Ungrouped Data

$$\mu = \frac{\sum X}{N} \quad or \quad \overline{X} == \frac{\sum X}{n} \qquad S = \sqrt{\frac{\sum (x-\overline{x})^2}{n-1}} \quad , \quad S = \sqrt{\frac{n\sum x^2 - (\sum x)^2}{n(n-1)}}$$

Variance (σ^2 , s^2): Variance is the **square of standard deviation.** **To Estimate S**: $S = Range/4$

TI-83/84 *Inputting data in* ***L1*** *(stat* $\rightarrow$ *Option 1* $\rightarrow$ *enter)*
then *stat* $\rightarrow$ *calc* $\rightarrow$ *Option 1* $\rightarrow$ *enter* $\rightarrow$ *2n d* $\rightarrow 1 \rightarrow$ *enter*

Grouped Data (Freq. Table)

$$\overline{X} = \frac{\sum (f \times m)}{\sum f} \qquad S = \sqrt{\frac{n\sum (f \times m^2) - (\sum f \times m)^2}{n(n-1)}}$$

TI-83/84 *Inputting* ***midpoints*** *in* ***L1*** *and* ***frequency*** *in* ***L2***
then *stat* $\rightarrow$ *calc* $\rightarrow$ *Option 1* $\rightarrow$ *enter* $\rightarrow$ ***L1 , L2*** $\rightarrow$ *enter*

Empirical Rules: If the **box-plot is centered** then we can apply the **three** following empirical rules.

$99.7\% = \overline{x} \pm 3S \quad \Rightarrow$ **99.7 %** of data are within $3S$ of the mean ($\overline{x}$)

$95\% = \overline{x} \pm 2S \quad \Rightarrow$ **95 %** of data are within $2S$ of the mean ($\overline{x}$)

$68\% = \overline{x} \pm S \quad \Rightarrow$ **68 %** of data are within $1S$ of the mean ($\overline{x}$)

Z -Score $Z = \frac{x-\overline{x}}{s}$ *or* $Z = \frac{x-\mu}{\sigma}$

---------- -2 ---------- 0 ---------- 2 ----------

Unusual Values: $Z < -2$ **Ordinary Values:** $-2 \le Z \le 2$ **Unusual Values:** $Z > 2$

$$Correrlation\ Coefficient = r = \frac{n\sum xy - \sum x \sum y}{\sqrt{n\sum x^2 - (\sum x)^2}\sqrt{n\sum y^2 - (\sum y)^2}} \qquad -1 \le r \le 1$$

Regression Equation: $y = ax + b$ a = Slope , b = y intercept

$$Slope = a = \frac{n(\sum xy) - (\sum x)(\sum y)}{n(\sum x^2) - (\sum x)^2} \qquad y\text{-}itc = b = \frac{(\sum y)(\sum x^2) - (\sum x)(\sum xy)}{n(\sum x^2) - (\sum x)^2}$$

TI-83/84 *2n d* $\rightarrow 0 \rightarrow$ ***select*** *Diagnostic on* $\rightarrow$ *enter* $\rightarrow$ *enter* ***then*** *Inputting* ***x-values*** *in* ***L1****and* ***y-values*** *in* ***L2***
then *stat* $\rightarrow$ *calc* $\rightarrow$ *Option 4* $\rightarrow$ *enter* $\rightarrow$ ***L1 , L2*** $\rightarrow$ *enter*

Using the regression equation to estimate or predict y and x that are shown by y' and x'

Multiplication Rule $P(A \text{ and } B \text{ and } C \text{ and} \ldots) = P(A)P(B)P(C)\ldots$