\*For Question 1 and Question 2, I use SPSS to solve.

\*For Question 3, Question 4, and Question 5, I use R Script file to solve.

Question 1

1. Let X be number of incoming service request through text messages in the sample of 10.

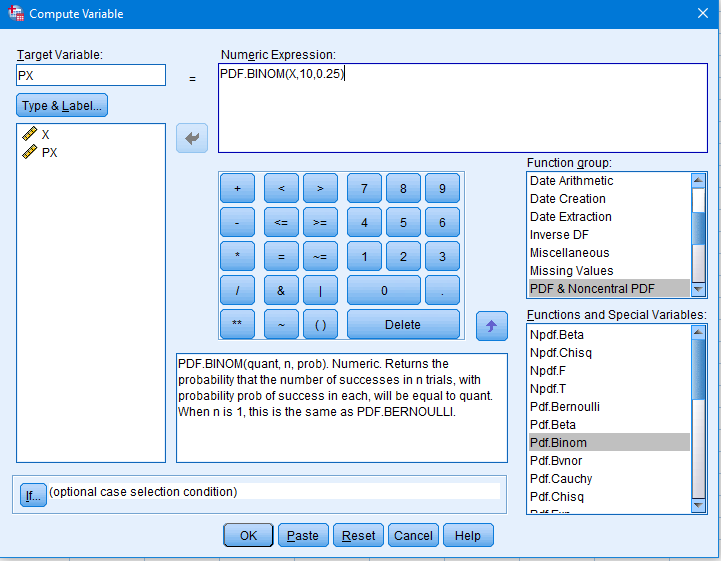


Diagram 1.1 Numeric Expression of P(x) in Binomial Distribution.

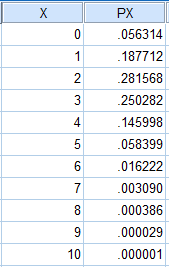


Diagram 1.2 Table of *x* value and Probability

1. Probability that the sample contains at most 5 service requests through voice calls is equal to Probability that at least 5 service requests through text messages.

From (a)

Question 2

1. To find reasonable range, Assume Z = 3 which has Confidence Interval of almost 99.7% from Empirical Rule. (

Let X be the life span of calculators

Expand the range by 5 for more detail that more than 99.7% of Confidence Interval.

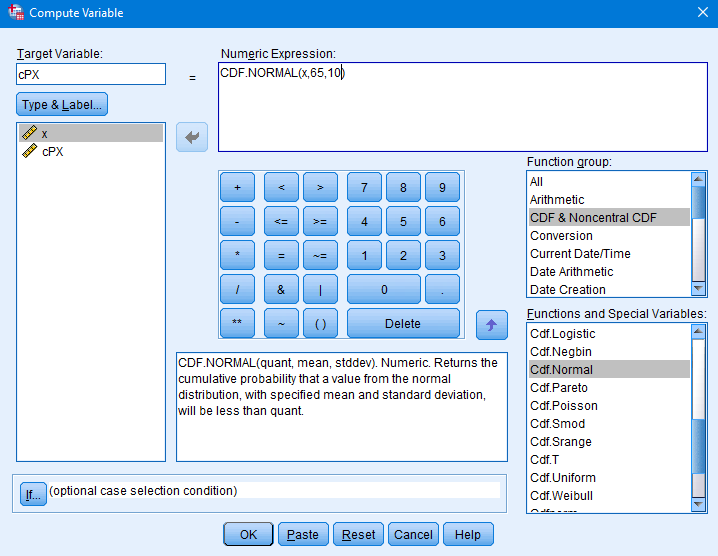


Diagram 2.1 Numeric Expression of CP(x) in Cumulative Normal Distribution.

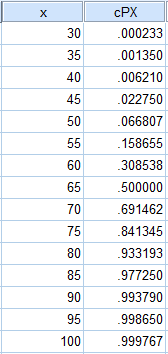


Diagram 2.2 Table of *x* value and Cumulative Probability ()

1. Probability that a calculator of the brand will have life span at least 6 years is equal to Probability that a calculator of the brand will have life span at least 72 months

We insert one more row for

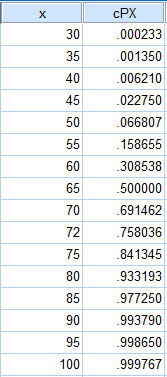


Diagram 2.3 Modified Table of *x* value and Cumulative Probability with new X

From Table

1. The minimum life span of the 20% most durable calculators of this brand.

So, We Add new columns for Inverse Normal Distribution with y as life span of calculator.

