Chapter 3

- **Population Mean** $\mu = \dfrac{\sum x}{N}$
- **Sample Mean** $\overline{x} = \dfrac{\sum x}{n}$
- **Population Standard Deviation**
  $\sigma = \sqrt{\dfrac{\sum (x-\overline{x})^2}{N}}$
- **Sample Standard Deviation** $s = \sqrt{\dfrac{\sum (x-\overline{x})^2}{n-1}}$
- **Mean From a Frequency Distribution**
  $$\mu = \frac{\sum x_i f_i}{\sum f_i}$$
- **Weighted Means**
  $$\mu = \frac{\sum w_i x_i}{\sum w_i}$$
- **Position of k^{th} Percentiles** (1^{st} Edition)
  $$i = \left(\frac{k}{100}\right) n$$
  - If i is not an integer, round up to next highest integer
  - If i is an integer, average the values in position i and $i+1$.
- **Position of k^{th} Percentiles** (2^{nd} Edition)
  $$i = \left(\frac{k}{100}\right) (n+1)$$
  - If i is not an integer, average observations $i-1$ and $i+1$
  - If i is an integer, the %ile is the i^{th} value from the bottom.
- $IQR = Q_3 - Q_1$
- **Lower Limit:** $Q_1 - 1.5 * IQR$
- **Upper Limit:** $Q_3 + 1.5 * IQR$

Chapter 4

- $S_{xx} = \sum (x-\overline{x})^2 = \sum x^2 - (\sum x)^2/n$
- $S_{yy} = \sum (y-\overline{y})^2 = \sum y^2 - (\sum y)^2/n$
- $S_{xy} = \sum xy - (\sum x)(\sum y)/n$
- **Regression Equation:** $\hat{y} = b_0 + b_1 x$, where
  $$b_1 = \frac{S_{xy}}{S_{xx}}$$
  and
  $$b_0 = \overline{y} - b_1 \overline{x}$$
- **SST** $= \sum (y-\overline{y})^2 = S_{yy}$
- **SSR** $= \sum (\hat{y}-\overline{y})^2 = \dfrac{S_{xy}^2}{S_{xx}}$
- **SSE** $= \sum (y-\hat{y})^2 = S_{yy} - \dfrac{S_{xy}^2}{S_{xx}}$
- **Coefficient of Determination**
  $$r^2 = \frac{SSR}{SST} = \frac{S_{xy}^2}{S_{xx} S_{yy}}$$
- **Linear correlation coefficient:**
  $$r = \frac{\frac{1}{n-1} \sum (x-\overline{x})(y-\overline{y})}{s_x s_y}$$
  or
  $$r = \frac{S_{xy}}{\sqrt{S_{xx} S_{yy}}}$$