

## Sikshapath

**Q1) Find the curve of second degree of regression of y on x ( ) to the following data by method of least square :**

x	1	2	3	4
y	6	11	18	27

Sol:

x	1	2	3	4
y	6	11	18	27

**Sol.** We form the following table:

x	y	x <sup>2</sup>	x <sup>3</sup>	x <sup>4</sup>	xy	x <sup>2</sup> y
1	6	1	1	1	6	6
2	11	4	8	16	22	44
3	18	9	27	81	54	162
4	27	16	64	256	108	432
$\Sigma x = 10$	$\Sigma y = 62$	$\Sigma x^2 = 30$	$\Sigma x^3 = 100$	$\Sigma x^4 = 354$	$\Sigma xy = 190$	$\Sigma x^2y = 644$

The equation of second degree parabola is given by

$$y = a + bx + cx^2 \quad \dots(1)$$

And the normal equations are

$$\Sigma y = an + b\Sigma x + c\Sigma x^2 \quad \dots(2)$$

$$\Sigma xy = a\Sigma x + b\Sigma x^2 + c\Sigma x^3 \quad \dots(3)$$

$$\Sigma x^2y = a\Sigma x^2 + b\Sigma x^3 + c\Sigma x^4 \quad \dots(4)$$

$$\Rightarrow \left. \begin{array}{l} 4a + 10b + 30c = 62 \\ 10a + 30b + 100c = 190 \\ 30a + 100b + 354c = 644 \end{array} \right\} \Rightarrow a = 3, b = 2, c = 1$$

Hence  $y = 3 + 2x + x^2$ . **Ans.**