CHAPTER 6

HYPOTHESIS TESTING

1. (B) 4.12.

Explanation

The z-statistic is calculated by subtracting the hypothesized parameter from the parameter that has been estimated and dividing the difference by the standard error of the sample statistic. Here, the test statistic = (sample mean - hypothesized mean) / (population standard deviation / (sample size)$^{1/2}$ = (X - μ) / (a / $n^{1/2}$) = (7 - 5) / (2 / $17^{1/2}$) = (2) / (2 / 4.1231) = 4.12.

(Study Session 2, Module 6.2, LOS 6.g)

Related Material

SchweserNotes - Book 1

2. (A) **For the 50% bonus level, the test statistic is -5.33 and Huffman should give Brickley a 50% bonus.**

Explanation

Using the process of Hypothesis testing:

Step 1: State the Hypothesis. For 25% bonus level - H_o: m 30% H_a: m < 30%; For 50% bonus level - H_o: m $\geq$ 25% H_a: m < 25%.

Step 2: Select Appropriate Test Statistic. Here, we have a normally distributed population with a known variance (standard deviation is the square root of the variance) and a large sample size (greater than 30.) Thus, we will use the z-statistic.

Step 3: Specify the Level of Significance. α = 0.10.

Step 4: State the Decision Rule. This is a one-tailed test. The critical value for this question will be the z-statistic that corresponds to an a of 0.10, or an area to the left of the mean of 40% (with 50% to the right of the mean). Using the z-table (normal table), we determine that the appropriate critical value = -1.28 (Remember that we highly recommend that you have the "common" z-statistics memorized!) Thus, we will reject the null hypothesis if the calculated test statistic is less than -1.28.

Step 5: Calculate sample (test) statistics. Z (for 50% bonus) = (24.2 - 25) / (1.5 /$\sqrt{100}$) = **-5.333.** Z (for 25% bonus) = (24.2 - 30) / (1.5 /$\sqrt{100}$) = **-38.67.**

Step 6: Make a decision. Reject the null hypothesis for both the 25% and 50% bonus level because the test statistic is less than the critical value. Thus, Huffman should give Soberg a 50% bonus.

The other statements are false. The critical value of -1.28 is based on the significance level, and is thus the same for both the 50% and 25% bonus levels.

(Study Session 2, Module 6.2, LOS 6.g)

Related Material

SchweserNotes - Book 1

3. (B) **not greater than returns on other days.**

Explanation

An appropriate null hypothesis is one that the researcher wants to reject. If Patterson believes that the returns on Mondays are greater than on other days, he would like to reject the hypothesis that the opposite is true-that returns on Mondays are not greater than returns on other days.

(Study Session 2, Module 6.1, LOS 6.a)

Related Material

SchweserNotes - Book 1

4. (C) **a Type I error only.**

Explanation

Rejection of a null hypothesis when it is actually true is a Type I error. Here, H_o: $\mu \leq 18$ inches and Ha: $\mu > 18$ inches. Type II error is failing to reject a null hypothesis when it is actually false.

Because a Type I error can only occur if the null hypothesis is true, and a Type II error can only occur if the null hypothesis is false, it is logically impossible for a test to result in both types of error at the same time.

(Study Session 2, Module 6.1, LOS 6.c)

Related Material

SchweserNotes - Book 1

5. (B) **In a test of the population mean, if the population variance is unknown and the sample is small, we should use a z-distributed test statistic.**

Explanation

If the population sampled has a known variance, the z-test is the correct test to use. In general, a t-test is used to test the mean of a population when the population is unknown. Note that in special cases when the sample is extremely large, the z-test may be used in place of the t-test, but the t-test is considered to be the test of choice when the population variance is unknown. A t-test is also used to test the difference between two population means while an F-test is used to compare differences between the variances of two populations.

(Study Session 2, Module 6.2, LOS 6.g)

Related Materia l

SchweserNotes - Book 1

6. (B) F-statistic.

Explanation

For a test of the equality of two variances, the appropriate test statistic test is the F-statistic.

(Study Session 2, Module 6.4, LOS 6.j)

Related Material

SchweserNotes - Book 1

7. (C) a Type II error increases.

Explanation

If P (Type I error) decreases, then P(Type II error) increases. A null hypothesis is never accepted. We can only fail to reject the null.

(Study Session 2, Module 6.1, LOS 6.c)

Related Material

SchweserNotes - Book 1

8. (B) simple random sampling.

Explanation

In simple random sampling, each item in the population has an equal chance of being selected. The analyst's method meets this criterion.

(Study Session 2, Module 6.1, LOS 6.c)

Related Material

SchweserNotes - Book 1

9. (C) H_0: ≤ 0.10 versus H_a: > 0.10.

