FLIP ROBO

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?
    a) Total Variation = Residual Variation – Regression Variation
    b) Total Variation = Residual Variation + Regression Variation
    c) Total Variation = Residual Variation * Regression Variation
    d) All of the mentioned
       Ans:b)

2. Collection of exchangeable binary outcomes for the same covariate data are called_____outcomes.
    a) random
    b) direct
    c) binomial
    d) none of the mentioned
   Ans: c)

3. How many outcomes are possible with Bernoulli trial?
    a) 2
    b) 3
    c) 4
    d) None of the mentioned
   Ans: a)

4. If Ho is true and we reject it is called
    a) Type-I error
    b) Type-II error
    c) Standard error
    d) Sampling error
   Ans: a)

5. Level of significance is also called:
    a) Power of the test
    b) Size of the test
    c) Level of confidence
    d) Confidence coefficient
    Ans: a)

6. The chance of rejecting a true hypothesis decreases when sample size is:
    a) Decrease
    b) Increase
    c) Both of them
    d) None
       Ans: b)

7. Which of the following testing is concerned with making decisions using data?
    a) Probability
    b) Hypothesis
    c) Causal
    d) None of the mentioned
    Ans: b)

8. What is the purpose of multiple testing in statistical inference?
    a) Minimize errors
    b) Minimize false positives

c) Minimize false negatives

d) All of the mentioned

Ans: d)

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

a) 0

b) 5

c) 1

d) 10

Ans: a)

Q10and Q15 are subjective answer type questions, Answer them in your own words briefly.

10. What Is Bayes' Theorem?

Ans: In statistics and probability theory, the Bayes' theorem (also known as the Bayes' rule) is a mathematical formula used to determine the conditional probability of events.

What is meant by Bayes theorem in probability?

Bayes' Theorem states that the conditional probability of an event, based on the occurrence of another event, is equal to the likelihood of the second event given the first event multiplied by the probability of the first event.

Bayes Theorm Formulae:

The formula for the Bayes theorem can be written in a variety of ways. The following is the most common version:

$P(A \mid B) = P(B \mid A)P(A) / P(B)$

$P(A \mid B)$ is the conditional probability of event A occurring, given that B is true.

$P(B \mid A)$ is the conditional probability of event B occurring, given that A is true.

$P(A)$ and $P(B)$ are the probabilities of A and B occurring independently of one another.

11. What is z-score?

A z-score is a numerical measurement that describes a value's relationship to the mean of a group of values. Z-score is measured in terms of standard deviation from the mean. If a z-score is 0, it indicates that the data points score is identical to the mean score.

12. What is t-test?

Ans: A t-test is a statistical test that compares the means of two samples. It is used in hypothesis testing, with a null hypothesis that the difference in group means is zero and an alternate hypothesis that the difference in group means is different from zero.

13. What is percentile?

Ans: In statistics, a percentile is a term that describes how a score compares to other scores from the same set. While there is no universal definition of percentile, it is commonly expressed as the percentage of values in a set of data scores that fall below a given value.

14. What is ANOVA?

Ans: Analysis of variance (ANOVA) is a statistical technique that is used to check if the means of two or more groups are significantly different from each other. ANOVA checks the impact of one or more factors by comparing the means of different samples.

15. How can ANOVA help?

Ans: ANOVA is helpful for **testing three or more variables**. It is similar to multiple two-sample t-tests. However, it results in fewer type I errors and is appropriate for a range of issues. ANOVA groups differences by comparing the means of each group and includes spreading out the variance into diverse sources.

For example, let's say you want to know if there's a difference between the average heights of four different types of trees in a forest. Instead of calculating whether each pair is statistically different from one another, you could run one ANOVA test to find out whether any of them are significantly different from one another.

We can use ANOVA to test for statistical differences between two or more groups to see if there is a significant difference between the means of those groups. ANOVA determines whether a test is valid by looking at the variation between and within groups.

If a test shows a large standard deviation between groups, then the differences are likely due o random chance; however, if the standard deviation within groups is large, then it may be due to real differences between groups.