STATISTICS WORKSHEET-9

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.
   Answer- c. Type I; Type II

2. Suppose we wish to test H0: μ =53 vs H1: μ > 53. What will result if we conclude that the mean is greater than 53 when its true value is really 55?
   Answer- a. We have made a Type I error

3. The value that separates a rejection region from an acceptance region is called a _____.
   Answer- b. critical value

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:
   Answer- b. A Type I error was made

5. Suppose we wish to test H0 : μ =21 vs H1 : μ > 21. Which of the following possible sample results gives the most evidence to support H1 (i.e., reject H0)? Hint: Compute Z-score.
   Answer-c. x = 17 s , = 7

6. Given H0: $\mu = 25$, H1: $\mu \neq 25$, and P-value = 0.041. Do you reject or fail to reject H0 at the 0.01 level of significance?

   Answer-a. fail to reject H0

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.

   Answer-c) At $\alpha = 0.05$, reject the null hypothesis.

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

   Answer-b. 0.041

9. For H1: $\mu > \mu 0$ p-value is 0.042. What will be the p-value for Ha: $\mu < \mu o$?

   Answer-C) 0.958

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

   Answer-c. Left tail

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

   Answer-a. Less than the significance level

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?

   Answer-b. 0.375

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

13.   What is T distribution and Z distribution?

Answer-The *t*-distribution is a type of normal distribution that is used for smaller sample sizes. Normally-distributed data form a bell shape when plotted on a graph, with more observations near the mean and fewer observations in the tails.

The *t*-distribution is used when data are *approximately* normally distributed, which means the data follow a bell shape but the population variance is unknown. The variance in a *t*-distribution is estimated based on the degrees of freedom of the data set (total number of observations minus 1).

It is a more conservative form of the **standard normal distribution**, also known as the *z*-distribution. This means that it gives a lower probability to the center and a higher probability to the tails than the standard normal distribution.

The **standard normal distribution**, also called the **z-distribution**, is a special normal distribution where the mean is 0 and the standard deviation is 1.

Any normal distribution can be standardized by converting its values into *z* scores. Z scores tell you how many standard deviations from the mean each value lies.

14. Is the T distribution normal?

    Answer-The *t*-distribution is a type of normal distribution that is used for smaller sample sizes. Normally-distributed data form a bell shape when plotted on a graph, with more observations near the mean and fewer observations in the tails.

15. .What does the T distribution tell us?

    Answer-The t-distribution is a way of describing **a set of observations where most observations fall close to the mean, and the rest of the observations make up the tails on either side**. It is a type of normal distribution used for smaller sample sizes, where the variance in the data is unknown.