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   
**ANSWER – b)**

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   
**ANSWER – c)**

3. How many outcomes are possible with Bernoulli trial?   
a) 2 b) 3 c) 4 d) None of the mentioned   
**ANSWER – a)**

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   
**ANSWER – a)**

5. Level of significance is also called:   
a) Power of the test b) Size of the test c) Level of confidence d) Confidence coefficient   
**ANSWER – a)**

6. The chance of rejecting a true hypothesis decreases when sample size is:   
a) Decrease b) Increase c) Both of them d) None   
**ANSWER – b)**

7. Which of the following testing is concerned with making decisions using data?   
a) Probability b) Hypothesis c) Causal d) None of the mentioned   
**ANSWER – b) , however there should be an option of A/B testing**

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   
**ANSWER – d)**

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   
**ANSWER = c)**

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

10. What Is Bayes' Theorem?   
ANSWER – Bayes’ theorem is completely based on conditional probability. Conditional probability means Probability of an event A given that event B is done.  
equation of bayes theorem is = p(A|B) =[ p(B|A) \* p(A) ] / p(B). Where p(A|B) is called posterior, p(B|A) is called likelihood , p(A) is called prior and p(B) is called evidence. Bayes’ theorem describes the [probability](https://corporatefinanceinstitute.com/resources/knowledge/other/total-probability-rule/) of an event based on prior knowledge of the conditions that might be relevant to the event.

11. What is z-score?   
ANSWER – Z-score is a standard score which gives us an idea about how far a point is away from the mean, it is a measure of how many standard deviation below or above the population mean a raw score is. Formula of zscore is = (observed value – sample mean) / standard deviation.  
Z-score helps in detecting outliers.

12. What is t-test?   
Student's t-test, is a statistic method of testing hypotheses about the mean of a small sample drawn from a normally distributed population when the population standard deviation is unknown. The purpose of student’s t-test is to find if there is a significant difference between two sets of data?  
The formula of t-statistics is = (sample mean – population mean of all samples) / (sample standard deviation / sqrt(sample size) ). If the size of the sample is more than 30 then It will follow the normal distribution and by 68-95-99.7 rule we can find the distribution, however if the sample size is below 30 then it will be a t-statistics test. When we find the t-value we can find the respective value from t-table to to calculate the area under 1 tailed or 2 tailed case.

13. What is percentile?   
ANSWER – A percentile is a comparison score between one specific score with the rest of the scores in a group. For example if someone scored 80 marks which is 82th percentile it means that 80 is higher then the 85 percent of the scores in a class.  
For finding the percentile of a specific number we 1st arrange the data in ascending order then find the position of the required marks using this formula = point location = (n + 1)\*p/100, where n is the number of the observation and p is the marks.

14. What is ANOVA?   
ANSWER – ANOVA is a statistical technique to compare the means of 2 or more groups of observation, ANOVA is used for continuous and numerical variable.

15. How can ANOVA help?  
ANSWER – ANOVA increase statistical power in test of hypothesis to take correct decision