LEON MARCO A. DEVELA
COM232

ASSIGNMENT #2
CCMACLRL

ASSIGNMENT #2

We want to predict a student's Exam Score (y) based on the number of Hours studied (x)

DATA

STUDENT	HOURS STUDIED (x)	EXAM SCORE (y)
1	1	52
2	2	57
3	3	61
4	4	65
5	5	70

TASK

We want to fit linear regression line of the form:

$$y = mx + b$$

A new student studied 6 hours. We want to predict the Exam Score using the regression equation.

FILL IN THE TABLE

- Compute x^2 for each student.
- Compute xy for each student.
- Find the totals: Σx, Σy, Σx^2, and Σxy.

STUDENT	x	y	xy	x^2
1	1	52	52	1
2	2	57	114	4
3	3	61	183	9
4	4	65	260	16
5	5	70	350	25
	$\Sigma x = 15$	$\Sigma y = 305$	$\Sigma xy = 959$	$\Sigma x^2 = 55$

COMPUTE THE SLOPE M

$$m = \frac{n(\Sigma xy) - (\Sigma x)(\Sigma y)}{n(\Sigma x^2) - (\Sigma x)^2}$$

$$m = \frac{5(959) - (15)(305)}{5(55) - (15)^2}$$

$m = 4.4$

COMPUTE THE INTERCEPT B

$$b = \frac{\Sigma y - m(\Sigma x)}{n}$$

$$b = \frac{305 - 4.4(15)}{5}$$

$b = 47.8$

REGRESSION EQUATION

$y = m(x) + b$

$y = 4.4(6) + 47.8$

$y = 74.2$

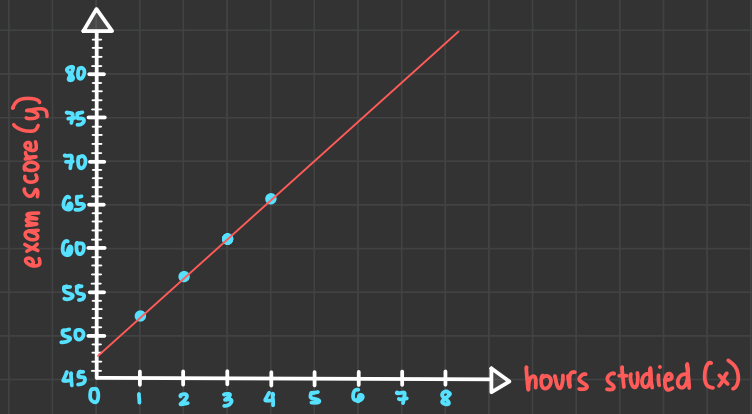
LEON MARCO A. DEVELA
COM232

ASSIGNMENT #2
CCMACLRL

DRAW THE REGRESSION LINE USING A SCATTER PLOT

- Calculate the $y_{predict}$ for each data points
- Draw a regression line using $y_{predict}$
- Use a circle for all data points
- Use a red line for the regression line

STUDENT	x	y	y predict
1	1	52	52.2
2	2	57	56.6
3	3	61	61
4	4	65	65.4
5	5	70	69.8



CALCULATE THE SUM OF SQUARED ERRORS

STUDENT	x	y	y predict	$y_i - y_{predict}$	$(y_i - y_{predict})^2$
1	1	52	52.2	-0.2	0.04
2	2	57	56.6	0.4	0.16
3	3	61	61	0	0
4	4	65	65.4	-0.4	0.16
5	5	70	69.8	0.2	0.04
					SSE = 0.4

CALCULATE THE SUM OF SQUARED TOTAL

STUDENT	x	y	MEAN($\bar{y}$)	$y_i - \bar{y}$	$(y_i - \bar{y})^2$
1	1	52	61	-9	81
2	2	57	61	-4	16
3	3	61	61	0	0
4	4	65	61	4	16
5	5	70	61	9	81
					SST = 194

LEON MARCO A. DEVELA
COM232

COMPUTE R^2

$$R^2 = 1 - \frac{SSE}{SST}$$

$R^2 = 0.998$

PREDICTION

Use your equation to predict the exam score for a student who studied for 6 hours.

$y = m(6) + b$

$y = 4.4(6) + 47.8$

$y = 74.2$