WORKSHEET_SET_2

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

Ans: C

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?
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

Ans: B

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

Ans: 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.

Ans: B

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.
a. x = 23 s , = 3
b. x = 19 s , = 4
c. x = 17 s , = 7
d. x = 18 s , = 6

Ans: C

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?
a. fail to reject H0
b. not sufficient information to decide
c. reject H0

Ans: A

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.

Ans: 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

Ans: B

9 . For H1: $\mu > \mu 0$ p-value is 0.042. What will be the p-value for Ha: $\mu < \mu o$?
a. 0.084
b. 0.021
c. 0.958
d. 0.042

Ans: C

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

Ans: 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

Ans: 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

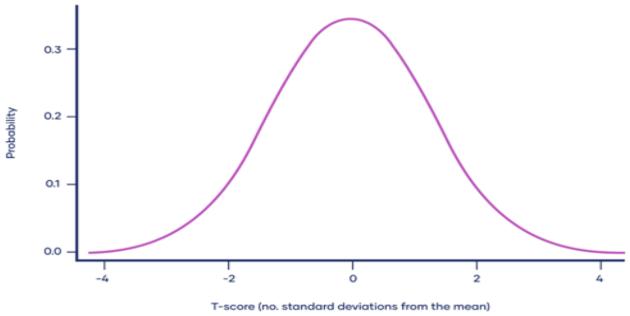
Ans: B

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

13.What is T distribution and Z distribution?

Ans: The *t*-distribution is a way of describing data that follow a bell curve when plotted on a graph, with the greatest number of observations close to the mean and fewer observations in the tails.

It is a type of normal distribution used for smaller sample sizes, where the variance in the data is unknown.

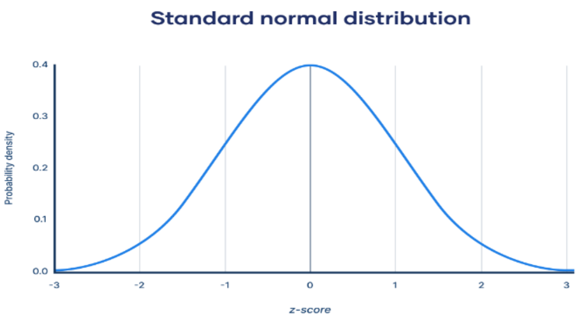


The *t*-distribution is most often used to:

- Find the critical values for a confidence interval when the data is approximately normally distributed.
- Find the corresponding *p*-value from a statistical test that uses the *t*-distribution (*t*-tests, regression analysis).

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?

Ans: 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).

15.What does the T distribution tell us?

Ans: The t-distribution describes the standardized distances of sample means to the population mean when the population standard deviation is not known, and the observations come from a normally distributed population.

The shape of the *t*-distribution depends on the degrees of freedom. The curves with more degrees of freedom are taller and have thinner tails. All three *t*-distributions have "heavier tails" than the z-distribution.

We can see how the curves with more degrees of freedom are more like a z-distribution. Compare the pink curve with one degree of freedom to the green curve for the z-distribution. The *t*-distribution with one degree of freedom is shorter and has thicker tails than the z-distribution. Then compare the blue curve with 10 degrees of freedom to the green curve for the z-distribution. These two distributions are very similar.