**STUDY QUESTIONS**

1. The first step in testing a hypothesis is to establish a(n) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ hypothesis and a(n) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ hypothesis.

2. In testing hypotheses, the researcher initially assumes that the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ hypothesis is true.

3. The region of the distribution in hypothesis testing in which the null hypothesis is rejected is called the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ region.

4. The rejection and acceptance regions are divided by a point called the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ value.

5. The portion of the distribution which is not in the rejection region is called the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ region.

6. The probability of committing a Type I error is called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

7. Another name for alpha is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

8. When a true null hypothesis is rejected, the researcher has committed a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ error.

9. When a researcher fails to reject a false null hypothesis, a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ error has been committed.

10. The probability of committing a Type II error is represented by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

11. Power is equal to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

12. Whenever hypotheses are established such that the alternative hypothesis is directional, then the researcher is conducting a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_-tailed test.

13. A \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_-tailed test is nondirectional.

14. If in testing hypotheses, the researcher uses a method in which the probability of the observed statistic is compared to alpha to reach a decision, the researcher is using the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ method.

15. Suppose Ho: *µ* = 95 and Ha: *µ* ≠ 95. If the sample size is 50, the population standard deviation is known, and *α* = .05, the critical value of *z* is \_\_\_\_\_\_\_\_.

16. Suppose Ho: *µ* = 2.36 and Ha: *µ* < 2.36. If the sample size is 64, the population standard deviation is known, and *α* = .01, the critical value of *z* is \_\_\_\_\_\_\_\_.

17. Suppose Ho: *µ* = 24.8 and Ha: *µ* ≠ 24.8. If the sample size is 49, the population

standard deviation is known, and *α* = .10, the critical value of *z* is \_\_\_\_\_\_\_\_.

18. Suppose a researcher is testing a null hypothesis that *µ* = 61. A random sample of

*n* = 38 is taken resulting in  = 63 and ** = 8.76. The observed *z* value is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

19. Suppose a researcher is testing a null hypothesis that *µ* = 413. A random sample of *n* = 70 is taken resulting in  = 405. The population standard deviation is 34. The observed *z* value is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

20. A researcher is testing a hypothesis of a single mean. The critical *z* value for *α* = .05 and a one-tailed test is 1.645. The observed *z* value from sample data is 1.13. The decision made by the researcher based on this information is to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the null hypothesis.

21. A researcher is testing a hypothesis of a single mean. The critical *z* value for *α* = .05 and a two-tailed test is ± 1.96. The observed *z* value from sample data is -1.91. The decision made by the researcher based on this information is to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the null hypothesis.

22. A researcher is testing a hypothesis of a single mean. The critical *z* value for *α* = .01 and a one-tailed test is -2.33. The observed *z* value from sample data is -2.45. The decision made by the researcher based on this information is to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the null hypothesis.

23. A researcher has a theory that the average age of managers in a particular industry is over 35-years-old. The null hypothesis to conduct a statistical test on this theory would be \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

24. A company produces, among other things, a metal plate that is supposed to have a six inch hole punched in the center. A quality control inspector is concerned that the machine which punches the hole is "out-of-control". In an effort to test this, the inspector is going to gather a sample of metal plates punched by the machine and measure the diameter of the hole. The alternative hypothesis used to statistical test to determine if the machine is out-of-control is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

25. The following hypotheses are being tested:

Ho: *µ* = 4.6

Ha: *µ* ≠ 4.6

The value of alpha is .05. To test these hypotheses, a random sample of 22 items is selected resulting in a sample mean of 4.1 with a sample standard deviation of 1.8. It can be assumed that this measurement is normally distributed in the population. The degrees of freedom associated with the *t* test used in this problem are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

26. The *critical t* value for the problem presented in question 25 is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

27. The problem presented in question 25 contains hypotheses which lead to a \_\_\_\_\_\_\_\_\_\_-tailed test.

28. The observed value of *t* for the problem presented in question 25 is

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

29. Based on the results of the observed *t* value and the critical table *t* value, the researcher should \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the null hypothesis in the problem presented in question 25.

