المجموعة	m	معادلات الانحدار	مقاييس المفاضلة		
			R^2	Mse	C_p
A	1	$y_i = \beta_0 + e_i$	0	226.31	442.92
B	2	$y_i = \beta_0 + \beta_1 x_{i1} + e_i$	0.533	115.06	202.55
	2	$y_i = \beta_0 + \beta_2 x_{i2} + e_i$	0.666	82.39	142.49
	2	$y_i = \beta_0 + \beta_3 x_{i3} + e_i$	0.285	176.30	315.16
	2	$y_i = \beta_0 + \beta_4 x_{i4} + e_i$	0.674	80.35	138.7
C	3	$y_i = \beta_0 + \beta_1 x_{i1} + \beta_2 x_{i2} + e_i$	0.978	5.79	2.68
	3	$y_i = \beta_0 + \beta_1 x_{i1} + \beta_3 x_{i3} + e_i$	0.548	122.7	198.1
	3	$y_i = \beta_0 + \beta_1 x_{i1} + \beta_4 x_{i4} + e_i$	0.972	7.47	5.50
	3	$y_i = \beta_0 + \beta_2 x_{i2} + \beta_3 x_{i3} + e_i$	0.847	41.54	62.44
	3	$y_i = \beta_0 + \beta_2 x_{i2} + \beta_4 x_{i4} + e_i$	0.680	86.88	138.23
	3	$y_i = \beta_0 + \beta_3 x_{i3} + \beta_4 x_{i4} + e_i$	0.935	17.57	22.37
D	4	$y_i = \beta_0 + \beta_1 x_{i1} + \beta_2 x_{i2} + \beta_3 x_{i3} + e_i$	0.982	5.34	3.04
	4	$y_i = \beta_0 + \beta_1 x_{i1} + \beta_2 x_{i2} + \beta_4 x_{i4} + e_i$	0.983	5.33	3.02
	4	$y_i = \beta_0 + \beta_1 x_{i1} + \beta_3 x_{i3} + \beta_4 x_{i4} + e_i$	0.981	5.64	3.50
	4	$y_i = \beta_0 + \beta_2 x_{i2} + \beta_3 x_{i3} + \beta_4 x_{i4} + e_i$	0.972	8.20	7.34
E	5	$y_i = \beta_0 + \beta_1 x_{i1} + \beta_2 x_{i2} + \beta_3 x_{i3} + \beta_4 x_{i4} + e_i$	0.982	5.98	5.00

1-When using R^2 as a comparison measure: Choose from each set the equation that contains the highest R^2 and arrange the results as in the table below:

	p	Equations	R^2
A	1	$y_i = \beta_0 + e_i$	-
B	2	$y_i = \beta_0 + \beta_4 x_{i4} + e_i$	0.674
C	3	$y_i = \beta_0 + \beta_1 x_{i1} + \beta_2 x_{i2} + e_i$	0.978
D	4	$y_i = \beta_0 + \beta_1 x_{i1} + \beta_2 x_{i2} + \beta_4 x_{i4} + e_i$	0.983
E	5	$y_i = \beta_0 + \beta_1 x_{i1} + \beta_2 x_{i2} + \beta_3 x_{i3} + \beta_4 x_{i4} + e_i$	0.982

Compare the value of R^2 for the equations chosen from each group: When comparing R^2 for the equations chosen from each group, we see that we must choose the equation:

$$y_i = \beta_0 + \beta_1 x_{i1} + \beta_2 x_{i2} + e_i$$

Because R^2 equals 0.978, it is very high.

It is noted that the value of R^2 for each of the two equations chosen from groups E and D is (0.982, 0.983), which contain more variables.

That is, adding X3, X4, or both to the equation that contains X1 and X2 has a very small effect on the rate of y.

So, the equation:

$$y_i = 52.57 + 1.46\, x_{i1} + 0.662\, x_{i2}$$

2-When using Mse as a comparison measure: Choose from each group the equation that contains the lowest Mse and arrange the results in the table below:

	p	Equations	Mse
A	1	$y_i = \beta_0 + e_i$	226.31
B	2	$y_i = \beta_0 + \beta_4 x_{i4} + e_i$	80.35
C	3	$y_i = \beta_0 + \beta_1 x_{i1} + \beta_2 x_{i2} + e_i$	5.79
D	4	$y_i = \beta_0 + \beta_1 x_{i1} + \beta_2 x_{i2} + \beta_4 x_{i4} + e_i$	5.33
E	5	$y_i = \beta_0 + \beta_1 x_{i1} + \beta_2 x_{i2} + \beta_3 x_{i3} + \beta_4 x_{i4} + e_i$	5.98

When we compare the Mse of the selected equations from each group, we see that the lowest Mse is the model:

$$y_i = \beta_0 + \beta_1 x_{i1} + \beta_2 x_{i2} + \beta_4 x_{i4} + e_i$$

But also note that the MSe of the form:

$$y_i = \beta_0 + \beta_1 x_{i1} + \beta_2 x_{i2} + e_i$$

It is also a little and the difference between them is very small, so adding the X4 to the model:

$$y_i = \beta_0 + \beta_1 x_{i1} + \beta_2 x_{i2} + e_i$$

It only reduces the value of the mean square error very slightly, so the model can be chosen:

$$y_i = \beta_0 + \beta_1 x_{i1} + \beta_2 x_{i2} + e_i$$

As the best equations too.

3-When using C_p as a measure of comparison between equations:

Choose from each group the equation that contains the lowest C_p and arrange the results as in the table:

	p	المعادلات	C_p
A	1	$y_i = \beta_0 + e_i$	442.92
B	2	$y_i = \beta_0 + \beta_4 x_{i4} + e_i$	138.7
C	3	$y_i = \beta_0 + \beta_1 x_{i1} + \beta_2 x_{i2} + e_i$	2.68
D	4	$y_i = \beta_0 + \beta_1 x_{i1} + \beta_2 x_{i2} + \beta_4 x_{i4} + e_i$	3.02
E	5	$y_i = \beta_0 + \beta_1 x_{i1} + \beta_2 x_{i2} + \beta_3 x_{i3} + \beta_4 x_{i4} + e_i$	5.00

From the table above we see that the best equation is:

$$y_i = \beta_0 + \beta_1 x_{i1} + \beta_2 x_{i2} + e_i$$

In conclusion, we see that the model:

$$y_i = \beta_0 + \beta_1 x_{i1} + \beta_2 x_{i2} + e_i$$

It has the best value of R^2, Mse and C_p.

In any case, sometimes each of the comparison criteria may give a preferred equation that differs from one another. In such cases, it is advisable to choose each of these equations to predict new data, and from them we can choose the best of these equations.