Explanation

The alternative hypothesis is determined by the theory or the belief. The researcher specifies the null as the hypothesis that he wishes to reject (in favor of the alternative). Note that this is a one-sided alternative because of the "greater than" belief.

(Study Session 2, Module 6.1, LOS 6.b)

Related Material

SchweserNotes - Book 1

10. (B) **chi-squared distributed.**

Explanation

In tests of whether the variance of a population equals a particular value, the chi-squared test statistic is appropriate.

(Study Session 2, Module 6.4, LOS 6.j)

Related Material

SchweserNotes - Book 1

11. (C) **Paired comparisons test**

Explanation

Portfolio theory teaches us that returns on two stocks over the same time period are unlikely to be independent since both have some systematic risk. Because the samples are not independent, a paired comparisons test is appropriate to test whether the means of the two stocks' returns distributions are equal. A difference in means test is not appropriate because it requires that the samples be independent. A chi-square test compares the variance of a sample to a hypothesized variance.

(Study Session 2, Module 6.3, LOS 6.i)

Related Material

SchweserNotes - Book 1

12. (B) **nonparametric test.**

Explanation

A rank correlation test is best described as a nonparametric test.

Related Material

(Study Session 2, Module 6.4, LOS 6.k)

SchweserNotes - Book 1

13. (C) **State the hypotheses. Specify the level of significance. Collect the sample and calculate the test statistics. Make a decision.**

Explanation

The hypotheses must be established first. Then the test statistic is chosen and the level of significance is determined. Following these steps, the sample is collected, the test statistic is calculated, and the decision is made.

(Study Session 2, Module 6.1, LOS 6.a)

Related Material

SchweserNotes - Book 1

14. (A) F-statistic.

Explanation

The ratio of the two sample variances follows an F distribution.

(Study Session 2, Module 6.4, LOS 6.j)

Related Material

SchweserNotes - Book 1

15. (A) the population mean of a normal distribution with unknown variance.

Explanation

When testing hypotheses about the population mean, the sample standard deviation must be used in the denominator of the test statistic when the population standard deviation is unknown, the population is normal, and/or the sample is large. The statistic is a t-stat with n - 1 degrees of freedom. The numerator is the sampling error for the population mean if the true mean is µ0 and the denominator is the standard error of the sample mean around the true mean.

Related Material

SchweserNotes - Book 1

16. (A) has a significance level of 95%.

Explanation

This test has a significance level of 5%. The relationship between confidence and significance is: significance level = 1 - confidence level. We know that the significance level is 5% because the sample size is large and the critical value of the test statistic is 1.96 (2.5% of probability is in both the upper and lower tails).

(Study Session 2, Module 6.1, LOS 6.c)

Related Material

SchweserNotes - Book 1

17. (A) at a 5% significance level, but not at a 2% significance

Explanation

With 19 - 2 = 17 degrees of freedom, the critical values are plus-or-minus 2.110 at a 5% significance level, 2.567 at a 2% significance level, and 2.898 at a 1% significance level. Because the t-statistic of -2.5433 is less than -2.110, the hypothesis can be rejected at a 5% significance level. Because the t-statistic is greater than -2.567, the hypothesis cannot be rejected at a 2% significance level (or any smaller significance level).

(Study Session 2, Module 6.4, LOS 6.l)

Related Material

SchweserNotes - Book 1

18. (B) Data errors.

Explanation

While data errors would certainly come to bear on the analysis, in their presence we would not be able to assert either statistical or economic significance. In other words, data errors are not a valid explanation. The others are factors that can produce statistically significant results that are not economically significant.

(Study Session 2, Module 6.1, LOS 6.d)

Related Material

SchweserNotes - Book 1

19. (C) 3%, but not at a significance level of 1%.

Explanation

The p-value of 1.96% is the smallest level of significance at which the hypothesis can be rejected.

(Study Session 2, Module 6.2, LOS 6.e)

Related Material

SchweserNotes - Book 1

20. (C) H_0: $\mu \geq 0.05$ versus H_a: $\mu < 0.05$.

Explanation

The null must be either equal to, less than or equal to, or greater than or equal to.

(Study Session 2, Module 6.1, LOS 6.b)

Related Material

SchweserNotes - Book 1

21. (A) can reject the null hypothesis at both the 5% and 1% significance levels.

Explanation

A p-value of 0.02% means that the smallest significance level at which the hypothesis can be rejected is 0.0002, which is smaller than 0.05 or 0.01. Therefore the null hypothesis can be rejected at both the 5% and 1% significance levels.