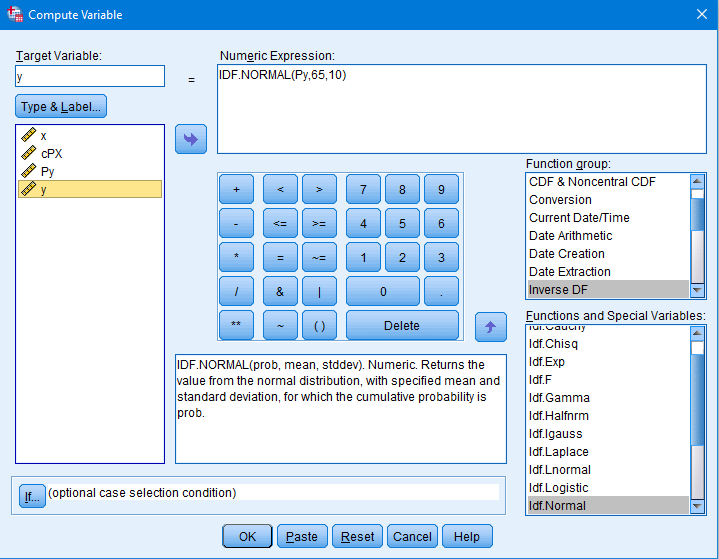


Diagram 2.4 Numeric Expression of y in Inverse Normal Distribution.

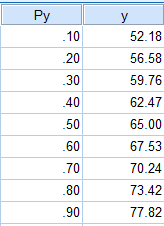


Diagram 2.5 Table of Cumulative Probability () and *y* value

From Table,

Since the table is show cumulative Probability

Then,

, Then

Therefore, the minimum life span of the 20% most durable calculators of this brand is 74 months

Question 3

There is no association between percentage of customers who think the food and service are excellent and restaurant in different area of a city.

There is an association between percentage of customers who think the food and service are excellent and restaurant in different area of a city.

|  |  |  |  |
| --- | --- | --- | --- |
| Restaurant in Area | Number of customers who think the food and services | | Total |
| Poor | Excellent |
| A | 82 | 118 | 200 |
| B | 90 | 160 | 250 |
| Total | 172 | 278 | 450 |

Or

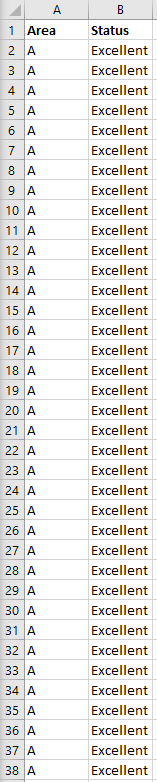


Diagram 3.1 Table of Area and Services Status created in Excel File

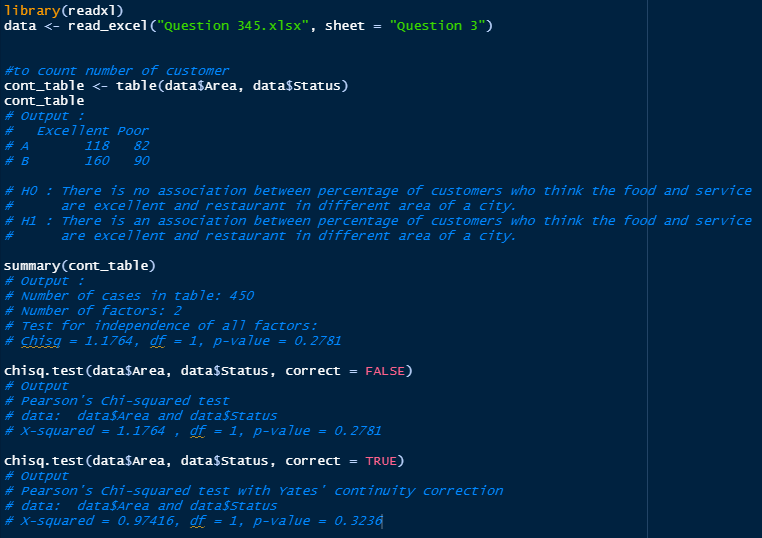


Diagram 3.2 Source code and Output of R programming to perform Chi-Square Test

From the Diagram 3.2, Since the degree of freedom . I will use Yates’ continuity correction in the function *chisq.text()* as additional result.

