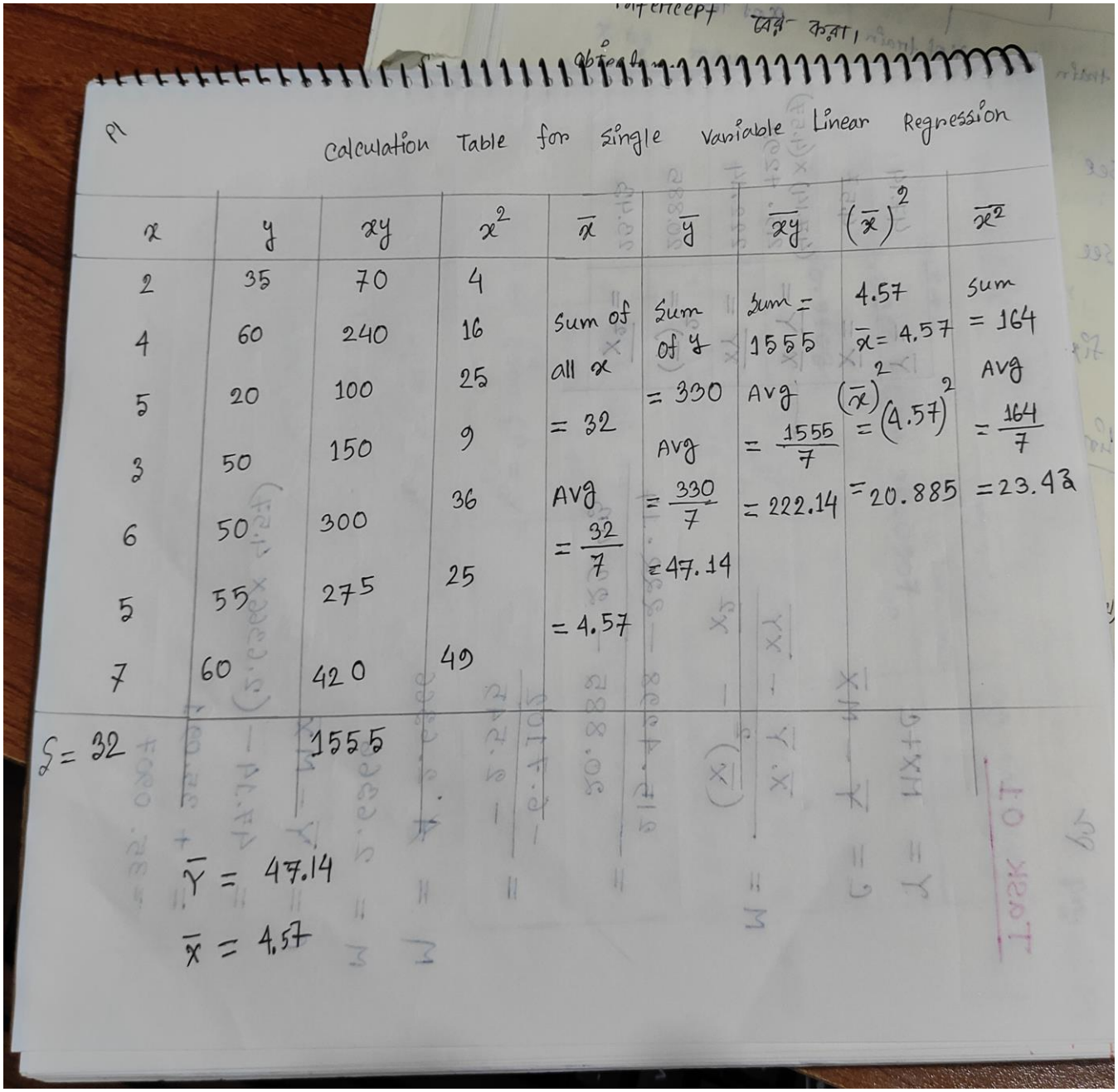


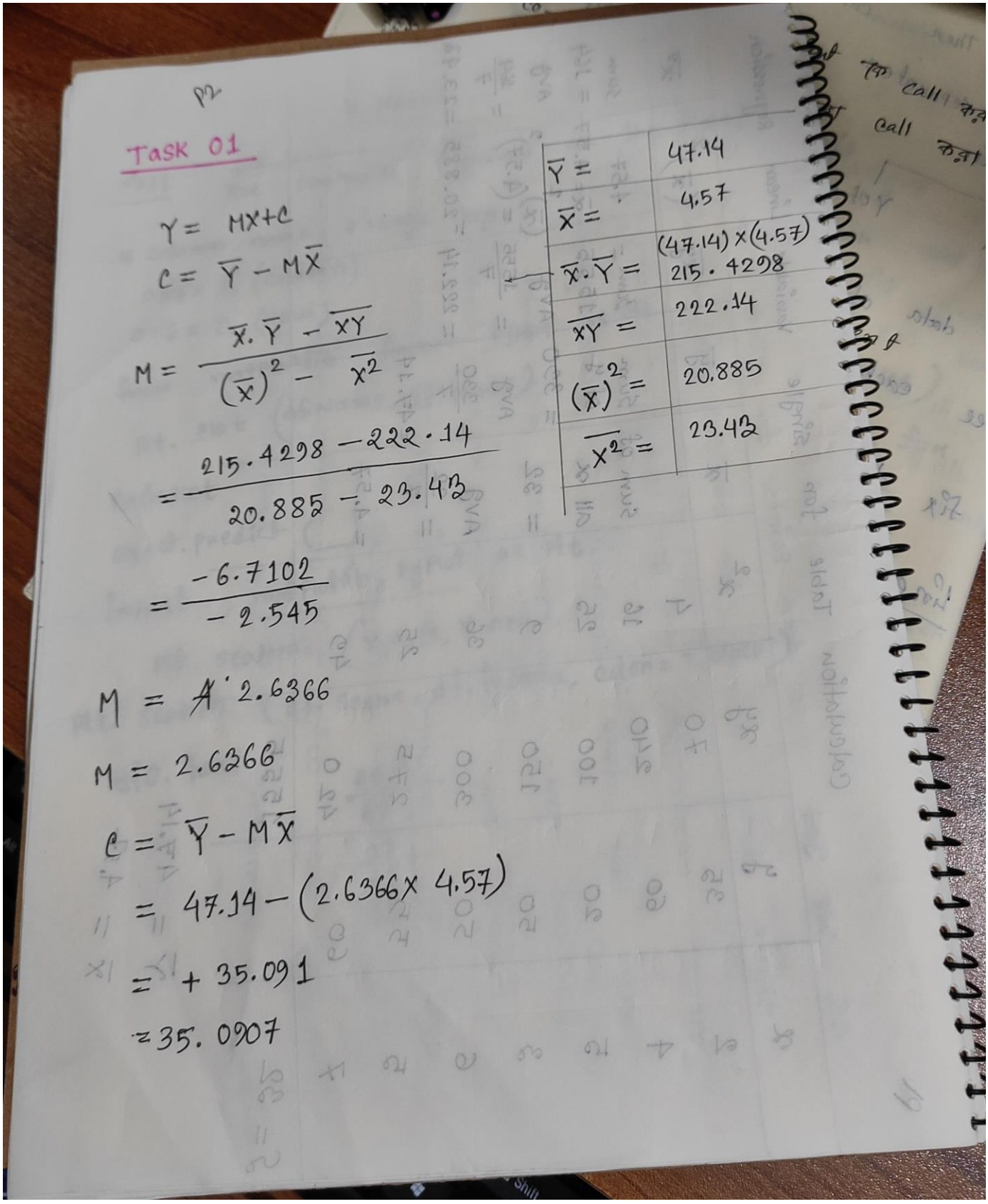
P1

Calculation Table for Single Variable Linear Regression

x	y	xy	x^2	$\bar{x}$	$\bar{y}$	$\overline{xy}$	$(\bar{x})^2$	$\overline{x^2}$
2	35	70	4					
4	60	240	16	Sum of all x = 32	Sum of y = 330	Sum = 1555	4.57	Sum = 164
5	20	100	25			Avg	$\bar{x} = 4.57$	
3	50	150	9		Avg	$= \frac{1555}{7}$	$(\bar{x})^2$	Avg
6	50	300	36	Avg	$= \frac{330}{7}$	$= 222.14$	$= (4.57)^2$	$= \frac{164}{7}$
5	55	275	25	$= \frac{32}{7}$	$= 47.14$		$= 20.885$	$= 23.43$
7	60	420	49	$= 4.57$				
$\Sigma = 32$		1555						