(Study Session 2, Module 6.2, LOS 6.e)

Related Material

SchweserNotes - Book 1

22. (C) reject the null hypotheses and conclude that the population mean is greater than 100.

Explanation

H_0:$\mu \leq 100$; H_a: $\mu > 100$. Reject the null since z= 3.4 > 1.65 (critical value).

(Study Session 2, Module 6.2, LOS 6.g)

Related Material

SchweserNotes - Book 1

23. (A) Ho: $\mu \leq 0.10$ versus H_a: $\mu > 0.10$.

Explanation

This is a one-sided alternative because of the "greater than" belief. We expect to reject the null.

(Study Session 2, Module 6.1, LOS 6.b)

Related Material

SchweserNotes - Book 1

24. (A) 10.56.

Explanation

With a large sample size (135) the z-statistic is used. The z-statistic is calculated by subtracting the hypothesized parameter from the parameter that has been estimated and dividing the difference by the standard error of the sample statistic. Here, the test statistic = (sample mean - hypothesized mean) / (population standard deviation / (sample size)$^{1/2}$) = $(X - \mu) / (\sigma / n^{1/2})$ = (64,000 - 59,000) / (5,500 / 135$^{1/2}$) = (5,000) / (5,500 / 11.62) = 10.56.

(Study Session 2, Module 6.1, LOS 6.c)

Related Material

SchweserNotes - Book 1

25. (B) rejecting a true null hypothesis.

Explanation

The Type I error is the error of rejecting the null hypothesis when, in fact, the null is true.

(Study Session 2, Module 6.1, LOS 6.c)

Related Material

SchweserNotes - Book 1

26. (B) The calculated Z-statistic determines the appropriate significance level to use.

Explanation

The significance level is chosen before the test so the calculated Z-statistic can be compared to an appropriate critical value.

(Study Session 2, Module 6.2, LOS 6.g)

Related Material

SchweserNotes - Book 1

27. (A) H_o: $\mu \leq 100$; H_a: $\mu > 100$.

Explanation

The null hypothesis is that the population mean is less than or equal to from 100. The alternative hypothesis is that the population mean is greater than 100.

(Study Session 2, Module 6.1, LOS 6.b)

Related Material

SchweserNotes - Book 1

28. (C) **reject the null hypothesis and conclude that the population means are not equal.**

Explanation

The hypothesis test is a two-tailed test of equality of the population means. The t-statistic is greater than the critical t-value. Therefore, Ratliff can reject the null hypothesis that the population means are equal.

(Study Session 2, Module 6.3, LOS 6.h)

Related Material

SchweserNotes - Book 1

29. (A) **The calculated test statistic is 1.291.**

Explanation

Here, we have a normally distributed population with an unknown variance (we are given only the sample standard deviation) and a small sample size (less than 30.) Thus, we will use the t-statistic.

The test statistic = t = (3,150 - 3,000) / (450 / $\sqrt{15}$) = **1.291**

(Study Session 2, Module 6.2, LOS 6.g)

Related Material

SchweserNotes - Book 1

30. (C) **fail to reject the null hypothesis and conclude that the population mean is not greater than 100.**

Explanation

At a 5% significance level, the critical t-statistic using the Student's t distribution table for a one-tailed test and 29 degrees of freedom (sample size of 30 less 1) is 1.699 (with a large sample size the critical z-statistic of 1.645 may be used). Because the critical t-statistic is greater than the calculated t-statistic, meaning that the calculated t-statistic is not in the rejection range, we fail to reject the null hypothesis and we conclude that the population mean is not significantly greater than 100.

(Study Session 2, Module 6.2, LOS 6.g)

Related Material

SchweserNotes - Book 1 30.

31. (B) **made a Type II error.**

Explanation

This statement is an example of a Type II error, which occurs when you fail to reject a hypothesis when it is actually false.

The other statements are incorrect. A Type I error is the rejection of a hypothesis when it is actually true.

(Study Session 2, Module 6.1, LOS 6.c)

Related Material

SchweserNotes - Book 1

32. (A) **State the hypothesis, select the level of significance, formulate the decision rule, compute the test statistic, and make a decision.**

Explanation

Depending upon the author there can be as many as seven steps in hypothesis testing which are:

(1) Stating the hypotheses.

(2) Identifying the test statistic and its probability distribution.

(3) Specifying the significance level.

(4) Stating the decision rule.

(5) Collecting the data and performing the calculations.

(6) Making the statistical decision.

(7) Making the economic or investment decision

(Study Session 2, Module 6.1, LOS 6.a)

Related Material

SchweserNotes - Book 1

33. (C) **H_0: $\mu \geq 0.15$ versus H_a: $\mu < 0.15$.**

Explanation

The alternative hypothesis may be thought of as what the analyst is trying to establish with statistical evidence, in this case that $\mu < 0.15$.

