

Q (1-c) :

$$\begin{aligned}\hat{\beta}_1 &= \frac{S_{xy}}{S_x^2} \\ &= \frac{r_{xy} \cdot s_x \cdot s_y}{s_x^2} \\ &= \frac{r_{xy} \cdot s_y}{s_x}\end{aligned}$$

$$r_{xy} = \frac{S_{xy}}{s_x \cdot s_y}$$

$$\Rightarrow S_{xy} = r_{xy} \cdot s_x \cdot s_y$$

$$\text{so, } r_{xy} = \hat{\beta}_1 \times (s_x / s_y)$$