Formulas and Tables by Mario F. Triola

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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)

variance $= s^2$

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

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

$\frac{n!}{n_1!\, n_2! \ldots n_k!}$ Permutations (n_1 alike, . . .)

${}_nC_r = \frac{n!}{(n-r)!\, r!}$ 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.)

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

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

Ch. 6: Normal Distribution

$z = \frac{x - \mu}{\sigma}$ or $\frac{x - \bar{x}}{s}$ Standard score

$\mu_{\bar{x}} = \mu$ Central limit theorem

$\sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}}$ Central limit theorem (Standard error)

Ch. 7: Confidence Intervals (one population)

$\hat{p} - E < p < \hat{p} + E$ Proportion

where $E = z_{\alpha/2}\sqrt{\frac{\hat{p}\hat{q}}{n}}$

$\bar{x} - E < \mu < \bar{x} + E$ Mean

where $E = t_{\alpha/2}\frac{s}{\sqrt{n}}$ (σ unknown)

or $E = z_{\alpha/2}\frac{\sigma}{\sqrt{n}}$ (σ known)

$\frac{(n-1)s^2}{\chi_R^2} < \sigma^2 < \frac{(n-1)s^2}{\chi_L^2}$ Variance

Ch. 7: Sample Size Determination

$n = \frac{[z_{\alpha/2}]^2 0.25}{E^2}$ Proportion

$n = \frac{[z_{\alpha/2}]^2 \hat{p}\hat{q}}{E^2}$ Proportion ($\hat{p}$ and $\hat{q}$ are known)

$n = \left[\frac{z_{\alpha/2}\sigma}{E}\right]^2$ Mean

Ch. 8: Test Statistics (one population)

$z = \frac{\hat{p} - p}{\sqrt{\frac{pq}{n}}}$ Proportion—one population

$t = \frac{\bar{x} - \mu}{\frac{s}{\sqrt{n}}}$ Mean—one population (σ unknown)

$z = \frac{\bar{x} - \mu}{\frac{\sigma}{\sqrt{n}}}$ Mean—one population (σ known)

$\chi^2 = \frac{(n-1)s^2}{\sigma^2}$ Standard deviation or variance—one population