The opposite of the alternative will be the null hypothesis, in this case that $\mu \geq 0.15$.

Remember that the null hypothesis always includes the "equal to" condition: ≥, ≤, =. The alternative hypothesis can only have one of these signs: <, >, ≠.

(Study Session 2, Module 6.1, LOS 6.b)

Related Material

SchweserNotes - Book 1

34. (B) **-2.021 and 2.021.**

Explanation

There are 41 - 1 = 40 degrees of freedom and the test is two-tailed. Therefore, the critical t-values are ± 2.021. The value 2.021 is the critical value for a one-tailed probability of 2.5%.

(Study Session 2, Module 6.2, LOS 6.g)

Related Material

SchweserNotes - Book 1

35. (C) **19.06.**

Explanation

With a large sample size (115) the z-statistic is used. The z-statistic is calculated by subtracting the hypothesized parameter from the parameter that has been estimated and dividing the difference by the standard error of the sample statistic.

Here, the test statistic = (sample mean - hypothesized mean) / (population standard deviation / (sample size)$^{1/2}$ = (X - μ) / (a / n$^{1/2}$) = (65,000 - 57,000) / (4,500 / 115$^{1/2}$) = (8,000) / (4,500 / 10.72) = 19.06.

(Study Session 2, Module 6.1, LOS 6.c)

Related Material

SchweserNotes - Book 1

36. (B) **H_0: μ_d = μ_{d0} = versus H_a: $\mu_d \neq \mu_{d0}$.**

Explanation

This is a paired comparison because the sample cases are not independent (i.e., there is a before and an after for each stock). Note that the test is two-tailed, t-test.

(Study Session 2, Module 6.3, LOS 6.i)

Related Material

SchweserNotes - Book 1

37. (C) **t-distribution with n - 2 degrees of freedom.**

Explanation

The test statistic for the significance of the correlation between two random variables follows a t-distribution with n - 2 degrees of freedom.

Related Material

SchweserNotes - Book 1

38. (C) **The significance level of the test represents the probability of making a Type I error.**

Explanation

A Type I error is the rejection of the null when the null is actually true. The significance level of the test (alpha) (which is one minus the confidence level) is the probability of making a Type I error. A Type II error is the failure to reject the null when it is actually false

(Study Session 2, Module 6.1, LOS 6.c)

Related Material

SchweserNotes - Book 1

39. (C) **the probability of rejecting a false null hypothesis.**

Explanation

This is the definition of the power of the test: the probability of correctly rejecting the null hypothesis (rejecting the null hypothesis when it is false).

(Study Session 2, Module 6.1, LOS 6.c)

Related Material

SchweserNotes - Book 1

40. (C) an F-statistic.

Explanation

Bay is testing a hypothesis about the equality of variances of two normally distributed populations. The test statistic used to test this hypothesis is an F-statistic. A chi-square statistic is used to test a hypothesis about the variance of a single population. A t-statistic is used to test hypotheses concerning a population mean, the differences between means of two populations, or the mean of differences between paired observations from two populations.

(Study Session 2, Module 6.4, LOS 6.j)

Related Material

SchweserNotes - Book 1

41. (C) Equal to for the null and not equal to for the alternative.

Explanation

A correctly formulated set of hypotheses will have the "equal to" condition in the null hypothesis.

(Study Session 2, Module 6.1, LOS 6.a)

Related Material

SchweserNotes - Book 1

42. (A) average difference between pairs of returns.

Explanation

A hypothesis test of the equality of the means of two normally distributed non-independent populations (hypothesized mean difference = 0) is a t-test and the numerator is the average difference between the sample returns over the sample period.

(Study Session 2, Module 6.3, LOS 6.i)

Related Material

SchweserNotes - Book 1

43. (C) failing to reject a false null hypothesis.

Explanation

The Type II error is the error of failing to reject a null hypothesis that is not true.

(Study Session 2, Module 6.1, LOS 6.c)

Related Material

SchweserNotes - Book 1

44. (A) The alternative hypothesis would be Ha: mean > 7.

Explanation

The way the question is worded, this is a two tailed test. The alternative hypothesis is not H_a: M > 7 because in a two-tailed test the alternative is =, while < and > indicate one-tailed tests. A test statistic is calculated by subtracting the hypothesized parameter from the parameter that has been estimated and dividing the difference by the standard error of the sample statistic. Here, the test statistic

= (sample mean - hypothesized mean) / (standard error of the sample statistic) = (5 - 7) / (1) = -2. The calculated Z is -2, while the critical value is -1.96. The calculated test statistic of -2 falls to the left of the critical Z-statistic of -1.96, and is in the rejection region. Thus, the null hypothesis is rejected and the conclusion is that the sample mean of 5 is significantly different than 7. What the negative sign shows is that the mean is less than 7; a positive sign would indicate that the mean is more than 7. The way the null hypothesis is written, it makes no difference whether the mean is more or less than 7, just that it is not 7.

