Math 1700: Elementary Statistics

1^{st} Week Summary (08/28/25)

- Algebra review:

  Summation:

  $\sum_{i=1}^{n} x_i = x_1 + x_2 + \cdots + x_n$

  $\sum_{i=1}^{n} x_i^2 = x_1^2 + x_2^2 + \cdots + x_n^2$

  $\left(\sum_{i=1}^{n} x_i\right)^2 = (x_1 + x_2 + \cdots + x_n)^2$

  $\sum_{i=1}^{n} x_i y_i = x_1 y_1 + x_2 y_2 + \cdots + x_n y_n$

  Factorials:

  $n! = n \times (n-1) \times \cdots 2 \times 1$

  Computations:

  e.g. $x + y\dfrac{\sqrt{s}}{n}$

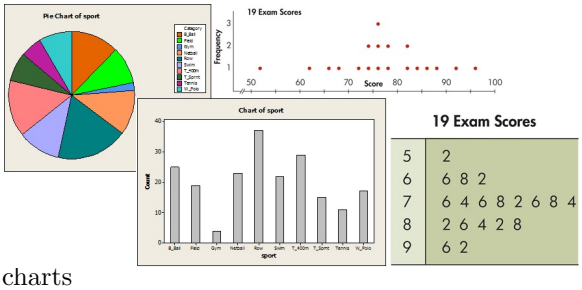
  Solving simple linear equations:

  $2 - 2x = 3x + 3$

- What is statistics?
- Descriptive statistics vs Inferential statistics.
- Population vs Sample.
- Variables and Data values.
- Parameter vs Statistic.
- Two types of data:

  Qualitative [Nominal and Ordinal]

  Quantitative [Continuous and Discrete]



- Sampling Techniques

  Simple Random Sample (SRS)

  Stratified Random Sample

  Cluster Sample

- Ways to chart qualitative data: Bar graphs and Pie charts
- Ways to chart quantitative data: Dot plot, Stem and Leaf plot, and Histogram
- Measures of Central Tendency

  Mean: $\bar{x} = \dfrac{x_1 + x_2 + \cdots + x_n}{n} = \dfrac{\sum_{i=1}^{n} x_i}{n}$

  Median:

  If n odd, $\tilde{x}$ = middle value

  If n even, $\tilde{x}$ = average of middle two values

  Mode: The value that happens most often in sample

  Midrange $= \dfrac{L + H}{2}$

- Measures of Dispersion

  Range $= H - L$

  Sample Variance: $s^2 = \dfrac{1}{n-1}\sum_{i=1}^{n}(x_i - \bar{x})^2 = \dfrac{1}{n-1}\left\{\sum_{i=1}^{n} x_i^2 - \dfrac{\left(\sum_{i=1}^{n} x_i\right)^2}{n}\right\} = \dfrac{1}{n-1}SS(x)$

  Sample Standard deviation: $s = \sqrt{s^2}$