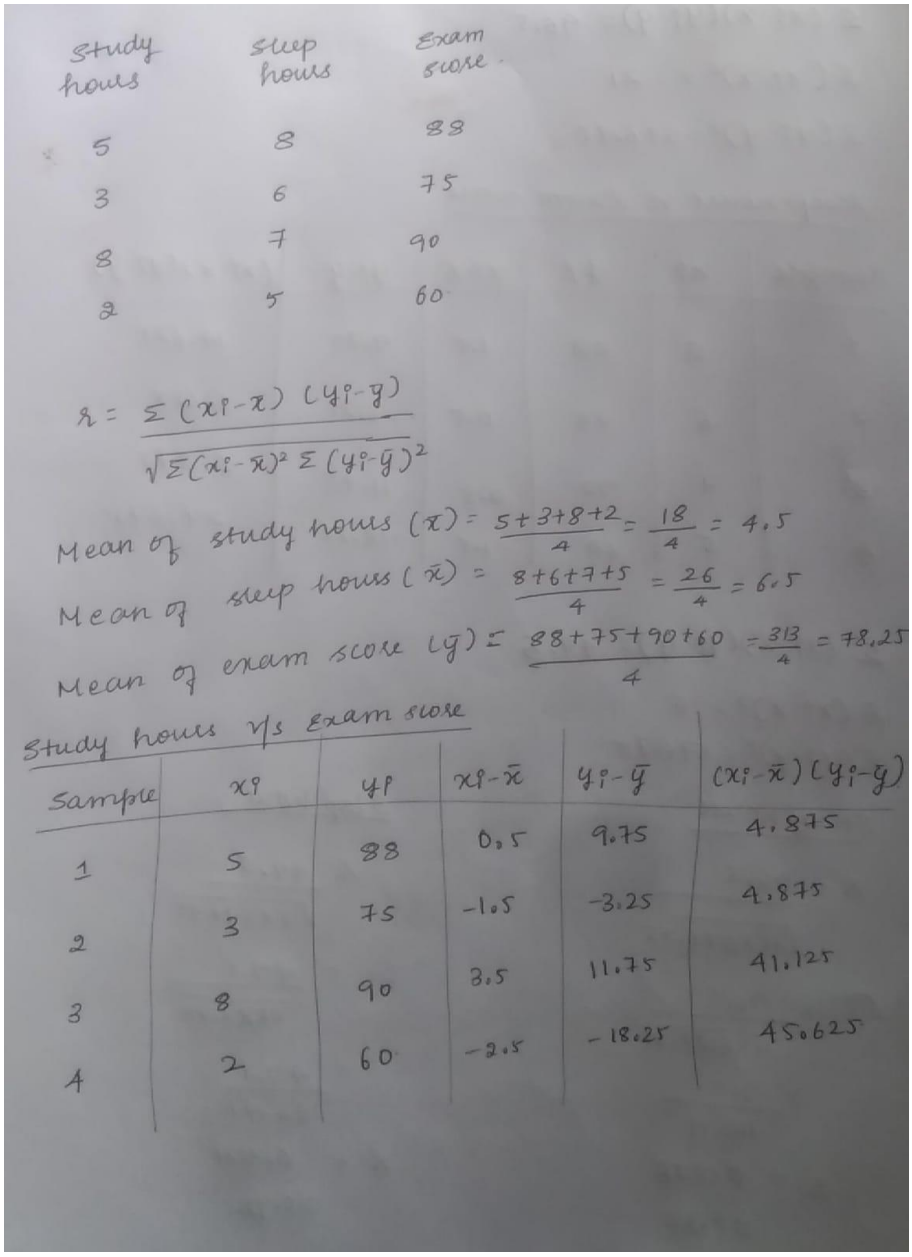
Study hours, Sleep hours vs Exam score



Study hours	Sleep hours	Exam score
5	8	88
3	6	75
8	7	90
2	5	60

$$r = \frac{\Sigma (x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\Sigma (x_i - \bar{x})^2 \Sigma (y_i - \bar{y})^2}}$$

Mean of study hours $(\bar{x}) = \frac{5+3+8+2}{4} = \frac{18}{4} = 4.5$

Mean of sleep hours $(\bar{x}) = \frac{8+6+7+5}{4} = \frac{26}{4} = 6.5$

Mean of exam score $(\bar{y}) = \frac{88+75+90+60}{4} = \frac{313}{4} = 78.25$

Study hours v/s Exam score

Sample	x_i	y_i	$x_i - \bar{x}$	$y_i - \bar{y}$	$(x_i - \bar{x})(y_i - \bar{y})$
1	5	88	0.5	9.75	4.875
2	3	75	-1.5	-3.25	4.875
3	8	90	3.5	11.75	41.125
4	2	60	-2.5	-18.25	45.625

$\Sigma (x_i - \bar{x})(y_i - \bar{y}) = 96.5$

$\Sigma (x_i - \bar{x})^2 = 21$

$\Sigma (y_i - \bar{y})^2 = 576.75$

Sleep hours vs Exam score

Sample	x_i	y_i	$x_i - \bar{x}$	$y_i - \bar{y}$	$(x_i - \bar{x})(y_i - \bar{y})$
1	8	88	1.5	9.75	14.625
2	6	75	-0.5	-3.25	1.625
3	7	90	0.5	11.75	5.875
4	5	60	-1.5	-18.25	27.375

$\Sigma (x_i - \bar{x})(y_i - \bar{y}) = 49.5$

$\Sigma (x_i - \bar{x})^2 = 5$

$\Sigma (y_i - \bar{y})^2 = 576.75$

Study hours

$$r = \frac{96.5}{\sqrt{21 \times 576.75}}$$

$$= \frac{96.5}{\sqrt{12122.75}}$$

$$= \frac{96.5}{110.11}$$

$r = 0.876$

≈ 0.88

Sleep hours

$$r = \frac{49.5}{\sqrt{5 \times 576.75}}$$

$$= \frac{49.5}{\sqrt{2883.75}}$$

$$= \frac{49.5}{53.71}$$

$r = 0.921$

≈ 0.92