(Study Session 2, Module 6.1, LOS 6.c)

Related Material

SchweserNotes - Book 1

45. (C) the transaction costs, tax effects, and risk of the strategy.

Explanation

A statistically significant excess of mean strategy return over the return of an index or benchmark portfolio may not be economically meaningful because of 1) the transaction costs of implementing the strategy, 2) the increase in taxes incurred by using the strategy, 3) the risk of the strategy. Although the market risk of the strategy portfolios is matched to that of the index portfolio, variability in the annual strategy returns introduces additional risk that must be considered before we can determine whether the results of the analysis are economically meaningful, that is, whether we should invest according to the strategy.

(Study Session 2, Module 6.1, LOS 6.d)

Related Material

SchweserNotes - Book 1

46. (C) the confidence level of the test is 95%.

Explanation

Rejecting the null hypothesis when it is true is a Type I error. The probability of a Type I error is the significance level of the test and one minus the significance level is the confidence level. The power of a test is one minus the probability of a Type II error, which cannot be calculated from the information given.

Related Material

SchweserNotes - Book 1

47. (C) F_0: $\mu \geq 0.15$ versus H_a: $\mu < 0.15$

Explanation

This is a one-sided alternative because of the "less than" belief.

(Study Session 2, Module 6.1, LOS 6.b)

Related Material

SchweserNotes - Book 1

48. (A) **fail to reject the null hypothesis that the population mean is equal to zero.**

Explanation

At a 5% significance level, the critical t-statistic using the Student's t distribution table for a two-tailed test and 19 degrees of freedom (sample size of 20 less 1) is ± 2.093. Because the critical t-statistic of -2.093 is to the left of the calculated t-statistic of -2.090, meaning that the calculated t-statistic is not in the rejection range, we fail to reject the null hypothesis that the population mean is not significantly different from zero.

(Study Session 2, Module 6.2, LOS 6.g)

Related Material

SchweserNotes - Book 1

49. (C) **less than or equal to statement and the alternative hypothesis is framed as a greater than statement.**

Explanation

If a researcher is trying to show that a return is greater than the risk-free rate then this should be the alternative hypothesis. The null hypothesis would then take the form of a less than or equal to statement.

(Study Session 2, Module 6.1, LOS 6.b)

Related Material

SchweserNotes - Book 1

50. (B) **19.99.**

Explanation

With a large sample size (75) the z-statistic is used. The z-statistic is calculated by subtracting the hypothesized parameter from the parameter that has been estimated and dividing the difference by the standard error of the sample statistic. Here, the test statistic = (sample mean - hypothesized mean) / (sample standard deviation / (sample size)$^{1/2}$ = (X - μ) / (σ / $n^{1/2}$) = (57,000 - 54,000) / (1,300 / $75^{1/2}$) = (3,000) / (1,300 / 8.66) = 19.99.

(Study Session 2, Module 6.1, LOS 6.c)

Related Material

SchweserNotes - Book 1

51. (A) **significance level of the test is 5%.**

Explanation

Rejecting the null hypothesis when it is true is a Type I error. The probability of a Type I error is the significance level of the test. The power of a test is one minus the probability of a Type II error, which cannot be calculated from the information given.

(Study Session 2, Module 6.1, LOS 6.c)

Related Material

SchweserNotes - Book 1

52. (A) **rejects the null hypothesis when it is actually true.**

Explanation

(A) Type I error is defined as rejecting the null hypothesis when it is actually true. It can be thought of as a false positive.

(B) Type II error occurs when a researching fails to reject the null hypothesis when it is false. It can be thought of as a false negative.

(Study Session 2, Module 6.1, LOS 6.c)

Related Material

SchweserNotes - Book 1

53. (B) **The analyst should fail to reject the null hypothesis and conclude that the earnings estimates are not significantly different from reported earnings.**

Explanation

The null hypothesis is that earnings estimates are equal to reported earnings. To reject the null hypothesis, the calculated test statistic must fall outside the two critical values. IF the analyst tests the null hypothesis with a z-statistic, the critical values at a 5% confidence level are ±1.96. Because the calculated test statistic, 1.25, lies between the two critical values, the analyst should fail to reject the null hypothesis and conclude that earnings estimates are not significantly different from reported earnings. If the analyst uses a t-statistic, the upper critical value will be even greater than 1.96, never less, so even without the exact degrees of freedom the analyst knows any t-test would fail to reject the null.

