

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: a) Total Variation = Residual Variation + Regression Variation

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) binomial

3. How many outcomes are possible with Bernoulli trial?

- a) 2
- b) 3
- c) 4
- d) None of the mentioned

Ans: a) 2

Ans: a) Type -I error

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: c) Level of confidence

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) Increase

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

- a) Probability

Hypothesis

- b) Causal
- c) None of the mentioned

Ans: b) Hypothesis

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: a) All of the mentioned

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) 0

Q10 and Q15 are subjective answer type questions, Answer them in your own words briefly.

10. What Is Bayes' Theorem?

Answer:

- Bayes' theorem describes the probability of occurrence of an event related to any condition.
- Bayes theorem is a mathematical formula, which is used to determine the conditional probability of the given event.
- The formula for the Bayes theorem can be written in a variety of ways. The following is the most common version:

$$P(A | B) = P(B | A)P(A) / P(B)$$

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

$P(B | A)$ 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?

Answer:

- A z score is simply defined as **the number of standard deviations from the mean**. The z-score can be calculated by subtracting mean by test value and dividing it by standard value. Where x is the test value, μ is the mean and σ is the standard value.

12. What is t-test?

Answer:

- t-test is a statistically significant test for the hypothesis testing (null and alternative hypotheses) when the sample size is small and the population parameter (mean and variance) is unknown.
- It is used to determine if there is a significant difference between the means of two groups, which may be related in certain features.

13. What is percentile?

Answer:

- A percentile **is** a comparison score between a particular score and the scores of the rest of a group. It shows the percentage of scores that a particular score surpassed. For example, if you score 75 points on a test, and are ranked in the 85th percentile, it means that the score 75 is higher than 85% of the scores.
- The percentile rank is calculated using the formula
$$R = (P/100) * (N)$$
where P is the desired percentile and N is the number of data points.
- Percentile is a number/value where a certain percentage of scores/data fall below that given number/value.

14. What is ANOVA?

Answer:

- An Analysis of Variance (ANOVA) is an inferential statistical tool that we use to find statistically significant differences among the means of two or more populations. We calculate variance but the goal is still to compare population mean differences.
- Analysis of variance (ANOVA) is a statistical procedure used to test the degree to which two or more groups vary in an experiment.

15. How can ANOVA help?

Answer:

- ANOVA checks the impact of one or more factors by comparing the means of different samples. We can use ANOVA to prove/disprove if all the medication treatments were equally effective or not.
- ANOVA tests compare the difference between the means of two or more groups of data. ANOVA tests measure the degree to which levels or groups of an independent variable differ from each other.
- It helps to find out whether the difference between groups of data is statistically significant.