$\bar{Y} = 47.14$

$\bar{x} = 4.57$



P2

Task 01

$Y = MX + C$

$C = \bar{Y} - M\bar{X}$

$$M = \frac{\bar{X}.\bar{Y} - \overline{XY}}{(\bar{X})^2 - \overline{X^2}}$$

$$= \frac{215.4298 - 222.14}{20.885 - 23.43}$$

$$= \frac{-6.7102}{-2.545}$$

$M = 2.6366$

$M = 2.6366$

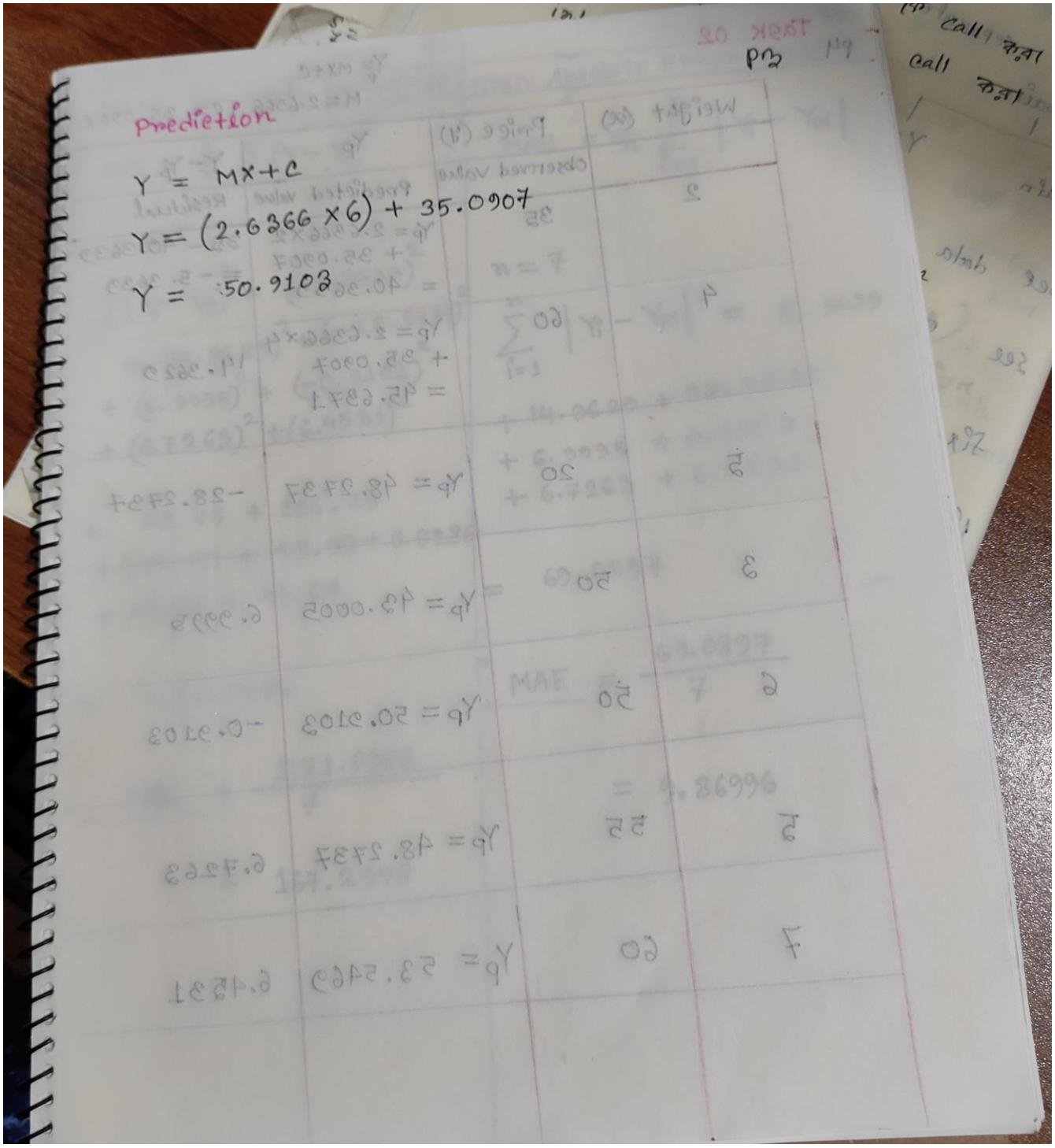
$C = \bar{Y} - M\bar{X}$

$= 47.14 - (2.6366 \times 4.57)$

$= +35.091$

$= 35.0907$

$\bar{Y} =$	47.14
$\bar{X} =$	4.57
$\bar{X}.\bar{Y} =$	$(47.14) \times (4.57)$ 215.4298
$\overline{XY} =$	222.14
$(\bar{X})^2 =$	20.885
$\overline{X^2} =$	23.43

