

STATISTICS WORKSHEET – 2

Q1 to Q12 have only one correct answer. Choose the correct option to answer your question.

1. The owner of a travel agency would like to determine whether or not the mean age of the agency's customers is over 24. If so, he plans to alter the destination of their special cruises and tours. If he concludes the mean age is over 24 when it is not, he makes a _____ error. If he concludes the mean age is not over 24 when it is, he makes a _____ error.

- a. Type II; Type II
- b. Type I; Type I
- c. Type I; Type II
- d. Type II; Type I

Answer : **C**

2. Suppose we wish to test $H_0: \mu = 53$ vs $H_1: \mu > 53$. What will result if we conclude that the mean is greater than 53

when its true value is really 55?

- a. We have made a Type I error
- b. We have made a correct decision
- c. We have made a Type II error
- d. None of the above are correct

Answer : **A**

3. The value that separates a rejection region from an acceptance region is called a _____.

- a. parameter
- b. critical value
- c. confidence coefficient
- d. significance level

Answer : **B**

4. A hypothesis test is used to prevent a machine from under filling or overfilling quart bottles of beer. On the basis of sample, the machine is shut down for inspection. A thorough examination reveals there is nothing wrong with the filling machine. From a statistical point of view:

- a. Both Type I and Type II errors were made.
- b. A Type I error was made.
- c. A Type II error was made.
- d. A correct decision was made.

Answer : **B**

5. Suppose we wish to test $H_0 : \mu = 21$ vs $H_1 : \mu > 21$. Which of the following possible sample results gives the most evidence to support H_1 (i.e., reject H_0)? Hint: Compute Z-score.

- a. $\bar{x} = 23$ s , = 3
- b. $\bar{x} = 19$ s , = 4
- c. $\bar{x} = 17$ s , = 7
- d. $\bar{x} = 18$ s , = 6

Answer : **A**

6. Given $H_0: \mu = 25$, $H_1: \mu \neq 25$, and P-value = 0.041. Do you reject or fail to reject H_0 at the 0.01 level of significance?

- a. fail to reject H_0
- b. not sufficient information to decide
- c. reject H_0

Answer : **C**

7. A bottling company needs to produce bottles that will hold 12 ounces of liquid. Periodically, the company gets complaints that their bottles are not holding enough liquid. To test this claim, the bottling company randomly samples 36 bottles. Suppose the p-value of this test turned out to be 0.0455. State the proper conclusion.

- a. At $\alpha = 0.085$, fail to reject the null hypothesis.
- b. At $\alpha = 0.035$, accept the null hypothesis.
- c. At $\alpha = 0.05$, reject the null hypothesis.
- d. At $\alpha = 0.025$, reject the null hypothesis.

Answer : **C**

8. If a hypothesis test were conducted using $\alpha = 0.05$, for which of the following p-values would the null hypothesis be rejected?

- a. 0.100
- b. 0.041
- c. 0.055
- d. 0.060

Answer : **B**

9 . For $H_1: \mu > \mu_0$ p-value is 0.042. What will be the p-value for $H_a: \mu < \mu_0$?

- a. 0.084
- b. 0.021
- c. 0.958
- d. 0.042

Answer : **D**

10. The test statistic is $t = 2.63$ and the p-value is 0.9849. What type of test is this?

- a. Right tail
- b. Two tail
- c. Left tail
- d. Can't tell

Answer : **C**

11. The test statistic is $z = 2.75$, the critical value is $z = 2.326$. The p- value is ...

- a. Less than the significance level
- b. Equal to the significance level
- c. Large than the significance level

Answer : **A**

12. The area to the left of the test statistic is 0.375. What is the probability value if this is a left tail test?

- a. 0.750
- b. 0.375
- c. 0.1885
- d. 0.625

Answer : **B**

Q13 to Q15 are subjective answers type questions, Answers them in their own words briefly.

13.What is T distribution and Z distribution?

Answer :

T-distribution and Z-distribution are both probability distributions commonly used in statistical inference.

Z-distribution, also known as the standard normal distribution, is a continuous probability distribution with a bell-shaped curve that is symmetric around a mean of zero and a standard deviation of one.

T-distribution, also known as Student's t-distribution, is a continuous probability distribution with a bell-shaped curve that is symmetric around a mean of zero but has a larger spread than the standard normal distribution. It is used when the sample size is small (usually less than 30) or the population standard deviation is unknown.

14.Is the T distribution normal?

Answer :

The t-distribution is similar to the normal distribution in shape, but with heavier tails. While the normal distribution has a mean of 0 and a standard deviation of 1, the t-distribution has a mean of 0 but a slightly larger standard deviation, which varies depending on the sample size. As the sample size increases, the t-distribution approaches the normal distribution. So, the t-distribution is not exactly normal, but it becomes more and more similar to the normal distribution as the sample size increases.

15.What does the T distribution tell us?

Answer :

Specifically, the t-distribution is used to calculate confidence intervals and conduct hypothesis tests about the population mean based on a sample mean. It takes into account the sample size and the sample standard deviation and produces wider intervals than the normal distribution when the sample size is small, due to greater uncertainty. The t-distribution becomes more similar to the normal distribution as the sample size increases.