STATISTICS WORKSHEET-3

Q1 to Q9 have only one correct answer. Choose the correct option to answer your question.

1. Which of the following is the correct formula for total variation?

Ans. B) Total Variation = Residual Variation + Regression Variation

2. Collection of exchangeable binary outcomes for the same covariate data are called outcomes.

Ans. c) binomial

3. How many outcomes are possible with Bernoulli trial?

ANS. A) 2

4. If Ho is true and we reject it is called

ANS. A) Type-I error

5. Level of significance is also called:

ANS. A) Power of the test

6. The chance of rejecting a true hypothesis decreases when sample size is:

ANS. A) Decrease

7. Which of the following testing is concerned with making decisions using data?

ANS. b) Hypothesis

8. What is the purpose of multiple testing in statistical inference?

ANS. D) All of the mentioned

9. Normalized data are centred at and have units equal to standard deviations of the original data

ANS. A) 0

10. What Is Bayes' Theorem?

ANS. The Bayes' theorem (also known as Bayes' law or Bayes' rule), which bears Thomas Bayes' name, predicts the likelihood of an event based on knowledge of circumstances that may be associated to it in probability theory and statistics.

The Bayes theorem, for instance, enables the risk to an individual of a known age to be assessed more accurately (by conditioning it on their age) than simply assuming that the individual is typical of the population as a whole.

This is useful in situations where it is known that the risk of developing health problems increases with age.

Bayesian inference, a particular method of statistical inference, is one of the many uses of Bayes' theorem.

The theorem's probabilities may have several probability interpretations depending on how they

are used. Theorem expresses using Bayesian probability interpretation

11. What is z-score?

ANS. You can plot a z-score on a normal distribution curve. The range of Z-scores ranges from -3 standard deviations (which would be on the far left of the normal distribution curve) to +3 standard deviations (which would fall to the far right of the normal distribution curve).

You must be aware of the mean and population standard deviation in order to use a z-score.

Z-scores allow results to be contrasted with those of a "normal" population. There are thousands of conceivable outcomes and unit combinations for test or survey findings, and those outcomes can appear meaningless.

For instance, knowing someone weighs 150 pounds may be useful knowledge, but to compare it to the weight of the "typical" person it might be intimidating to look at a large table of data (especially if some weights are recorded in kilograms).

A z-score can show you how that person's weight compares to the mean weight of the general population.

Formula for the Z score: one instance

For a sample, the fundamental Z score formula is: z = (x -) /

Let's say, for illustration, that your test score was 190. The test's standard deviation () is 25, while its mean () is 150. Your z score would be z = (x -) / = (190 - 150) / 25 = 1.6 assuming a normal distribution.

12. What is t-test?

ANS. To compare the means of two groups, a t test is a statistical test that is employed. It is frequently employed in hypothesis testing to establish whether a procedure or treatment truly affects the population of interest or whether two groups differ from one another.

The alternate hypothesis (Ha) states that the true difference is not equal to zero, contrary to the null hypothesis (H0), which states that the true difference between these group means is zero.

- A t-test is an inferential measurement used to decide whether there is a massive contrast between the method for two gatherings and how they are connected. T-tests are utilized when the informational collections follow an ordinary dissemination and have obscure changes, similar to the informational collection recorded from flipping a currency multiple times.

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- A T-test is the last factual measure for deciding contrasts between two implies that might possibly be connected. The testing utilizes haphazardly chosen tests from the two classifications or gatherings. It is a factual technique wherein tests are picked haphazardly, and there is no ideal ordinary conveyance.

13. What is percentile?

ANS. A percentile is an action utilized in measurements demonstrating the worth underneath which a given level of perceptions in a gathering of perceptions fall. For instance, the twentieth percentile is the worth underneath which 20% of the perceptions might be found.

The term percentile and the connected term percentile rank are many times utilized in the revealing of scores from standard referred to tests. For instance, in the event that a score is at the 86th percentile, where 86 is the percentile rank, it is equivalent to the worth underneath which 86% of the perceptions might be found. Conversely, assuming it is in the 86th percentile, the score is at or underneath the worth of which 86% of the perceptions might be found. Each score is in the 100th percentile.

"Percentile" is in regular use, however there is no widespread definition for it. The most widely recognized meaning of a percentile is a number where a specific level of scores fall underneath that number. You could realize that you scored 67 out of 90 on a test. However, that figure has no genuine significance except if you understand what percentile you fall into. Assuming you realize that your score is in the 90th percentile, that implies you scored better compared to 90% of individuals who stepped through the examination.

14. What is ANOVA?

ANS. 14. Examination of fluctuation (ANOVA) is an investigation device utilized in measurements that parts a noticed total changeability found inside an informational index into two sections: precise variables and irregular elements. The orderly variables affect the given informational collection, while the irregular elements don't. Experts utilize the ANOVA test to decide the impact that free factors have on the reliant variable in a relapse review. Examination of difference, or ANOVA, is a measurable strategy that isolates noticed fluctuation information into various parts to use for extra tests. A one-way ANOVA is utilized for at least three gatherings of information, to acquire data about the connection between the reliant and free factors.

An ANOVA test is a method for seeing whether review or examination results are huge. All in all, they assist you with sorting out whether or not you really want to dismiss the invalid speculation or acknowledge the substitute theory.

Essentially, you're trying gatherings to check whether there's a distinction between them. Instances of when you should test various gatherings:

- A gathering of mental patients are attempting three distinct treatments: directing, medicine and biofeedback. You need to check whether one treatment is superior to the others.

- A producer has two unique cycles to make lights. They are curious as to whether one interaction is better compared to the next.

- Understudies from various schools take a similar test. You need to check whether one school beats the other.

The Formula for ANOVA is:

$$F = \frac{MSE}{MST}$$

Where:

F= ANOVA coefficient

MST= Mean sum of squares due to treatment

MSE= Mean sum of squares due to error

15. How can ANOVA help?

ANS. 15. ANOVA is useful for testing at least three factors. It is like different two-example t-tests. Notwithstanding, it brings about less sorts I mistakes and is fitting for a scope of issues. ANOVA bunches contrasts by looking at the method for each gathering and incorporates fanning out the difference into assorted sources. It is utilized with subjects, test gatherings, among gatherings and inside gatherings.

One-Way ANOVA versus Two-Way ANOVA

There are two fundamental sorts of ANOVA: one-way and two-way. There likewise varieties of ANOVA. For instance, MANOVA (multivariate ANOVA) contrasts from ANOVA as the previous tests for different ward factors at the same time while the last option evaluates just a single ward variable at a time. One-way or two-way alludes to the quantity of autonomous factors in your examination of change test. A one-way ANOVA assesses the effect of a sole component on a sole reaction variable. It decides if every one of the examples are something similar. The one-way ANOVA is utilized to decide if there are any measurably tremendous contrasts between the method for at least three free (inconsequential) gatherings.

A two-way ANOVA is an expansion of the one-way ANOVA. With a one-way, you have one free factor influencing a reliant variable. With a two-way ANOVA, there are two free thinkers. For instance, a two-way ANOVA permits an organization to look at laborer efficiency in light of two free factors, for example, compensation and range of abilities. Noticing the collaboration between the two factors and tests the impact of two variables simultaneously is used.