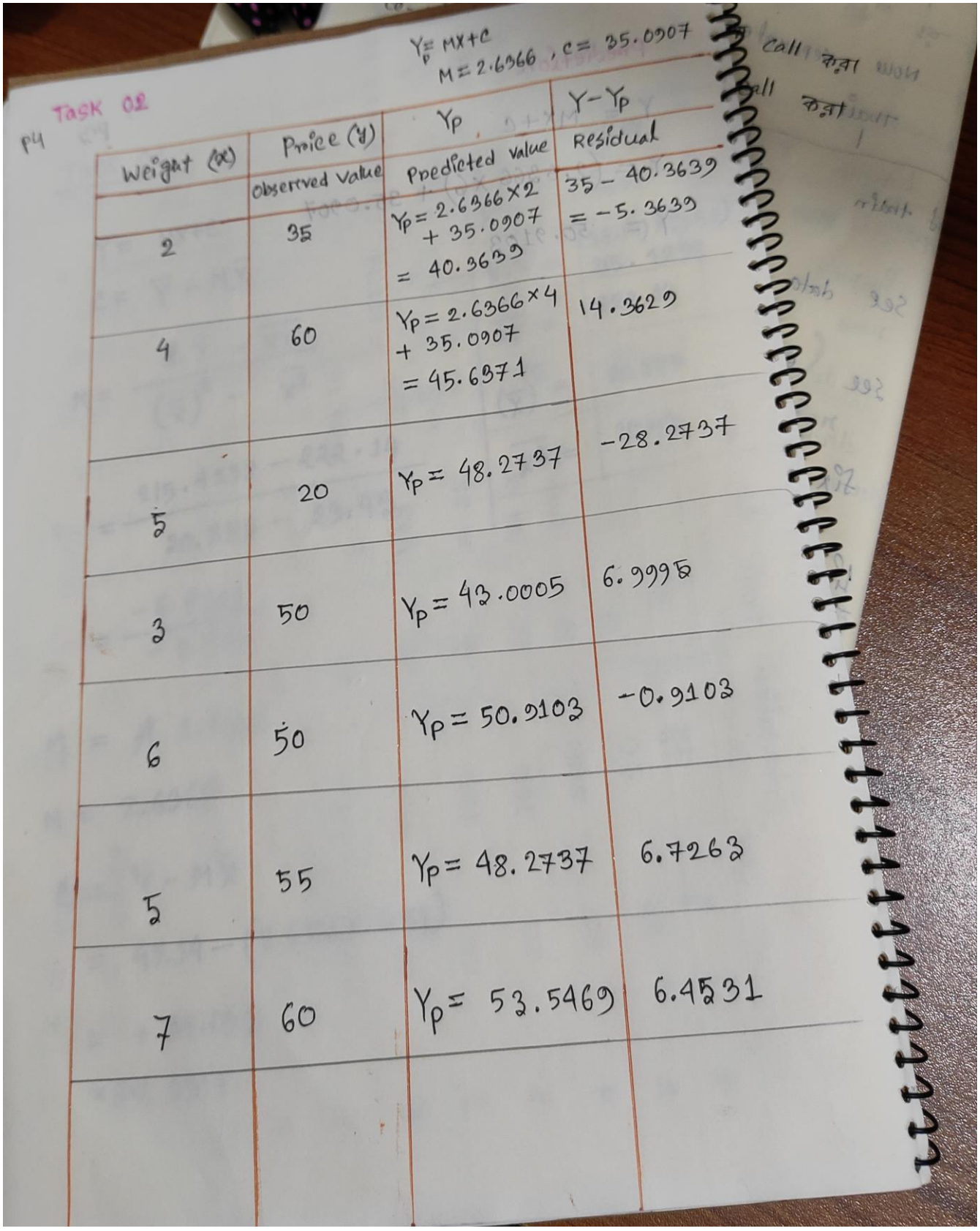


Prediction

$Y = MX + C$

$Y = (2.6366 \times 6) + 35.0907$

$Y = 50.9103$



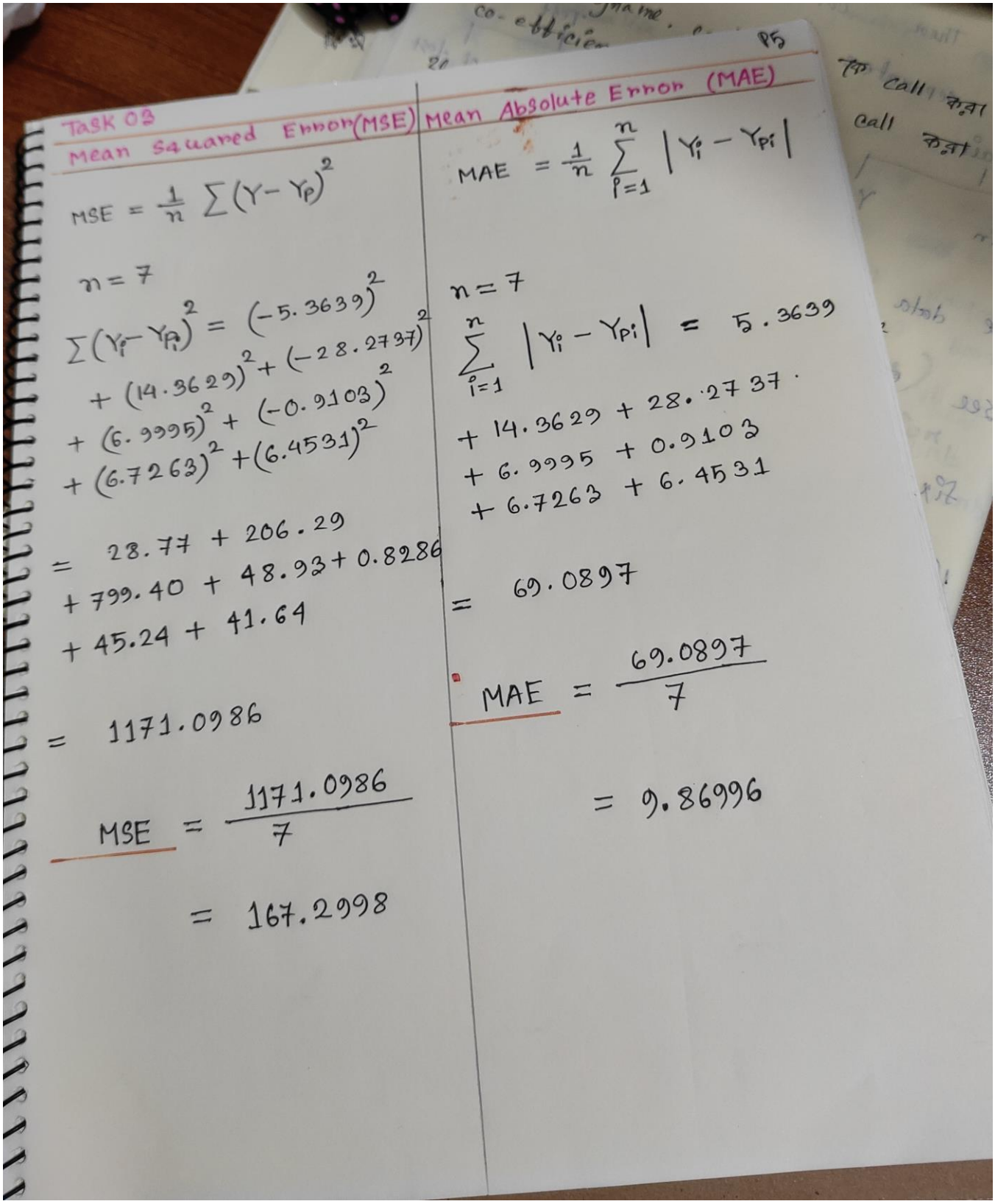
p4

TASK 02

$Y_p = MX + C$

$M = 2.6366$, $C = 35.0907$

Weight (x)	Price (y) Observed Value	Y_p Predicted Value	$Y - Y_p$ Residual
2	35	$Y_p = 2.6366 \times 2 + 35.0907 = 40.3639$	$35 - 40.3639 = -5.3639$
