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) 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

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) 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: b) Size of the test

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 b) Hypothesis c) Causal d) 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: d) 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

Q10and Q15 are subjective answer type questions, Answer them in your own words briefly.
10. What Is Bayes' Theorem?
ANS: Principled way of calculating a conditional probability without the joint probability.

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. Essentially, the Bayes' theorem describes the probability of an event based on prior knowledge of the conditions that might be relevant to the event.

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

Where:

- $P(A|B)$ – the probability of event A occurring, given event B has occurred
- $P(B|A)$ – the probability of event B occurring, given event A has occurred
- $P(A)$ – the probability of event A
- $P(B)$ – the probability of event B

11. What is z-score?
ANS: - z-score (also called a standard score) gives you an idea of how far from the mean a data point is. But more technically it's a measure of how many standard deviations below or above the population mean a raw score is. A z-score can be placed on a normal distribution curve. Z-scores range from -3 standard deviations (which would fall to the far left of the normal distribution curve) up to +3 standard deviations (which would fall to the far right of the normal distribution curve). In order to use a z-score, you need to know the mean μ and also the population standard deviation.

12.What is t-test?
ANS: t-test is a type of inferential statistic used to determine if there is a significant difference between the means of two groups, which may be related in certain features. It is mostly used when the data sets, like the data set recorded as the outcome from flipping a coin 100 times, would follow a normal distribution and may have unknown variances. A t-test is used as a hypothesis testing tool, which allows testing of an assumption applicable to a population.

13.What is percentile?
ANS: Percentiles indicate the percentage of scores that fall below a particular value. They tell you where a score stands relative to other scores. For example, a person with an IQ of 120 is at the 91st percentile, which indicates that their IQ is higher than 91 percent of other scores

14.What is ANOVA?
ANS: Analysis of variance (ANOVA) is an analysis tool used in statistics that splits an observed aggregate variability found inside a data set into two parts: systematic factors and random factors. The systematic factors have a statistical influence on the given data set, while the random factors do not. Analysts use the ANOVA test to determine the influence that independent variables have on the dependent variable in a regression study.

15.How can ANOVA help?
ANS: An ANOVA test is a way to find out if survey or experiment results are significant. In other words, they help you to figure out if you need to reject the null hypothesis or accept the alternate hypothesis.

THE END