

Chapter 3: Equations

Equation 3.1:

$$(x_i - \bar{x})(y_i - \bar{y})$$

Equation 3.2:

$$(x_i - \bar{x})(y_i - \bar{y}) > 0$$

Equation 3.3:

$$(x_i - \bar{x})(y_i - \bar{y}) < 0$$

Equation 3.4:

$$\sum_{i=1}^n (x_i - \bar{x})(y_i - \bar{y})$$

Equation 3.5:

$$x_i - \bar{x}$$

Equation 3.6:

$$y_i - \bar{y}$$

Equation 3.7:

$$\frac{\sum_{i=1}^n (x_i - \bar{x})(y_i - \bar{y})}{n-1} = \text{COV}(X, Y)$$

Equation 3.8:

$$\text{COV}(X, V) = \frac{\sum_{i=1}^n (x_i - \bar{x})(v_i - \bar{v})}{n-1}$$

Equation 3.9:

$$\text{COV}(X, V) = \frac{\sum_{i=1}^n (x_i - \bar{x})(by_i - b\bar{y})}{n-1}$$

Equation 3.10:

$$\text{COV}(X, V) = b \text{COV}(X, Y)$$

Equation 3.11:

$$V(X) = \frac{\sum_{i=1}^n (x_i - \bar{x})^2}{n-1}$$

Equation 3.12:

$$\text{SD}(X) = +\sqrt{V(X)} = +\sqrt{\frac{\sum_{i=1}^n (x_i - \bar{x})^2}{n-1}}$$

Equation 3.13:

$$\frac{\text{COV}(X, Y)}{\text{SD}(X)\text{SD}(Y)} = \text{CORR}(X, Y)$$

Equation 3.14:

$$\text{V}(bY) = b^2\text{V}(Y)$$

Equation 3.15:

$$\text{COV}(X, X) = \text{V}(X)$$

Equation 3.16:

$$\text{COV}(X, -X) = -\text{COV}(X, X)$$

Equation 3.17:

$$\text{SD}(-X) = +\sqrt{\text{V}(-X)} = +\sqrt{\text{V}(X)} = \text{SD}(X)$$