STATISTICS WORKSHEET-3

Q.1] B

Q.2] C

Q.3] A

Q.4] A

Q.5] B

Q.6] B

Q.7] B

Q.8] D

Q.9] A

Q.10] What Is Bayes' Theorem?

ANS= Bayes' theorem describes the probability of occurrence of an event related to any condition. It is also considered for the case of conditional probability. The theorem is used the formula $P(A/B)=P(B/A)*P(A)/P(B)$

Where $P(A/B)$ is the probability of event A occurring given that event B has occurred.

$P(B/A)$ is the probability of event B occurring given that event A has occurred.

$P(A)$ is the probability of event A occurring.

$P(B)$ is the probability of event B occurring.

Bayes' theorem is used in many fields, including statistics, artificial intelligence, medicine etc.

Q.11] What is z-score?

ANS= A z-score also known as a standard score, is a measure of how far away a data point is from the mean of a distribution in terms of the number of standard deviations. It is a way to standardize the values of a variable so that they can be compared across different distributions.

Formula= $z=(x- \mu)/ \sigma$

Where x =value of the observation.

μ =mean of the distribution.

σ =standard deviation.

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).

z-score are widely used in statistics, inferential statistics and machine learning to standardize the data and in hypothesis testing, outlier detection and data normalization.

Q.12] What is t-test?

ANS= A t-test is an inferential statistic used to determine if there is a significant difference between the means of two groups and how they are related. T-tests are used when the data sets follow a normal distribution and have unknown variances, like the data set recorded from flipping a coin 100 times.

The t-test is a test used for hypothesis testing in statistics and uses the t-statistic, the t-distribution values, and the degrees of freedom to determine statistical significance.

There are two types of t-test:

1] independent samples t-test= This test used when the two groups being compared are independent of each other.

2] paired sample t-test= This test is used when the two groups being compared are related to each other.

Q.13] What is percentile?

ANS= In statistics, a percentile is a value that separates a dataset into 100 equal parts. Percentiles are often used to describe the distribution of a dataset by providing information about the relative standing of a particular value within the dataset.

For example, the 50th percentile is also known as the median and it is the value that separates the lowest 50% of the data from the highest 50% of the data. The 25th percentile is also known as the first quartile and separates the lowest 25% from the highest 75% of the data. Similarly, the 75th percentile separates the lowest 75% from the highest 25% of the data.

Percentiles can be calculated using the formula:

P(n) = (n/100)*N

Where P(n) is the nth percentile, n is the percentage (from 1 to 100), and N is the number of observations in the dataset. Percentiles are widely used in various fields such as economics, education, healthcare, and many more to compare the distribution of data and to provide a summary of the data.

Q.14] What is ANOVA?
ANS= ANOVA (Analysis of Varia ANOVA (Analysis of Variance) is a statistical method that is used to compare the means of two or more groups. It is a technique for testing whether there are significant differences between the means of different groups.

There are three types of ANOVA:

One-way ANOVA: This test is used when there is only one independent variable and two or more groups.

Two-way ANOVA: This test is used when there are two independent variables and two or more groups.

Three-way ANOVA: This test is used when there are three independent variables and two or more groups.

ANOVA is widely used in many fields such as agriculture, biology, engineering, marketing, and many more to compare means of different groups and understand the relationship between variables.

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Q.15] How can ANOVA help?

ANS= ANOVA (Analysis of Variance) can help in several ways:

1] Identifying differences between groups: ANOVA can be used to determine whether there are significant differences in the means of two or more groups.

2] Understanding relationships between variables: ANOVA can be used to understand the relationship between two or more independent variables and a dependent variable. This can help researchers identify which variables are most important in explaining the variation in the dependent variable, and can help in building predictive models.

3] Identifying interactions: In two-way or three-way ANOVA, it helps to identify if the effect of one variable depends on the value of another variable.

4] Assessing the reliability of experiments: ANOVA can help to determine whether the results of an experiment are reliable by assessing the variation within and between groups.

5] Making comparisons: ANOVA can be used to compare means of different groups, ANOVA can help to understand which group has higher or lower means, this can be useful in fields such as healthcare, education, and many more.