

$$\text{Destination, } Y = m \boxed{x} + c$$

$\downarrow$  Slope       $\downarrow$  Dependent variable (6)       $\downarrow$  Intercept



$$m = \frac{\sum (x - \bar{x})(y - \bar{y})}{\sum (x - \bar{x})^2} \quad c = \bar{y} - m \bar{x}$$

Task - 01

Here,

$$x = [2, 4, 5, 3, 5, 7]$$

$$y = [35, 60, 20, 50, 55, 60]$$

mean:

$$\bar{x} = \frac{2+4+5+3+5+7}{6} = 4.33$$

$$\bar{y} = \frac{35+60+20+50+55+60}{6} = 46.66$$

Calculate:  $\sum (x - \bar{x})(y - \bar{y})$

When,  $x=2$  then  $(2-4.33)(35-46.66) = \cancel{38.82} 27.16$

$x=4$  &  $y=60$  then  $(4-4.33)(60-46.66) = -4.40$

$x=5$  &  $y=20$  then  $(5-4.33)(20-46.66) = -17.86$

$x=3$  &  $y=50$  then  $(3-4.33)(50-46.66) = -4.44$

$x=5$  &  $y=55$  then  $(5-4.33)(55-46.66) = 5.58$

$x=7$  &  $y=60$  then  $(7-4.33)(60-46.66) = 35.61$

Total =  $\cancel{27.16} - 4.40 - 17.86 - 4.44 + 5.58 + 35.61$

$\cancel{27.16}$   
 $= 41.66$

Calculate  $\sum (x - \bar{x})^2$

when  $x = 2$  then  $(2 - 4.33)^2 = 5.42$

"  $x = 2$  then  $(4 - 4.33)^2 = 0.10$

"  $x = 3$  then  $(5 - 4.33)^2 = 0.44$

"  $x = 3$  then  $(3 - 4.33)^2 = 1.76$

"  $x = 5$  then  $(5 - 4.33)^2 = 0.44$

"  $x = 7$  then  $(7 - 4.33)^2 = 7.12$

Total = 15.28

plug both value into the formula

$$m = \frac{41.66}{15.28}$$
$$= 2.72$$

For intercept  $c$ ,

$$c = 46.66 - (2.72 \times 4.33)$$
$$= 34.88$$

finally, predict the value,

$$Y = mX + c$$
$$= 2.72 \times 6 + 34.88$$
$$= 51.20$$