30. It is believed that the average time to assemble a given product is less than 2 hours.

To test this, a sample of 18 assemblies is taken resulting in a sample mean of 1.91

hours with a sample standard deviation of 0.73 hours. Suppose α = .01. If a

hypothesis test is done on this problem, the table value is \_\_\_\_\_\_\_\_\_\_\_\_\_\_. The

observed value is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. The decision is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

31. A political scientist want to statistically test the null hypothesis that her candidate for governor is currently carrying at least 57% of the vote in the state. She has her assistants randomly sample 550 eligible voters in the state by telephone and only 300 declare that they support her candidate. The observed *z* value for this problem is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

32. Problem 31 is a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_-tailed test.

33. Suppose that the value of alpha for problem 31 is .05. After comparing the observed value to the critical value, the political scientist decided to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the null hypothesis.

34. A company believes that it controls .27 of the total market share in the South for one of its products. To test this belief, a random sample of 1150 purchases of this product in the South are contracted. 385 of the 1150 purchased this company's brand of the product. If a researcher wants to conduct a statistical test for this problem, the alternative hypothesis would be \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

35. The observed value of *z* for problem 34 is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

36. Problem 34 would result in a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_-tailed test.

37. Suppose that a .01 value of alpha were used in problem 34. The critical value of *z* for the problem is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

38. Upon comparing the observed value of *z* to the critical value of *z*, it is determined to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the null hypothesis in problem 34.

39. A production process produces parts with a normal variance of 27.3. Engineers are concerned that the process may now be producing parts with greater variance than that. To test this concern, a sample of 9 newly produced parts is taken. The sample standard deviation is 5.93. Let *α* = .01. The null hypothesis for this problem is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

40. The critical table value of **2 for problem 39 is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

41. The observed value of chi-square in problem 39 is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

42. The decision reached for problem 39 is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

43. The null hypothesis for a test is H0: *μ* = 30. The population standard deviation is known to be 0.63. A one-tailed test is being conducted in the lower tail of the distribution. After taking a sample of 49 items and computing a mean, it is decided to fail to reject the null hypothesis. Let *α* = .05. If the null hypothesis is not true and if the true alternative hypothesis is 29.6, the value of beta is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

44. Suppose the alternative mean in problem 43 is really 29.9, the value of beta is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

45. Plotting the power values against the various values of the alternative hypotheses produces a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ curve.

46. Plotting the values of ** against various values of the alternative hypothesis produces a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ curve.

47. The *p*-value for an observed *z* of 2.73 is \_\_\_\_\_\_\_\_\_.

48. The *p*-value for an observed *z* of 0.85 is \_\_\_\_\_\_\_\_\_.

49. In a hypothesis-testing problem, a *p*-value of .0046 is obtained for the observed statistic. If a one-tailed test is being conducted and ** is .01, then the decision is to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

the null hypothesis.

50. A researcher is conducting a two-tailed hypothesis test using a 5% level of

significance. As a result of the test, a *p*-value of .032 is obtained for one of the

tails. The decision should be to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the null hypothesis.

**ANSWERS TO STUDY QUESTIONS**

1. Null, Alternative 26. + 2.08

2. Null 27. Two

3. Rejection 28. – 1.30

4. Critical 29. Fail to Reject

5. Nonrejection Region 30. – 2.567, - 0.52, Fail to Reject

6. Alpha 31. – 1.16

7. Level of Significance 32. One

8. Type I 33. Fail to Reject

9. Type II 34. *p* ≠ .27

10. Beta 35. 4.95

11. 1 - β 36. Two

12. One 37. + 2.575

13. Two 38. Reject

14. *p*-value 39. H0: *σ*2 = 27.3

15. +1.96 40. 20.0902

16. – 2.33 41. 10.3047

17. + 1.645 42. Fail to Reject

18. 1.41 43. .0026

19. – 1.97 44. .7019

20. Fail to Reject 45. Power

21. Fail to Reject 46. Operating Characteristic

22. Reject 47. .0032

23. *μ* = 35 48. .1977

24. *μ* ≠ 6” 49. reject

25. 21 50. fail to reject