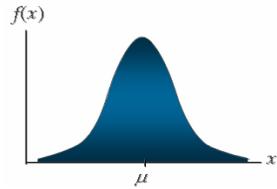


01: Introduction to Statistics

Key Statistics Terms	Probability
<p>Statistics: A branch of mathematics that deals with the effective management and analysis of data.</p> <p>Population: An entire collection of data.</p> <p>Scores: Observations that make up a data set.</p> <p>Total scores: N is the total number of scores of population</p> <p>Sample: A subset of the population.</p> <p>Random: Chosen in a way to allow each member of the population an equal chance of being selected.</p>	<p>A probability provides a quantitative description of the likely occurrence of a particular event.</p> <p>Random Variable associates a unique numerical value with every outcome of an experiment (Discrete, Continuous)</p>
Key Formulas	Frequency Distribution
<p>Mean, $\mu = \frac{\sum x}{N}$</p> <p>Midrange = $\frac{x_{largest} + x_{smallest}}{2}$</p> <p>Range = $x_{Highest} - x_{Lowest}$ <i>Mode = Value in the set occurs most often.</i> <i>Median = put the values in order, then find the middle</i></p> <p>Population Variance, $\sigma^2 = \frac{\sum (x - \mu)^2}{N}$</p> <p>Sample Variance, $s^2 = \frac{\sum (x_i - \bar{x})^2}{n - 1}$</p> <p>Population standard deviation, $\sigma = \sqrt{\frac{\sum (x_i - \mu)^2}{N}}$</p> <p>Sample standard deviation, $s = \sqrt{\frac{\sum (x_i - \bar{x})^2}{n - 1}}$</p> <p>Probability, $P(E) = \frac{E}{N}$</p> <p>Conditional Probability, $P(B A) = P(A \text{ and } B) / P(A)$</p> <p>Central Limit Theorem, $\bar{X} \sim N(\mu, \frac{\sigma^2}{n})$</p> <p>Uniform probability fn, $f(x) = 1/(b - a)$, for $a \leq x \leq b$ $= 0$, elsewhere</p> <p>Expected value of x, $E(x) = (a + b)/2$</p> <p>Variance of x, $Var(x) = (b - a)^2/12$</p> <p>Normal Probability Density Fn, $f(x) = \frac{1}{\sqrt{2\pi}\sigma} e^{-(x-\mu)^2/2\sigma^2}$</p> <p>Expon. Prob. Density, $P(x) = \lambda e^{-\lambda x}$</p>	<p>A Frequency Distribution whose magnitude along the X axis and frequency of score along the Y axis. These distributions are represented by Histograms, Bar Charts, Frequency Polygons, and Stem-and-leaf plots.</p>
	Testing Hypothesis
	<p>In hypothesis, we determine whether the data supports the claim or not.</p> <p>Null Hypothesis – Statement of no effect.</p> <p>Alternative Hypothesis – Statement suspect is true.</p> <p>Type I error is rejecting the null hypothesis when it is true</p> <p>Type II error is not rejecting the null hypothesis when it is false.</p>
	Limit Theorem
	<p>As the sample size increases the sampling distribution of the sample mean approaches the normal distribution with mean μ of 0 and variance σ^2/n of 1.</p>
	Probability Distribution
	<div style="display: flex; align-items: center;">  <div style="margin-left: 20px;"> <p>A continuous random variable can assume any value in an interval on the real line or in a collection of intervals- Uniform, Normal, and Exponential.</p> </div> </div>
	Statistics Problem Solving Tips
	<ul style="list-style-type: none"> ✓ Split problems into parts. ✓ Analyze the given values ✓ Draw (this includes drawing pictures and diagrams) ✓ Make a List (this includes making a table) ✓ Think (this means using skills you already know) ✓ Think about the statistical methods used. ✓ Analyze the efficiency of the result.
	Typical Problem
	<p>Example: The probability that a student, selected at random from the freshman class at Hard Rock College, will pass a certain economics course is 4/5, and the probability that the student passes both economics and religion is 1/2 . What is the probability that he will pass religion if it is known that he has passed economics?</p> $P(R E) = \frac{P(E \text{ and } R)}{P(E)}$ $= \frac{\frac{1}{4}}{\frac{5}{8}} = \frac{2}{5}$
Variables Used	How to Use
<p>N=Number of scores μ=mean $\pi = 3.14..$ $e = 2.718$ a=smallest value a variable can assume b=largest value a variable can assume E=events λ= rate of change</p>	<p>How to Use This Cheat Sheet: These are the keys related this topic. Try to read through it carefully twice then recite it out on a blank sheet of paper. Review it again before the exams.</p>
Measures	
<p>Measures of Central tendency are measures of the location of the middle or the center of a distribution- (Mean, Median, Mode, Mid-range).</p> <p>Measures of Variability describes in an exact quantitative measure, how spread out/clustered together the scores are- (Range, Variance, Standard deviation).</p>	

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