



REPORT

On

PARAMETRIC AND NON-PARAMETRIC TEST

Submitted by

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Q1.

A. Which test is suitable for the below problem? And why?

Ans **Wilcoxon rank test** is used for this problem. **Wilcoxon rank test** is a nonparametric test of the null hypothesis that it is equally likely that a randomly selected value from one sample will be less than or greater than a randomly selected value from a second sample. This is used over here because to determine whether two dependent samples i.e. business graduates and non-business graduates were selected from populations having the same distribution

B. State the hypothesis for the problem.

Ans H_0 i.e. the null hypothesis states that if $p > 0.05$ then there is no statistically significant difference between the variables i.e. business graduates and non-business graduates for this problem.

H_a i.e. the alternate hypothesis states that if $p < 0.05$ then there is statistically significant difference between the variables i.e. business graduates and non-business graduates for this problem.

C. Statistical Outcome: TEST stat= 2.29, p value = 0.0110 & Interpret your result.

Ans As per the values i.e. TEST stat= 2.29, p value = 0.0110 here $p < 0.05$ that means we have to reject the null hypothesis and accept the alternate hypothesis which states that there is significant difference between the business graduates and non-business graduates.

Q2.

A. Which test is suitable for the below problem? And why?

Ans **Wilcoxon signed-rank test** is used for this problem. The **Wilcoxon signed-rank test** is a non-parametric statistical hypothesis test used to compare two related samples, matched samples, or repeated measurements on a single sample to assess whether their population means ranks differ. This is used over here because to determine whether two dependent samples i.e. European cars and North American cars were selected from populations having the same distribution

B. State the hypothesis for the problem.

Ans H_0 i.e. the null hypothesis states that if $p > 0.05$ then there is no statistically significant difference between the variables i.e. European car is not perceived to be more comfortable than North American car for this problem.

H_a i.e. the alternate hypothesis states that if $p < 0.05$ then there is statistically significant difference between the variables i.e. European car is perceived to be more comfortable than North American car for this problem.

C. Statistical Outcome: TEST stat= 2.29, p value = 0.0110 & Interpret your result

Ans As per the values i.e. TEST stat= 20.29, p value = 0.0110 here $p < 0.05$ that means we have to accept the alternate hypothesis and reject the null hypothesis which states that there is

significant difference between the European cars and North American cars i.e. European car is perceived to be more comfortable than North American car for this problem.

Q3.

A. Which test is suitable for the below problem? And why?

Ans As per the sample provided to us which is not normally distributed, we are going to apply non-parametric test for the better result and for this sample we are going to use **Chi-square goodness of fit test**. This is so because there is one sample inference and the sample size too are less than equal to 30 which fulfils the condition of Chi-square test. The Chi Square statistic is commonly used for testing relationships between categorical variables (here it is equal to 1cc and less than 1cc).

B. State the hypothesis for the problem.

Ans H_0 i.e. the null hypothesis states that if $p > 0.05$ then there is no relationship exists on the categorical variables in the population, the variables are independent of each other and that there is not a statistical relationship between the categorical variables. Here the variance of the fill is 1 cubic centimetre.

H_a i.e. the alternate hypothesis states that if $p < 0.05$ then relationship exists on the categorical variables in the population, the variables are not independent of each other and that there is a statistical relationship between the categorical variables. Here the variance of the fill is less than 1 cubic centimetre.

C. Statistical Outcome: TEST stat= 15.20, p value = 0.0852 & Interpret your result.

Ans As per the values i.e. TEST stat= 15.20, p value = 0.0852 here $p > 0.05$ that means we have to accept the null hypothesis and reject the alternate hypothesis which states that for this problem the variables are independent of each other and that there is not a statistical relationship between the categorical variables.

Q4.

A. Which test is suitable for the below problem? And why?

Ans As per the sample provided to us which is normally distributed, we are going to apply parametric test for the better result and for this sample we are going to use **one sample t test**. This is so because to determine if there is a significant difference between the mean of group, which may be related in certain features and here parameter to be tested is population mean. It is the statistical difference between a sample mean and a known or hypothesized value of the mean in the population.

B. State the hypothesis for the problem.

Ans H_0 i.e. the null hypothesis states that if $p > 0.05$ then there is no significant difference in the two means. The mean of the population is 2 pounds.

H_a i.e. the alternate hypothesis states that if $p < 0.05$ then there is significant difference in the two means. The mean of the population is greater than 2 pounds.

C. Statistical Outcome: TEST stat= 2.23, p value = 0.0134 & Interpret your result.

Ans As per the values i.e. TEST stat= 2.23, p value = 0.0134 here $p < 0.05$ that means we have to accept the alternate hypothesis and reject the null hypothesis which states that the mean of the population is greater than 2 pounds and there is significant difference in the two means.

Q5.

A. Which test is suitable for the below problem? And why?

Ans As per the sample provided to us which is normally distributed, we are going to apply parametric test for the better result and for this sample we are going to use **One-way Anova test**. This is so because to compare four variables from the population and the samples are independent too, also the claim is about the variance of the sample.

B. State the hypothesis for the problem.

Ans H_0 i.e. the null hypothesis states that if $p > 0.05$ then there is no significant difference between any of the bumper's reaction to low speed collision i.e. $\mu_1 = \mu_2 = \mu_3 = \mu_4$.

H_a i.e. the alternate hypothesis states that if $p < 0.05$ then there is significant difference between some of the bumper's reaction to low speed collision.

C. Statistical Outcome: TEST stat= 4.06, p value = 0.0139 & Interpret your result.

Ans As per the values i.e. TEST stat= 4.06, p value = 0.0139 here $p < 0.05$ that means we have to accept the alternate hypothesis and reject the null hypothesis which states that there is significant difference between some of the bumper's reaction to low speed collision.

Q6.

A. Which test is suitable for the below problem? And why?

Ans As per the sample provided to us which is not normally distributed, we are going to apply non-parametric test for the better result and for this sample we are going to use **one sample Z test**. This is so because many non-parametric test statistics, such as U statistics, are approximately normal for large enough sample sizes and which is 110 million, and hence are often performed as Z-tests.

B. State the hypothesis for the problem.

Ans H_0 i.e. the null hypothesis states that if $p > 0.05$ then households are watching deal or no deal show in same proportion as that of other shows.

H_a i.e. the alternate hypothesis states that if $p < 0.05$ then households are not watching deal or no deal show in the same proportion as that of other shows.

C. Statistical Outcome: TEST stat=1.96, p value = 0.1949 & Interpret your result.

Ans As per the values i.e. TEST stat= 1.96, p value = 0.1949 here $p > 0.05$ that means we have to accept the null hypothesis and reject the alternate hypothesis which states that households are watching deal or no deal show in the same proportion as compared to other shows that are streaming at the time slot from 9.00 - 9.30 P.M.