4	60	$Y_p = 2.6366 \times 4 + 35.0907 = 45.6971$	14.3029
5	20	$Y_p = 48.2737$	-28.2737
3	50	$Y_p = 43.0005$	6.9995
6	50	$Y_p = 50.9103$	-0.9103
5	55	$Y_p = 48.2737$	6.7263
7	60	$Y_p = 53.5469$	6.4531



Task 03

Mean Squared Error (MSE)

$$MSE = \frac{1}{n}\sum(Y - Y_p)^2$$

$n = 7$

$$\sum(Y_i - Y_{pi})^2 = (-5.3639)^2 + (14.3629)^2 + (-28.2737)^2 + (6.9995)^2 + (-0.9103)^2 + (6.7263)^2 + (6.4531)^2$$

$$= 28.77 + 206.29 + 799.40 + 48.93 + 0.8286 + 45.24 + 41.64$$

$$= 1171.0986$$

$$MSE = \frac{1171.0986}{7}$$

$$= 167.2998$$

Mean Absolute Error (MAE)

$$MAE = \frac{1}{n}\sum_{i=1}^{n} |Y_i - Y_{pi}|$$

$n = 7$

$$\sum_{i=1}^{n} |Y_i - Y_{pi}| = 5.3639 + 14.3629 + 28.2737 + 6.9995 + 0.9103 + 6.7263 + 6.4531$$

$$= 69.0897$$

$$MAE = \frac{69.0897}{7}$$

$$= 9.86996$$