We often use three different **sum of squares** values to measure how well the regression line actually fits the data:

1. Sum of Squares Total (SST) – The sum of squared differences between individual data points (y_i) and the mean of the response variable ($\bar{y}$).

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

2. Sum of Squares Regression (SSR) – The sum of squared differences between predicted data points ($\hat{y}_i$) and the mean of the response variable ($\bar{y}$).

- $SSR = \Sigma(\hat{y}_i - \bar{y})^2$

3. Sum of Squares Error (SSE) – The sum of squared differences between predicted data points ($\hat{y}_i$) and observed data points (y_i).

- $SSE = \Sigma(\hat{y}_i - y_i)^2$

The following relationship exists between these three measures:

SST = SSR + SSE

R-squared = SSR / SST