Assignment

Data set:-

x	y
Weight	price
2	35
4	60
5	20
3	50
6	50
5	55
7	60

Formula, $y = mx + c$ = predict output

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

$$\therefore \Sigma(xy) = (2\times35) + (4\times60) + (5\times20) + (3\times50) + (6\times50) + (5\times55) + (7\times60)$$

$$= 1555$$

$$\Sigma x = 2+4+5+3+6+5+7 = 32$$

$$\Sigma y = 35+60+20+50+50+55+60 = 330$$

$$\Sigma(x^2) = 4+16+25+9+36+25+49 = 164$$

$$(\Sigma x)^2 = 32^2 = 1024$$

$$n = 7$$

$$\therefore m = \frac{1405 - (32 \times 330)}{164 - 102.4}$$

$$\therefore m = \frac{7 \times 1555 - 32 \times 330}{7 \times 164 - (32)^2}$$

$$= \frac{325}{124} = 2.62$$

and $$c = \frac{\Sigma y - m \Sigma x}{n}$$

$$= \frac{330 - 2.62 \times 32}{7}$$

$$= 35.16$$

1. Task - 1:

predict value for 6 $= 2.62 \times 6 + 35.16$

$= 50.88$ (Ans:-)

2. Task - 2:

residul = orginal (price) - predict (price)

$= 35 - 40.4 = -5.4$

residual
-5.40
14.35
-28.26
6.97
-0.88
6.83
6.49

Task:-3

We Know, $MSE = \frac{1}{n} \sum_{i=1}^{n} (Y_i - \hat{Y}_i)^2$

$$\therefore (Y_i - \hat{Y}_i)^2 = (-5.40)^2 + (14.35)^2 + (-28.26)^2 + (6.97)^2 + (-0.88)^2 + (6.83)^2 + (6.49)^2$$

$$= 29.16 + 205.92 + 798.63 + 48.58 + 0.77 + 45.29 + 20.16$$

$$= 1148.51$$

$$\therefore MSE = \frac{1148.51}{7} = 164.07$$

$$\therefore MAE = \frac{1}{n} \sum_{i=1}^{n} |Y_i - \hat{Y}_i|$$

$$= \frac{5.40 + 14.35 + 28.26 + 6.97 + 0.88 + 6.73 + 49}{7}$$

$$= 9.87 \text{ (Ans:-)}$$