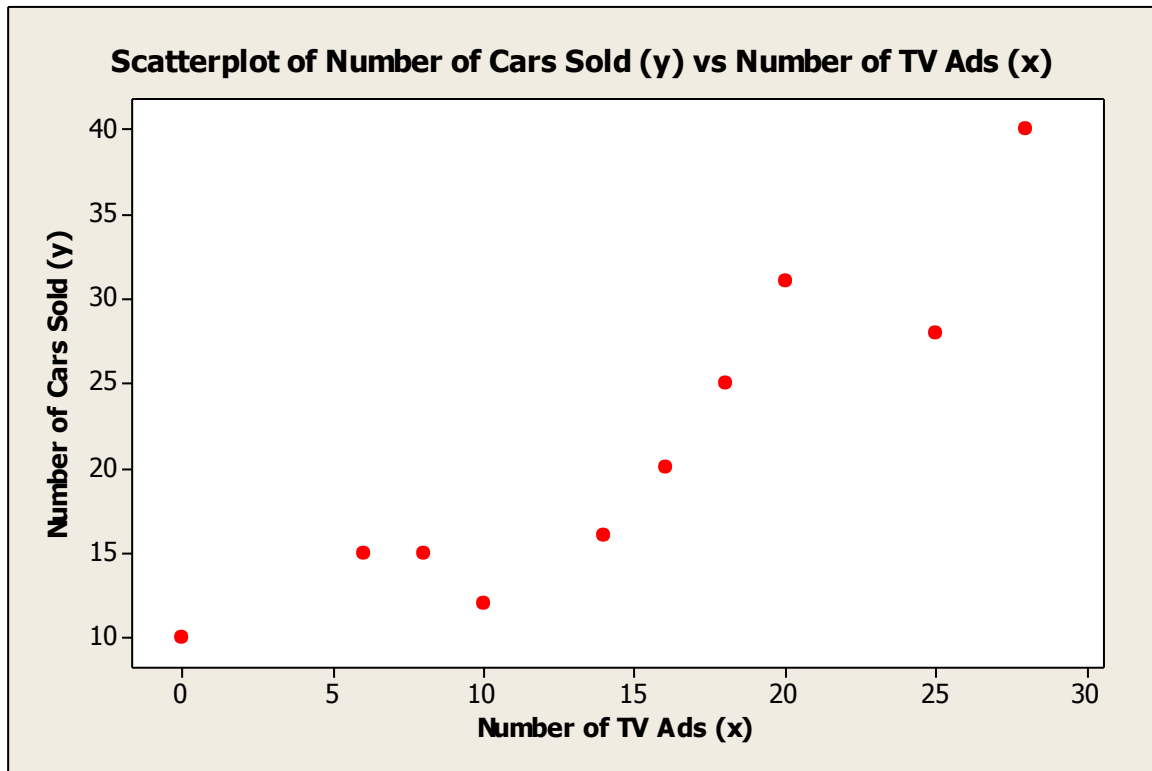


Minitab

## 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)

$$\sum x = 145$$

$$\sum y = 212$$

$$\sum xy = 3764$$

$$\sum x^2 = 2785$$

$$n =$$

### Part (v)

Row	B1	A1
1	1.01099	6.54066

$$\mathbf{b} = 1.01099$$

$$\mathbf{a} = 6.54066$$

### Part (vi)

Write the Line of Regression,  $y = a + bx$

$15 = 1.01 + 6.54 * 8$

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Part (vi)

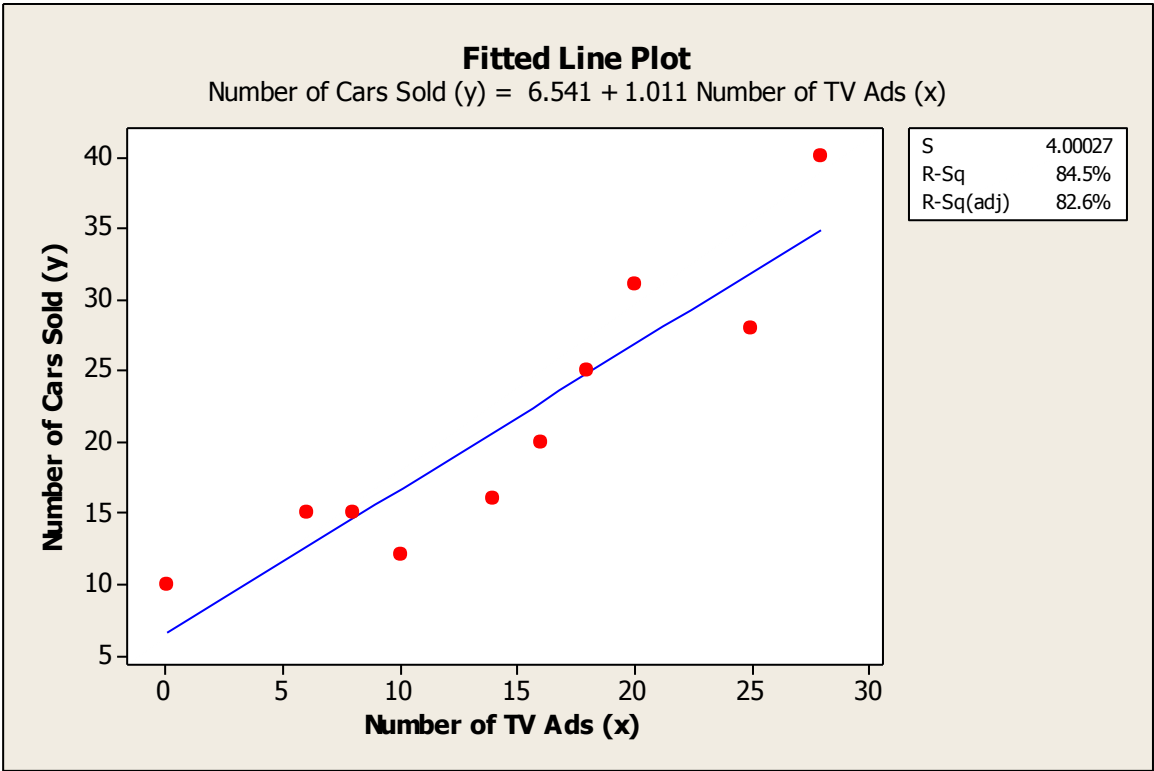
Regression Analysis: Number of Cars Sold (y) versus Number of TV Ads (x)

