Ch. 3: Descriptive Statistics

$$\bar{x} = \frac{\Sigma x}{n}$$ Mean

$$\bar{x} = \frac{\Sigma f \cdot x}{\Sigma f}$$ Mean (frequency table)

$$s = \sqrt{\frac{\Sigma (x - \bar{x})^2}{n - 1}}$$ Standard deviation

$$s = \sqrt{\frac{n(\Sigma x^2) - (\Sigma x)^2}{n(n - 1)}}$$ Standard deviation (shortcut)

$$s = \sqrt{\frac{n[\Sigma (f \cdot x^2)] - [\Sigma (f \cdot x)]^2}{n(n - 1)}}$$ Standard deviation (frequency table)

$$\text{variance} = s^2$$

Coefficient of variation

	Sample	Population
Coefficient of variation	$CV = \frac{s}{\bar{x}} \cdot 100\%$	$CV = \frac{\sigma}{\mu} \cdot 100\%$
z score	$z = \frac{x - \bar{x}}{s}$ or	$z = \frac{x - \mu}{\sigma}$

Midrange

$$\text{midrange} = \frac{\text{maximum data value} + \text{minimum data value}}{2}$$

Range rule of thumb

$$s \approx \frac{\text{range}}{4}$$

Ch. 4: Probability

$P(A \text{ or } B) = P(A) + P(B)$ if A, B are mutually exclusive

$P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$
if A, B are not mutually exclusive

$P(A \text{ and } B) = P(A) \cdot P(B)$ if A, B are independent

$P(A \text{ and } B) = P(A) \cdot P(B|A)$ if A, B are dependent

$P(\bar{A}) = 1 - P(A)$ Rule of complements

$_nP_r = \dfrac{n!}{(n-r)!}$ Permutations (no elements alike)

$\dfrac{n!}{n_1!\, n_2! \cdots n_k!}$ Permutations (n_1 alike, . . .)

$_nC_r = \dfrac{n!}{(n-r)!\, r!}$ Combinations

Ch. 5: Probability Distributions

$\mu = \Sigma x \cdot P(x)$ Mean (prob. dist.)

$\sigma = \sqrt{\Sigma[x^2 \cdot P(x)] - \mu^2}$ Standard deviation (prob. dist.)

$P(x) = \dfrac{n!}{(n-x)!\, x!} \cdot p^x \cdot q^{n-x}$ Binomial probability

$\mu = n \cdot p$ Mean (binomial)

$\sigma^2 = n \cdot p \cdot q$ Variance (binomial)

$\sigma = \sqrt{n \cdot p \cdot q}$ Standard deviation (binomial)

$P(x) = \dfrac{\mu^x \cdot e^{-\mu}}{x!}$ Poisson distribution
where $e \approx 2.71828$