**Minitab**

**Practical 5: Correlation and Regression**

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Go to BLACKBOARD and Open PRACTICAL FIVE.MTW

Save Project As **Practical Five.**

In this practical you will take raw data, make a Scatter Graph and Calculate the Line of Regression using the Method of Least Squares.

If the least squares regression line of y on x is given by , then

* A used car lot is trying to increase its business by showing a TV ad. Over a 10 week period, they have recorded the number of times the ad was shown and the number of cars sold. The data is given in C1 and C2.

Make a Scatter Graph of the data.

GRAPH>SCATTERPLOT (Simple)

Y VARIABLES: Number of Cars Sold

X VARIALBES: Number of TV Ads

*What type of correlation does the Scatter Graph have?*

* Now it is time to calculate the line of regression using the method of Least Squares. First, label C3 as ‘xy’ and C4 and ‘x^2’ (similar to the table used when calculating the line of regression by hand.
* Calculate *xy*: CALC>CALCULATOR

*Number of TV Ads (x) \* Number of Cars Sold (y)*

Store the result in C3 (*xy*).

* Calculate : CALC>CALCULATOR

*( Number of TV Ads (x) )^2*

Store the result in C4 (x^2)

* Next, we need to sum C1-C4. This is done using CALC>COLUMN
* STATISTICS. Select SUM in the dialog box and store the results as follows.

|  |  |
| --- | --- |
| **Calculation** | **Constant Name** |
|  | SumX1 |
|  | SumY1 |
|  | SumXY1 |
|  | SumX1SQ |

After you have finished the calculations, display the four constants simultaneously using the DATA>DISPLAY DATA command. Fill in the information below:

|  |  |  |
| --- | --- | --- |
|  |  |  |
|  |  | *n =* |

* Now it is time to calculate the Regression Coefficients **a** and **b**. Label C5 as ‘**B1**’ and C6 as ‘**A1**’

Use CALC>CALCULATOR to calculate **b** and store the result as **B1**.

(10\*SumXY1 - SumX1\*SumY1)/(10\*SumX1SQ - SumX1^2)

Use CALC>CALCULATOR to calculate **a** and store the result as **A1**.

(SumY1/10)-B1\*(SumX1/10)

After you have finished the calculations, display the two constants simultaneously using the DATA>DISPLAY DATA command. Fill in the information below:

|  |  |
| --- | --- |
| **b =** | **a =** |

* Write the Line of Regression,

|  |
| --- |
|  |

* The analysis just carried out can all be done very quickly by MINITAB as follows: Use

STAT>REGRESSION>FITTED LINE PLOT

RESPONSE: Number of Cars Sold

PREDICTOR: Number of TV Ads

Notice you get a graph showing the plotted data along with the line of regression. The equation of the line is written at the top of your graph. The session window also has the equation of the line along with other results from analysis.

* The second set of data comes from a restaurant with outdoor seating. The restaurant has randomly recorded the daily temperature and the number of customers seated outside at midday.

Repeat steps (i) to (iii) for the second set of data. Save your constants as follows:

*What type of correlation does the Scatter Graph have?*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Column** | **9** | **10** | **11** | **12** |
| **Label** | xy2 | x2 ^2 | B2 | A2 |

|  |  |
| --- | --- |
| **Calculation** | **Constant Name** |
|  | SumX2 |
|  | SumY2 |
|  | SumXY2 |
|  | SumX2SQ |

|  |  |  |
| --- | --- | --- |
|  |  |  |
|  |  | *n =* |

|  |  |
| --- | --- |
| b = | a = |

Write the Line of Regression,

|  |
| --- |
|  |