Conclusion:

Since (Yates’ Continuity Correction), We failed to reject and conclude that there is no association between percentage of customers who think the food and service are excellent and restaurant in different area of a city.

Question 4

, Time taken for both machines to assemble the products have the same variance

, Time taken for both machines to assemble the products **does not** have the same variance

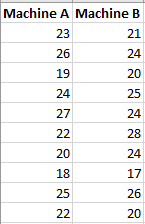


Diagram 4.1 Table of Time Taken (in Minutes) to assemble a fixed number of products using Machine A and Machine B created in Excel File

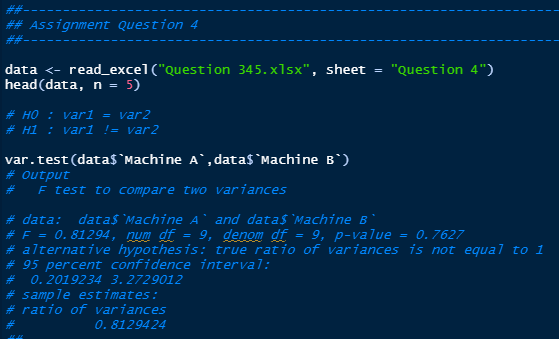


Diagram 4.2 Source code and Output of R programming to perform variance Test

From the Diagram 4.2,

Since , we failed to reject and conclude that the time taken for both machines to assemble the products have the same variance

, Mean time taken to assemble the product by using Machine A is shorter than mean time taken to assemble the product by using Machine B

, Mean time taken to assemble the product by using Machine A is **not** shorter than mean time taken to assemble the product by using Machine B.

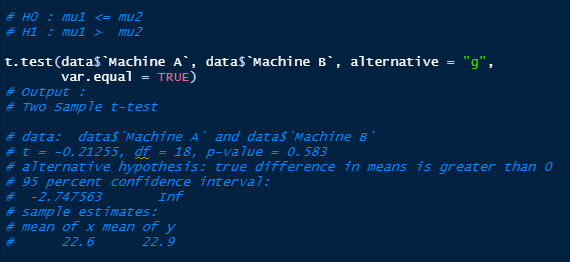


Diagram 4.3 Source code and Output of R programming to perform T Test

From the Diagram 4.3,

Since , we failed to reject and conclude that mean time taken to assemble the product by using Machine A is shorter than mean time taken to assemble the product by using Machine B. Therefore, Machine A is recommended to choose to assembly the product in shorter time.

Question 5

: There is no association between the number of cars at different seasons and zones.

: There is an association between the number of cars at different seasons and zones.

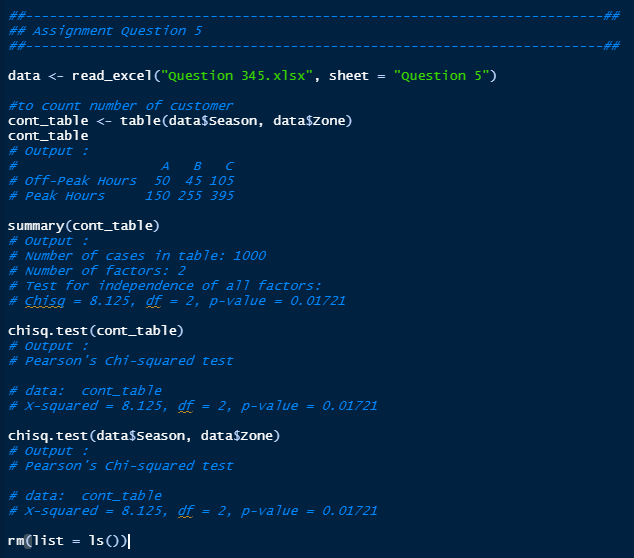


Diagram 5.1 Source code and Output of R programming to perform Chi Square Test

From the Diagram 5.1,

Since , we reject and conclude that there is an association between the number of cars at different seasons and zones.