

# Linear Regression Formulas

Best fit line:

$$\beta_1 = \frac{\sum(x_i - \bar{X})(y_i - \bar{Y})}{\sum(x_i - \bar{X})^2} \quad (1)$$

$$\beta_0 = \bar{Y} - \beta_1 \bar{X} \quad (2)$$

Standard Deviation of Regression Line:

$$s_{reg} = \sqrt{\frac{\sum \text{residual}^2}{n-2}} = \sqrt{\frac{\sum(y_i - \hat{y}_i)^2}{n-2}} \quad (3)$$

Standard error of Slope:

$$SE_{b1} = \frac{s_{reg}}{\sqrt{\sum(x_i - \bar{x})^2}} \quad (4)$$

$R^2$ :

$$R^2 = \frac{\sum(\hat{y}_i - \bar{y})^2}{\sum(y_i - \bar{y}_i)^2} = \frac{SSM}{SST} \quad (5)$$