(Study Session 2, Module 6.2, LOS 6.g)

Related Material

SchweserNotes - Book 1

54. (C) **21.62.**

Explanation

With a large sample size (175) the z-statistic is used. The z-statistic is calculated by subtracting the hypothesized parameter from the parameter that has been estimated and dividing the difference by the standard error of the sample statistic. Here, the test statistic = (sample mean - hypothesized mean) / (population standard deviation / (sample size)$^{1/2}$ = $(X - \mu) / (\sigma / n^{1/2})$ = (67,000 - 58,500) / (5,200 / 175$^{1/2}$) = (8,500) / (5,200 / 13.22) = 21.62.

(Study Session 2, Module 6.1, LOS 6.c)

Related Material

SchweserNotes - Book 1

55. (A) **Compute the sample value of the test statistic, set up a rejection (critical) region, and make a decision.**

Explanation

Depending upon the author there can be as many as seven steps in hypothesis testing which are:

(1) Starting the hypotheses.

(2) Identifying the test statistic and its probability distribution.

(3) Specifying the significance level.

(4) Starting the decision rule.

(5) Collecting the data and performing the calculation's.

(6) Making the statistical decision.

(7) Making the economic or investment decision.

(Study Session 2, Module 6.1, LOS 6.a)

Related Material

SchweserNotes - Book 1

56. (A) Mak cannot charge a higher rate next season for advertising spots based on this sample.

Explanation

Mak cannot conclude with 95% confidence that the average share of viewers for the show this season exceeds 8.5 and thus she cannot charge a higher advertising rate next season.

Hypothesis testing process:

Step 1: *State the hypothesis.* Null hypothesis: mean 8.5%; Alternative hypothesis: mean > 8.5%

Step 2: *Select the appropriate test statistic.* Use a *t* statistic because we have a normally distributed population with an unknown variance (we are given only the sample variance) and a small sample size (less than 30). If the population were not normally distributed, no test would be available to use with a small sample size.

Step 3: Specify the level of significance. The significance level is the probability of a Type I error, or 0.05.

Step 4: *State the decision rule.* This is a one-tailed test. The critical value for this question will be the t-statistic that corresponds to a significance level of 0.05 and n-1 or 18 degrees of freedom. Using the t-table, we determine that we will reject the null hypothesis if the calculated test statistic is greater than the critical value of **1.734.**

Step 5: Calculate the sample (test) statistic. The test statistic = t = (9.6 - 8.5) / (10.0 / .NI19) = **0.4795.** (Note: Remember to use standard error in the denominator because we are testing a hypothesis about the population mean based on the mean of 18 observations.)

Step 6: Make a decision. The calculated statistic is less than the critical value. Mak cannot conclude with 95% confidence that the mean share of viewers exceeds 8.5% and thus she cannot charge higher rates.

Note: By eliminating the two incorrect choices, you can select the correct response to this question without performing the calculations.

(Study Session 2, Module 6.2, LOS 6.g)

Related Material

SchweserNotes - Book 1

57. (B) **null hypothesis can be rejected at the 5% significance level.**

Explanation

A p-value of 0.035 means the hypothesis can be rejected at a significance level of 3.5% or higher. Thus, the hypothesis can be rejected at the 10% or 5% significance level, but cannot be rejected at the 1% significance level.

(Study Session 2, Module 6.2, LOS 6.e)

Related Material

SchweserNotes - Book 1

58. (B) **two samples are of the same size.**

Explanation

The F-statistic can be computed using samples of different sizes. That is, n_1 need not be equal to n_2.

(Study Session 2, Module 6.4, LOS 6.j)

Related Material

SchweserNotes - Book 1

59. (C) **A hypothesized mean of 3, a sample mean of 6, and a standard error of the sampling means of 2 give a sample Z-statistic of 1.5.**

Explanation

Z = (6 - 3)/2 = 1.5. A Type II error is failing to reject the null hypothesis when it is false. The null hypothesis that the population mean is less than or equal to 5 should be rejected when the sample Z-statistic is greater than the critical Z-statistic.

(Study Session 2, Module 6.1, LOS 6.c)

Related Material

SchweserNotes - Book 1

60. (A) **If the alternative hypothesis is H_a: $\mu > \mu_0$, a two-tailed test is appropriate.**

Explanation

The hypotheses are always stated in terms of a population parameter. Type I and Type II are the two types of errors you can make - reject a null hypothesis that is true or fail to reject a null hypothesis that is false. The alternative may be one-sided (in which case a > or < sign is used) or two-sided (in which case a ≠ is used).

