

STATISTICS WORKSHEET

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

1. b) Total Variation = Residual Variation + Regression Variation
2. c) binomial
3. a) 2
4. a) Type-I error
5. b) Size of the test
6. b) Increase
7. b
8. d
9. a

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

10. What Is Bayes' Theorem?

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 theorem provides a way to calculate the probability of a hypothesis based on its prior probability, the probabilities of observing various data given the hypothesis, and the observed data itself.

Bayesian classification uses Bayes theorem to predict the occurrence of any event. Bayesian classifiers are the statistical classifiers with the Bayesian probability understandings. The theory expresses how a level of belief, expressed as a probability.

In statistics the Bayes' theorem 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.

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

11. What is z-score?

Z-scores are expressed in terms of standard deviations from their means. These z-scores have a distribution with a mean of 0 and a standard deviation of 1. Simply put, a z-score (also called a standard score) gives you an idea of how far from the mean a data point 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 σ .

The basic z score formula for a sample is:

$$Z = (x - \mu) / \sigma$$

12. What is t-test?

The t-test is a test that is mainly used to compare the mean of two groups of samples. It is meant for evaluating whether the means of the two sets of data are statistically significantly different from each other. There are many types of t-test. Some of these are:

- The one-sample t-test, which is used to compare the mean of a population with a theoretical value.
- The unpaired two-sample t-test, which is used to compare the mean of two independent given samples.
- The paired t-test, which is used to compare the means between two groups of samples that are related.

The T-test formula is given below:

$$t = (\bar{x} - \mu) / (s / \sqrt{n})$$

13. What is percentile?

A percentile (or a centile) is a measure used in statistics indicating the value below which a given percentage of observations in a group of observations fall. For example, the 20th percentile is the value (or score) below which 20% of the observations may be found.

14. What is ANOVA?

An ANOVA test is a type of statistical test used to determine if there is a statistically significant difference between two or more categorical groups by testing for differences of means using variance. Another Key part of ANOVA is that it splits the independent variable into 2 or more groups

In other words, they help you to figure out if you need to reject the null hypothesis or accept the alternate hypothesis. Basically, you're testing groups to see if there's a difference between them.

15. How can ANOVA help?

An ANOVA test is a way to find out if survey or experiment results are significant difference between two or more categorical groups by testing for differences of means using variance. Examples of situations where ANOVA might be used to test different groups:

- A group of psychiatric patients are trying three different therapies: counseling, medication and biofeedback. You want to see if one therapy is better than the others.
- A manufacturer has two different processes to make light bulbs. They want to know if one process is better than the other.
- Students from different colleges take the same exam. You want to see if one college outperforms the other.