The regression equation is  
Number of Cars Sold (y) = 6.541 + 1.011 Number of TV Ads (x)

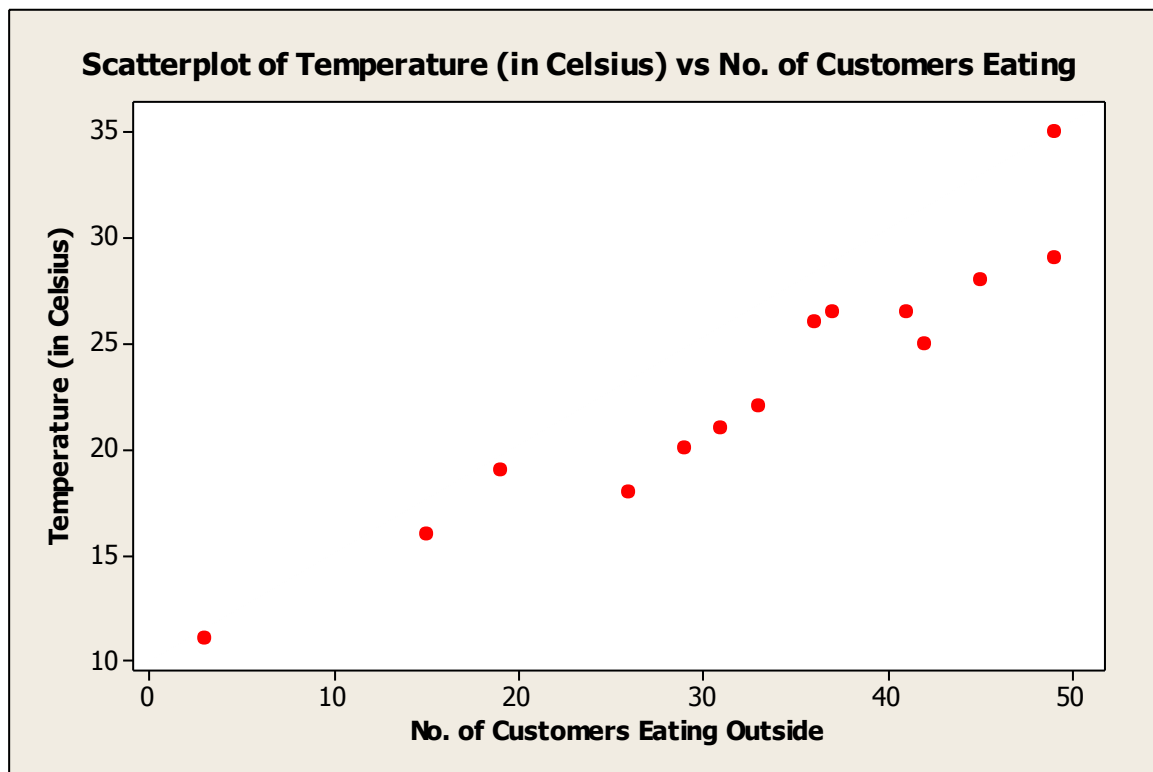
S = 4.00027    R-Sq = 84.5%    R-Sq(adj) = 82.6%

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)

$$\sum x = 323$$

$$\sum y = 455$$

$$\sum xy = 11508$$

$$\sum x^2 = 7942.5$$

### Part (v)

Row	B2	A2
1	1.28032	4.156

$$b = 1.28$$

$$a = 4.156$$

### Part (vi)

Write the Line of Regression,  $y = a + bx$

$$45 = 4.15 + 1.28 (28.0)$$

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## 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

Obs	No. of Customers Eating Outside	Temperature (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			

### Fitted Line Plot

Temperature (in Celsius) =  $8.864 + 0.4372 \text{ No. of Customers Eating Outside}$

