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

**ANSWER: b**

1. Collection of exchangeable binary outcomes for the same covariate data are called outcomes.
   1. random
   2. direct
   3. binomial
   4. none of the mentioned

**ANSWER: c**

1. How many outcomes are possible with Bernoulli trial?
   1. 2
   2. 3
   3. 4
   4. None of the mentioned

**ANSWER: a**

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

**ANSWER: a**

1. Level of significance is also called:
   1. Power of the test
   2. Size of the test
   3. Level of confidence
   4. Confidence coefficient

**ANSWER: b**

1. The chance of rejecting a true hypothesis decreases when sample size is:
   1. Decrease
   2. Increase
   3. Both of them
   4. None

**ANSWER: a**

1. Which of the following testing is concerned with making decisions using data?
   1. Probability
   2. Hypothesis
   3. Causal
   4. None of the mentioned

**ANSWER: b**

1. 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

**ANSWER: d**

1. Normalized data are centred at and have units equal to standard deviations of the original data
   1. 0
   2. 5
   3. 1
   4. 10

**ANSWER: b**

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

1. What Is Bayes' Theorem?

**ANSWER :** Bayes' Theorem is a mathematical formula for determining conditional probability.

Formula For Bayes' Theorem :

P(A∣B)= P(A⋂B) / P(B) = P(A)⋅P(B∣A) / P(B)

where:

P(A)= The probability of A occurring

P(B)= The probability of B occurring

P(A∣B)=The probability of A given B

P(B∣A)= The probability of B given A

P(A⋂B))= The probability of both A and B occurring

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1. What is z-score?

**ANSWER :** A Z-score is a numerical measurement that describes a value's relationship to the mean of a group of values. Z-score is measured in terms of standard deviations from the mean.

The formula for computing z-score:

Z = (sample mean – population mean )/ Sample standard deviation

1. What is t-test?

**ANSWER :** 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.

The formula for computing the t-value and degrees of freedom for a paired t-test is:​

T= mean1−mean2 /( s(diff)/ sqrt(n) )​

where:

mean1 and mean2=The average values of each of the sample sets

s(diff)=The standard deviation of the differences of the paired data values

n=The sample size (the number of paired differences)

n−1=The degrees of freedom

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1. What is percentile?

**ANSWER :** In statistics, a percentile is a score below which a given percentage of scores in its frequency distribution fall or a score at or below which a given percentage fall.

1. What is ANOVA?

**ANSWER :** ANOVA is a statistical method that stands for analysis of variance, which is used to do the analysis of variance between and within the groups whenever the groups are more than two. ANOVA creates a way to test several null hypothesis at the same time.

1. How can ANOVA help?

**ANSWER :** The use of ANOVA depends on the research design. Commonly, researchers are using ANOVA in three ways: one-way ANOVA, two-way ANOVA[**,**](http://www.statisticssolutions.com/academic-solutions/resources/directory-of-statistical-analyses/factorial-anova/) and N-way Multivariate ANOVA.

One-Way: When we compare more than two groups, based on one factor (independent variable), this is called one way ANOVA.

Two-Way: Two-way ANOVA’s can be used to see the effect of one of the factors after controlling for the other, or it can be used to see the INTERACTION between the two factors. This is a great way to control for extraneous variables as you are able to add them to the design of the study.

N-Way: When the factor comparison is taken, then it said to be n-way ANOVA. For example, in productivity measurement if a company takes all the factors for productivity measurement, then it is said to be n-way ANOVA.