Example: Finding Regression Coefficient

We will compute the regression coefficient (slope) in a simple linear regression example step by step.

Example Data

X (Hours studied)	Y (Exam score)
1	2
2	4
3	5
4	4
5	5

Regression Equation

We want the regression line: $Y = a + bX$, where:

- b = regression coefficient (slope)

- a = intercept

Step 1: Compute Means

$\bar{X} = (1+2+3+4+5)/5 = 3$

$\bar{Y} = (2+4+5+4+5)/5 = 4$

Step 2: Formula for slope b

$b = \Sigma(Xi - \bar{X})(Yi - \bar{Y}) / \Sigma(Xi - \bar{X})^2$

Step 3: Table of calculations

X	Y	$X - \bar{X}$	$Y - \bar{Y}$	$(X-\bar{X})(Y-\bar{Y})$	$(X-\bar{X})^2$
1	2	-2	-2	4	4
2	4	-1	0	0	1
3	5	0	1	0	0
4	4	1	0	0	1
5	5	2	1	2	4

Sum	6	10

Step 4: Compute slope

$b = 6/10 = 0.6$

Step 5: Compute intercept

$a = \bar{Y} - b\bar{X} = 4 - (0.6)(3) = 2.2$

Final Regression Equation

$Y = 2.2 + 0.6X$