One-way ANOVA

$$\begin{aligned}
k &= \text{number of groups} \\
n_i &= \text{sample size of the } i\text{th sample} \\
n* &= \text{combined sample size} \\
\bar{y}_i &= \text{sample mean of the } i\text{th sample} \\
\bar{\bar{y}} &= \text{grand mean} \\
s_i &= \text{sample SD of the } i\text{th sample} \\
\text{SS(between)} &= \sum_{i=1}^{k} n_i(\bar{y}_i - \bar{\bar{y}})^2 \\
\text{SS(within)} &= \sum_{i=1}^{k} (n_i - 1)s_i^2 \\
\text{SS(total)} &= \sum_{i=1}^{k}\sum_{j=1}^{n_i} (y_{ij} - \bar{\bar{y}})^2 \\
\text{df(between)} &= k - 1 \\
\text{df(within)} &= n^* - k \\
\text{df(total)} &= n^* - 1 \\
\text{MS(between)} &= \text{SS(between)/df(between)} \\
\text{MS(within)} &= \text{SS(within)/df(within)} \\
F &= \text{MS(between)/MS(within)} \\
\hat{\sigma} &= \sqrt{\text{MS(within)}}
\end{aligned}$$

Correlation Coefficient

$$\begin{aligned}
r &= \frac{1}{n-1}\sum_{i=1}^{n}\left(\frac{x_i - \bar{x}}{s_x}\right)\left(\frac{y_i - \bar{y}}{s_y}\right) \\
&= \frac{\sum(x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\sum(x_i - \bar{x})^2 \sum(y_i - \bar{y})^2}}
\end{aligned}$$

Simple Linear Regression

fitted line	$Y = b_0 + b_1 X$
slope	$b_1 = \frac{\sum(x_i - \bar{x})(y_i - \bar{y})}{\sum(x_i - \bar{x})^2}$
	$b_1 = r\frac{s_y}{s_x}$
intercept	$b_0 = \bar{y} - b_1\bar{x}$
fitted value	$\hat{y}_i = b_0 + b_1 x_i$
residual	$y_i - \hat{y}_i$
residual sum of squares	$\text{SS(resid)} = \sum(y_i - \hat{y}_i)^2$
	$\text{SS(resid)} = (n-1)(1-r^2)s_y^2$
residual SD	$s_{Y\|X} = \sqrt{\frac{\text{SS(resid)}}{n-2}}$
	$s_{Y\|X} = \sqrt{\frac{n-1}{n-2}}\sqrt{1-r^2}\,s_y$
SE(b_1)	$\text{SE}(b_1) = \frac{s_{Y\|X}}{\sqrt{\sum(x_i - \bar{x})^2}}$
	$\text{SE}(b_1) = \sqrt{\frac{1-r^2}{n-2}}\frac{s_y}{s_x}$
confidence interval	$b_1 \pm t^*\text{SE}(b_1)$
hypothesis test	$t = \frac{b_1}{\text{SE}(b_1)} = r\sqrt{\frac{n-2}{1-r^2}}$