# Minitab Practical 5: Correlation and Regression

## Part (I)



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

*Positive*

## Part (ii)

**Sum of Number of TV Ads (x)**

Sum of Number of TV Ads (x) = 145

**Sum of Number of Cars Sold (y)**

Sum of Number of Cars Sold (y) = 212

## Part (ii) (a)

**Sum of Xy**

Sum of Xy = 3764

*Part (ii)* (b)

**Sum of x"2**

Sum of x"2 = 2785

## *Part (iii)*

**Data Display**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Row | Number of TV ads (x) | Number of Cars Sold (y) | Xy | x"2 |
| 1 | 6 | 15 | 90 | 36 |
| 2 | 20 | 31 | 620 | 400 |
| 3 | 0 | 10 | 0 | 0 |
| 4 | 14 | 16 | 224 | 196 |
| 5 | 25 | 28 | 700 | 625 |
| 6 | 16 | 20 | 320 | 256 |
| 7 | 28 | 40 | 1120 | 784 |
| 8 | 18 | 25 | 450 | 324 |
| 9 | 10 | 12 | 120 | 100 |
| 10 | 8 | 15 | 120 | 64 |

## Part (iv)

|  |  |  |
| --- | --- | --- |
| 145 | 212 |  |
| 3764 | 2785 | *n =* |

## Part (v)

Row B1 A1

1 1.01099 6.54066

|  |  |
| --- | --- |
| **b =**  1.01099 | **a =**6.54066 |

Part (vi) Write the Line of Regression,

|  |
| --- |
|  |

**15 = 1.01 + 6.54 \* 8**

Part (vi)

**Regression Analysis: Number of Cars Sold (y) versus Number of TV Ads (x)**

The regression equation is

Number of Cars Sold (y) = 6.541 + 1.011 Number of TV Ads (x)

S = 4.00027 R-Sq = 84.5% R-Sq(adj) = 82.6%

Analysis of Variance

Source DF SS MS F P

Regression 1 697.582 697.582 43.59 0.000

Error 8 128.018 16.002

Total 9 825.600



# Part (ii)



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

*Positive*

## Part (ii)

**Sum of Temperature (in Celsius)**

Sum of Temperature (in Celsius) = 323

**Sum of No. of Customers Eating Outside**

Sum of No. of Customers Eating Outside = 455

## Part (ii) (a)

**Sum of Xy(2)**

Sum of Xy(2) = 11508

**Sum of x^2**

Sum of x^2 = 7942.5

## Part (iii)

**Scatterplot of Temperature (in Celsius) vs No. of Customers Eating**

**Data Display**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Row | Temperature (in Celsius) | No. of Customers Eating Outside | Xy(2) | x^2 |
| 1 | 28.0 | 45 | 1260.0 | 784.00 |
| 2 | 16.0 | 15 | 240.0 | 256.00 |
| 3 | 11.0 | 3 | 33.0 | 121.00 |
| 4 | 25.0 | 42 | 1050.0 | 625.00 |
| 5 | 29.0 | 49 | 1421.0 | 841.00 |
| 6 | 26.5 | 41 | 1086.5 | 702.25 |
| 7 | 18.0 | 26 | 468.0 | 324.00 |
| 8 | 22.0 | 33 | 726.0 | 484.00 |
| 9 | 21.0 | 31 | 651.0 | 441.00 |
| 10 | 26.5 | 37 | 980.5 | 702.25 |
| 11 | 35.0 | 49 | 1715.0 | 1225.00 |
| 12 | 26.0 | 36 | 936.0 | 676.00 |
| 13 | 20.0 | 29 | 580.0 | 400.00 |
| 14 | 19.0 | 19 | 361.0 | 361.00 |

## Part (iv)

|  |  |  |
| --- | --- | --- |
| 323 | 455 |  |
| 11508 | 7942.5 |  |

## Part (v)

Row B2 A2

1 1.28032 4.156

|  |  |
| --- | --- |
| b = 1.28 | a = 4.156 |

## Part (vi)

Write the Line of Regression,

45 = 4.15 + 1.28 (28.0)

|  |
| --- |
|  |

## Part (vii)

**Regression Analysis: Temperature (in versus No. of Customers**

The regression equation is

Temperature (in Celsius) = 8.86 + 0.437 No. of Customers Eating Outside

Predictor Coef SE Coef T P

Constant 8.864 1.464 6.05 0.000

No. of Customers Eating Outside 0.43716 0.04189 10.44 0.000

S = 2.01404 R-Sq = 90.1% R-Sq(adj) = 89.2%

Analysis of Variance

Source DF SS MS F P

Regression 1 441.75 441.75 108.90 0.000

Residual Error 12 48.68 4.06

Total 13 490.43

Unusual Observations

No. of

Customers

Eating Temperature

Obs Outside (in Celsius) Fit SE Fit Residual St Resid

3 3.0 11.000 10.175 1.348 0.825 0.55 X

11 49.0 35.000 30.285 0.876 4.715 2.60R

R denotes an observation with a large standardized residual.

X denotes an observation whose X value gives it large leverage.

**Regression Analysis: Temperature (in Celsius) versus No. of Customers Eating**

The regression equation is

Temperature (in Celsius) = 8.864 + 0.4372 No. of Customers Eating Outside

S = 2.01404 R-Sq = 90.1% R-Sq(adj) = 89.2%

Analysis of Variance

Source DF SS MS F P

Regression 1 441.752 441.752 108.90 0.000

Error 12 48.676 4.056

Total 13 490.429

