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?
   1. Total Variation = Residual Variation – Regression Variation
   2. **Total Variation = Residual Variation + Regression Variation**
   3. Total Variation = Residual Variation \* Regression Variation
   4. All of the mentioned
2. Collection of exchangeable binary outcomes for the same covariate data are called outcomes.
   1. random
   2. direct
   3. **binomial**
   4. none of the mentioned
3. How many outcomes are possible with Bernoulli trial?
   1. **2**
   2. 3
   3. 4



* 1. None of the mentioned

1. If Ho is true and we reject it is called
   1. **Type-I error**
   2. Type-II error
   3. Standard error
   4. Sampling error
2. Level of significance is also called:
   1. **Power of the test**
   2. Size of the test
   3. Level of confidence
   4. Confidence coefficient
3. The chance of rejecting a true hypothesis decreases when sample size is:
   1. Decrease
   2. **Increase**
   3. Both of them
   4. None
4. Which of the following testing is concerned with making decisions using data?
   1. Probability
   2. **Hypothesis**
   3. Causal
   4. None of the mentioned
5. What is the purpose of multiple testing in statistical inference?
   1. Minimize errors
   2. Minimize false positives
   3. Minimize false negatives
   4. **All of the mentioned**
6. Normalized data are centred at and have units equal to standard deviations of the original data
   1. **0**
   2. 5
   3. 1
   4. 10

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

1. What Is Bayes' Theorem?

Ans :- Bayes' Theorem, named after 18th-century British mathematician Thomas Bayes, is a mathematical formula for determining conditional probability. Conditional probability is the likelihood of an outcome occurring, based on a previous outcome having occurred in similar circumstances. Bayes' theorem provides a way to revise existing predictions or theories (update probabilities) given new or additional evidence.Bayes' Theorem allows you to update the predicted probabilities of an event by incorporating new information.

It is often employed in finance in calculating or updating risk evaluation.

The theorem has become a useful element in the implementation of machine learning.

The theorem was unused for two centuries because of the high volume of calculation capacity required to execute bits transactions.

Formula for Bayes’ Theorem

The Bayes’ theorem is expressed in the following formula:

Bayes’ Theorem - Formula

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

Note that events A and B are independent events (i.e., the probability of the outcome of event A does not depend on the probability of the outcome of event

1. What is z-score?

Ans :- A z-score measures the distance between a data point and the mean using standard deviations. Z-scores can be positive or negative. The sign tells you whether the observation is above or below the mean. For example, a z-score of +2 indicates that the data point falls two standard deviations above the mean, while a -2 signifies it is two standard deviations below the mean. A z-score of zero equals the mean. Statisticians also refer to z-scores as standard scores

1. What is t-test?

Ans :- A t test is a statistical test that is used to compare the means of two groups. It is often used in hypothesis testing to determine whether a process or treatment actually has an effect on the population of interest, or whether two groups are different from one another.

1. 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.

Percentiles show how a given value compares to others. The general rule is that if a value is in the kth percentile, it is greater than K per cent of the total values.

We can use the following formula to calculate percentile

Percentile= number of values/total number of values ×100

To find the percentile, here are a few steps to use the percentile formula. If q is any number between zero and hundred, the qth percentile is a value that divides the data into two parts i.e the lowest part contains the q percent of the data and the rest of the data is the upper part.

1. What is ANOVA?

Ans :- Analysis of Variance (ANOVA) is a statistical formula used to compare variances across the means (or average) of different groups. A range of scenarios use it to determine if there is any difference between the means of different groups. ANOVA means analysis of variance. ANOVA test is a statistical significance test that is used to check whether the null hypothesis can be rejected or not during hypothesis testing.

An ANOVA test can be either one-way or two-way depending upon the number of independent variables.

1. How can ANOVA help?

Ans :- ANOVAs is helpful because they can be used in scenarios where there is more than one independent variable. ANOVA tests can be used in the following disciplines:

-Natural sciences. In natural sciences, like ecology, ANOVA tests can be used to determine if the differences in beetle populations is significant in a group of locations.

-Social sciences. In social sciences, ANOVA tests can be used to study the statistical significance of various study environments on test scores.

-Medical research. In medical research, the ANOVA test can be used to identify the relationship between various types or brands of medications on individuals with migraines or depression.

