$\Sigma x_i = 5865$ $\quad \Sigma y_i = 222$. $\quad \Sigma x_i y_i = 113289$. $\quad n = 12$

$\Sigma (x_i - \bar{x})^2 = 31128.25$ $\quad \Sigma (y_i - \bar{y})^2 = 975$

1. $$\hat{\beta}_1 = \frac{S_{xy}}{S_{xx}} = \frac{\Sigma x_i y_i - \Sigma x_i \cdot \Sigma y_i / n}{\Sigma (x_i - \bar{x})^2} = \frac{113289 - 5865 \cdot 222 / 12}{31128.25}$$

$$= \underline{0.1538}$$

$$\hat{\beta}_0 = \frac{\Sigma y_i - \hat{\beta}_1 \Sigma x_i}{n} = \frac{222 - 0.1538 \cdot 5865}{12} = \underline{-56.7675}$$

2. 95% CL. $\alpha = 0.05$. $\quad t_{0.025, 10} = 2.23$

$$SSE = \Sigma (y_i - \hat{y}_i) = 31128.25$$

$$S = \sqrt{\frac{SSE}{n-2}} = \sqrt{\frac{975}{10}} = 9.8742$$

$$S_{\hat{\beta}_1} = \frac{S}{\sqrt{S_{xx}}} = \frac{9.8742}{\sqrt{31128.25}} = 0.056$$

$$CI: \quad \hat{\beta}_1 \pm t_{\alpha/2, n-2} \cdot S_{\hat{\beta}_1} = 0.1538 \pm 2.23 \cdot 0.056$$

$$= \underline{(0.0289, 0.2787)}$$

3. 614000 is not in the range of X used to build the regression model, thus we can make prediction at this value of X.