

2.

X	Y
1	10
2	15
8	35
13	44

① FIND \bar{X}

$$\bar{X} = \frac{1+2+8+13}{4}$$

$$= \frac{24}{4}$$

$$\bar{X} = 6$$

② FIND \bar{y}

$$\bar{y} = \frac{10+15+35+44}{4}$$

$$= \frac{104}{4}$$

$$\bar{y} = 26$$

③ FIND S_x

X	$x-\bar{x}$	$(x-\bar{x})^2$
1	$1-6=-5$	$(-5)^2=25$
2	$2-6=-4$	$(-4)^2=16$
8	$8-6=2$	$(2)^2=4$
13	$13-6=7$	$(7)^2=49$

$$\sum (x-\bar{x})^2 = 94$$

$$S_x = \sqrt{\frac{\sum (x-\bar{x})^2}{n-1}}$$

$$= \sqrt{\frac{94}{4-1}} = \sqrt{\frac{94}{3}} = 5.59762$$

④ FIND S_y

Y	$y-\bar{y}$	$(y-\bar{y})^2$
10	$10-26=-16$	$(-16)^2=256$
15	$15-26=-11$	$(-11)^2=121$
35	$35-26=9$	$9^2=81$
44	$44-26=18$	$18^2=324$

$$\sum (y-\bar{y})^2 = 782$$

$$S_y = \sqrt{\frac{\sum (y-\bar{y})^2}{n-1}}$$

$$= \sqrt{\frac{782}{4-1}} = \sqrt{\frac{782}{3}} = 16.14517$$

⑤ BUILD TABLE

X	Y	$\frac{(x-\bar{x})}{S_x} \times \frac{(y-\bar{y})}{S_y}$
1	10	$\left(\frac{1-6}{5.59762}\right) \times \left(\frac{10-26}{16.14517}\right) = 0.88521$
2	15	$\left(\frac{2-6}{5.59762}\right) \times \left(\frac{15-26}{16.14517}\right) = 0.48686$
8	35	$\left(\frac{8-6}{5.59762}\right) \times \left(\frac{35-26}{16.14517}\right) = 0.19917$
13	44	$\left(\frac{13-6}{5.59762}\right) \times \left(\frac{44-26}{16.14517}\right) = 1.39420$

$$r = \frac{\sum}{n-1}$$

$$r = \frac{2.96544}{4-1}$$

$$r = 0.98848$$

$$\sum = 2.96544$$

$$\bar{X} = 6 \quad \bar{y} = 26 \quad S_x = 5.59762 \quad S_y = 16.14517 \quad r = 0.98848$$

$$b_1 = r \cdot \frac{S_y}{S_x} = 0.98848 \cdot \frac{16.14517}{5.59762} = 2.85$$

$$b_0 = \bar{y} - b_1 \bar{X} = 26 - 2.85(6) = 8.9$$

$$\text{so } \hat{y} = b_1 X + b_0$$

$$\hat{y} = 2.85X + 8.9$$