(Study Session 2, Module 6.1, LOS 6.c)

Related Material

SchweserNotes - Book 1

61. (B) **variances are equal.**

Explanation

A test of the equality of variances requires an F-statistic. The calculated F-statistic is 0.0083/0.0078 = 1.064. Since the calculated F value of 1.064 is less than the critical F value of 1.61, we cannot reject the null hypothesis that the variances of the 2 stocks are equal.

(Study Session 2, Module 6.4, LOS 6.j)

Related Material

SchweserNotes - Book 1

62. (C) **reject the null hypothesis and conclude that the population mean is greater than 100.**

Explanation

At a 5% significance level, the critical t-statistic using the Student's t distribution table for a one-tailed test and 29 degrees of freedom (sample size of 30 less 1) is 1.699 (with a large sample size the critical z-statistic of 1.645 may be used). Because the calculated t-statistic of 3.4 is greater than the critical t-statistic of 1.699, meaning that the calculated t-statistic is in the rejection range, we reject the null hypothesis and we conclude that the population mean is greater than 100.

(Study Session 2, Module 6.2, LOS 6.g)

Related Material

SchweserNotes - Book 1

63. (C) **Type II error over a Type I error.**

Explanation

The statement shows a preference for failing to reject the null hypothesis when it is false (a Type II error), over rejecting it when it is true (a Type I error).

(Study Session 2, Module 6.1, LOS 6.d)

Related Material

SchweserNotes - Book 1

64. (A) **2.048**

Explanation

The test statistic for a hypothesis test concerning population correlation follows a t-distribution with n - 2 degrees of freedom. For a sample size of 30 and a significance level of 5%, the sample statistic must be greater than 2.048 or less than -2.048 to reject the hypothesis that the population correlation equals zero.

(Study Session 2, Module 6.4, LOS 6.1)

Related Material

SchweserNotes - Book 1

65. (B) **Nonparametric tests rely on population parameters.**

Explanation

Nonparametric tests are not concerned with parameters; they make minimal assumptions about the population from which a sample comes. It is important to distinguish between the test of the difference in the means and the test of the mean of the differences. Also, it is important to understand that parametric tests rely on distributional assumptions, whereas nonparametric tests are not as strict regarding distributional properties.

(Study Session 2, Module 6.4, LOS 6.k)

Related Material

SchweserNotes - Book 1

66. (B) **the null hypothesis cannot be rejected.**

Explanation

For a two-tailed test at a 5% level of significance the calculated z-statistic would have to be greater than the critical z value of 1.96 for the null hypothesis to be rejected.

(Study Session 2, Module 6.1, LOS 6.c)

Related Material

SchweserNotes - Book 1

67. (C) **t-distribution.**

Explanation

The test statistic for the equality of the means of two normally distributed independent populations is a t-statistic and equality is rejected if it lies outside the upper and lower critical values.

(Study Session 2, Module 6.3, LOS 6.h)

Related Material

SchweserNotes - Book 1

68. (A) **10.75.**

Explanation

With a large sample size (125) and an unknown population variance, either the t-statistic or the z-statistic could be used. Using the z-statistic, it is calculated by subtracting the hypothesized parameter from the parameter that has been estimated and dividing the difference by the standard error of the sample statistic. The test statistic = (sample mean - hypothesized mean) / (sample standard deviation / (sample size$^{1}/^{2}$)) = (X - μ) / (s / n$^{1}/^{2}$) = (65,000 - 62,500) / (2,600 / 125$^{1/2}$) = (2,500) / (2,600 / 11.18) = 10.75.

(Study Session 2, Module 6.2, LOS 6.g)

Related Material

SchweserNotes - Book 1

69. (C) **rejects a true null hypothesis.**

Explanation

A Type I Error is defined as rejecting the null hypothesis when it is actually true. The probability of committing a Type I error is the significance level or alpha risk.

(Study Session 2, Module 6.1, LOS 6.c)

Related Material

SchweserNotes - Book 1

70. (A) **A Type I error is the probability of rejecting the null hypothesis when the null hypothesis is false.**

Explanation

A Type I error is the probability of rejecting the null hypothesis when the null hypothesis is true.

(Study Session 2, Module 6.1, LOS 6.c)

Related Material

SchweserNotes - Book 1

71. (C) H_a: p < 0.

Explanation

The alternative hypothesis is determined by the theory or the belief. The researcher specifies the null as the hypothesis that she wishes to reject (in favor of the alternative). The theory in this case is that the correlation is negative.

(Study Session 2, Module 6.1, LOS 6.b)

Related Material

SchweserNotes - Book 1

72. (A) not rejected.

