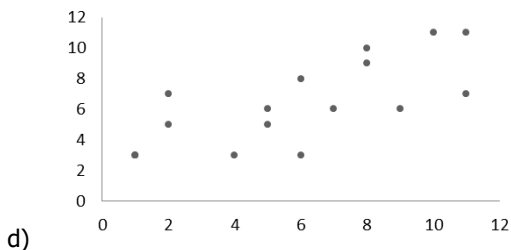
(Source: *minitab.com*)

- a) Do not reject the null hypothesis
 - b) Reject the null hypothesis
51. Researchers would like to use the number of hours a student spends completing homework to predict his/her test score. Which variable is the explanatory variable?
- a) Researchers
 - b) Every student
 - c) Test score
 - d) The number of hours a student spends completing homework



52. Which scatterplot has the weakest negative correlation?





53. Given the following data, compute the correlation coefficient.

x	21	27	26	22	28
y	15	14	17	16	13

- a) 0.5682
 b) 0.7811
 c) -0.4569
 d) -0.6741
54. Determine the equation of the least-squares regression line given the following statistics:

Mean of $x = 76.7$

Mean of $y = 82.6$

Standard deviation of $x = 15.8$

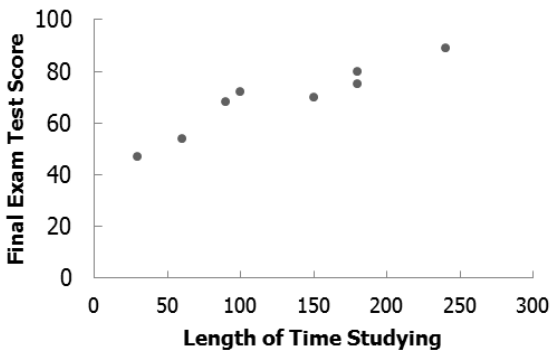
Standard deviation of $y = 15.3$

$r = 0.95$

- a) $\hat{y} = 0.92 - 12.04x$
 b) $\hat{y} = 0.92 + 12.04x$
 c) $\hat{y} = 12.04 - 0.92x$
 d) $\hat{y} = 12.04 + 0.92x$



55. What is the equation of the least-squares regression line that corresponds to the following scatterplot?



- a) $\hat{y} = 46.22 - 0.1798x$
b) $\hat{y} = 46.22 + 0.1798x$
c) $\hat{y} = -46.22 - 0.1798x$
d) $\hat{y} = -46.22 + 0.1798x$
56. A study was performed to determine if the scores on a pretest would be a good predictor for scores on a posttest. The equation of the least-squares regression line resulted in the following: $\hat{y} = 56.23 + 0.336x$. Use the equation of the least-squares regression line to predict the posttest score for a student who scored a 68 on the pretest.
- a) 56.23
b) 79.08
c) 33.38
d) 98.39



57. Given $r = 0.87$, what would be the value of the coefficient of determination?

- a) 0.8700
- b) 1.7412
- c) 0.9325
- d) 0.7569

58. Given the following contingency table, calculate the X^2 test statistic.

	Reporter	Accountant
Male	66	68
Female	45	55

- a) 0.52
- b) 0.98
- c) 0.78
- d) 0.42

59. A researcher performed an ANOVA. She knew that if there was no difference between the means, MS_B and MS_W would be equal. Thus, the ratio of MS_B to MS_W would be 1 and she could conclude that there was not sufficient evidence to _____.

- a) do not reject the null hypothesis
- b) reject the null hypothesis



60. When performing an ANOVA, researchers can conclude that not all the population means are _____ if the null hypothesis is rejected.
- a) equal
 - b) critical
 - c) correlated
 - d) associated

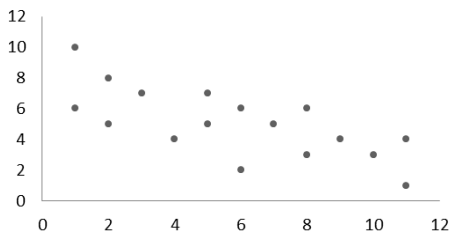


Answers

1. Analyze data to allow administrators to make informed decisions
2. Simple random sampling
3. Stratified sampling
4. Response bias
5. Ethnic background
6. Weight
7. Number of desks
8. Miles per gallon
9. Skewed left
10. Symmetrical
11. 41
12. 19.5
13. 18
14. The mean will increase by 20 points
15. 204
16. 2.94
17. 10
18. 64
19. History test
20. 10
21. 0.35
22. 0.87
23. 0.45
24. 0.105
25. 0.077
26. 0.684
27. 64
28. 120
29. 462
30. Number of computers
31. 2.9, 1.26
32. 0.0078
33. 0.6554
34. 2.2
35. 0.0548



36. (123, 127)
37. 3.9
38. 95%
39. (38.7, 41.3)
40. (0.253, 0.339)
41. 19
42. $H_0: \mu = 4, H_A: \mu < 4$
43. Do not reject $H_0: \mu = 34$
44. Type I error
45. T-test
46. Two-tailed
47. Do not reject the null hypothesis
48. Do not reject the null hypothesis
49. Difference between the two sample means
50. Reject the null hypothesis
51. The number of hours a student spends completing homework



- 52.
53. -0.4569
54. $\hat{y} = 12.04 + 0.92x$
55. $\hat{y} = 46.22 + 0.1798x$
56. 78.08
57. 0.7569
58. 0.42
59. Reject the null hypothesis
60. Equal

