**Team Number:**

**Team Captain:**

**Team Members:**

**Activity on October 12, 2022**

**Problem 1 (10 Points)** The data set used in this activity is “ACT\_04.Data.xlsx”. A supermarket chain is interested in exploring the relationship between the sales of its store-brand canned vegetables (*y*) in local newspaper (*x*1), and the amount of shelf space allocated to the brand (*x*2).

1. Read the data into your software system
2. Produce a scatter plot of Y and X1.
3. Produce a scatter plot of Y and X2.
4. Build a regression model with two predictors X1 and X2. (Model I)
5. Build another regression model with three predictors X1, X2, and X12. (Model II)
6. Build the third regression model with all five predictors. (Model III)
7. Build the last regression model with four predictors X1, X2, X12, and X1SQ (Model IV)

After completion of this activity, complete the following table.

|  |  |  |
| --- | --- | --- |
| Model | R-Square | MSE |
| I |  |  |
| II |  |  |
| III |  |  |
| IV |  |  |
|  |  |  |

**Problem 2 (10 Points)**

Use the software of your team selected to calculate the following statistics and complete the table below:

1. Normal Quantile at probability 0.0125 and 0.99
2. Student t quantile at probability 0.0125 (with degrees of freedom 333) and 0.99 (with degrees of freedom 345)
3. Chi-square quantile at probability 0.025 (with degrees of freedom 125) and 0.975 (with degrees of freedom 245)
4. F quantile at probability 0.01 (with degrees of freedom 12 and 250) and 0.99 (with degrees of freedom 24 and 500)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Distribution** | **Degrees of Freedom I** | **Degrees of Freedom II** | **Probability** | **Quantile** |
| Normal | NA | NA | 0.0125 |  |
| Normal | NA | NA | 0.99 |  |
| Student t | 333 | NA | 0.0125 |  |
| Student t | 345 | NA | 0.99 |  |
| Chi-Square | 125 | NA | 0.025 |  |
| Chi-Square | 245 | NA | 0.975 |  |
| F | 12 | 250 | 0.01 |  |
| F | 24 | 500 | 0.99 |  |

**Note:**

1. **The quantile of a standard normal random variable at a is 0.098 if if x is standard normal random variable**
2. **The quantile of a chi-square random variable at b is 0.048 if if x is chi-square random variable**

**Problem 3 (10 Points) Chapter III Problem 3, 4, 5, 6, and 7 on Page 121 to page 123 of the textbook**