Explanation

$F = s_1^2 / s_2^2 = \$2.92^2 / \$2.69^2 = 1.18$

From an F table, the critical value with numerator df = 24 and denominator df = 30 is 1.89. We cannot reject the null hypothesis.

(Study Session 2, Module 6.4, LOS 6.j)

Related Material

SchweserNotes - Book 1

73. (A) hoped-for outcome.

Explanation

The alternative hypothesis is typically the hypothesis that a researcher hopes to support after a statistical test is carried out. We can reject or fail to reject the null, not 'prove' a hypothesis.

(Study Session 2, Module 6.1, LOS 6.a)

Related Material

SchweserNotes - Book 1

74. (C) Yes.

Explanation

The t-statistic for a test of the population correlation coefficient is $\frac{r\sqrt{n-2}}{\sqrt{1-r^2}}$ where *r* is the correlation coefficient and *n* is the sample size.

(Study Session 2, Module 6.4, LOS 6.l)

Related Material

SchweserNotes - Book 1

75. (C) **H_0: $\mu_{DR} \leq \mu_{LR}$ versus H_a: $\mu_{DR} > \mu_{LR}$.**

Explanation

The alternative hypothesis is determined by the theory or the belief. It is essentially what the analyst is trying to support, in this case that **H_a: $\mu_{DR} > \mu_{LR}$**

The opposite of the alternative will be the null hypothesis, in this case H_0: $\mu_{LR} \leq \mu_{LR}$

Remember that the null hypothesis can only have one of the following signs: ≥, ≤, =.

The alternative hypothesis, on the other hand, can only have one of these signs: <, >, ≠

(Study Session 2, Module 6.1, LOS 6.b)

Related Material

SchweserNotes - Book 1

76. (C) **A type I error is acceptance of a hypothesis that is actually false.**

Explanation

A type I error is the rejection of a hypothesis that is actually true.

(Study Session 2, Module 6.1, LOS 6.c)

Related Material

SchweserNotes - Book 1

77. (A) **fails to reject a false null hypothesis.**

Explanation

A Type II error is defined as accepting the null hypothesis when it is actually false. The chance of making a Type II error is called beta risk.

(Study Session 2, Module 6.1, LOS 6.c)

Related Material

SchweserNotes - Book 1

78. (C) **reject the null hypothesis and conclude that the population mean is significantly different from zero.**

Explanation

At a 5% significance level, the critical t-statistic using the Student's t-distribution table for a two-tailed test and 19 degrees of freedom (sample size of 20 less 1) is ± 2.093 (with a large sample size the critical z-statistic of 1.960 may be used). Because the critical t-statistic of 2.093 is to the left of the calculated t-statistic of 2.7, meaning that the calculated t-statistic is in the rejection range, we reject the null hypothesis and we conclude that the population mean is significantly different from zero.

(Study Session 2, Module 6.2, LOS 6.g)

Related Material

SchweserNotes - Book 1

79. (C) **true null hypothesis 5% of the time.**

Explanation

The level of significance is the probability of rejecting the null hypothesis when it is true. The probability of rejecting the null when it is false is the power of a test.

Related Material

SchweserNotes - Book 1

80. (B) **F test.**

Explanation

The F test is used to test the differences of variance between two samples.

(Study Session 2, Module 6.4, LOS 6.j)

Related Material

SchweserNotes – Book

81. (A) **F-distributed.**

Explanation

The F-distributed test statistic, F = s_1^2 / s_2^2, is used to compare the variances of two populations.

(Study Session 2, Module 6.4, LOS 6.j)

Related Material

SchweserNotes - Book 1

82. (A) **The probability of a Type I error is equal to the significance level of the test.**

Explanation

The probability of getting a test statistic outside the critical value(s) when the null is true is the level of significance and is the probability of a Type I error. The power of a test is 1 minus the probability of a Type II error. Hypothesis testing does not prove a hypothesis, we either reject the null or fail to reject it.

(Study Session 2, Module 6.1, LOS 6.c)

Related Material

SchweserNotes - Book 1

83. (B) **fails to reject the null hypothesis.**

Explanation

The null hypothesis for a test of equality of means is H_0: $\mu 1 - \mu 2 = 0$. Assuming the variances are equal, degrees of freedom for this test are ($n_1 + n_2 - 2$) = 12 + 12 - 2 = 22. From the table of critical values for Student's t-distribution, the critical value for a two-tailed test at the 5% significance level for df = 22 is 2.074. Because the calculated t-statistic of 2.0 is less than the critical value, this test fails to reject the null hypothesis that the means are equal.

(Study Session 2, Module 6.3, LOS 6.h)

Related Material

SchweserNotes - Book 1