Math 124 Review for Midterm 1

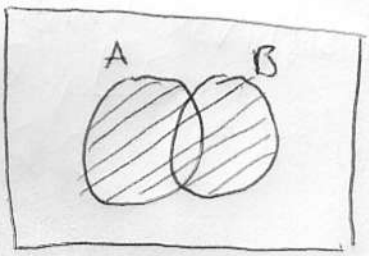
What have we covered?

- Exploratory Data Analysis
  - histograms
  - Boxplots – 1.5IQR outlier rule
  - Summary statistics
    - mean
    - median
    - Variance
    - Standard Deviation
    - UQ, LQ
    - IQR
  - Scatterplots
  - Correlation

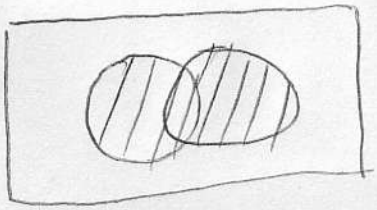
- Probability
  - random experiment
  - probability as description of long run events
  - Assigning Probabilities $P(A) = \frac{\#A}{N}$
    - equally likely outcomes $P(\text{outcome}) = \frac{1}{N}$
    - probability rules – probabilities $0 \leq p \leq 1$
      - total probability $= 1$
  - Independence

$$P(A \cap B) = P(A)P(B)$$

  - Venn diagrams
    - union



    - intersection



- Probability Rules for Unions

$$P(A \cup B) = P(A) + P(B) \quad \text{if disjoint}$$

$$P(A \cup B) = P(A) + P(B) - P(A \cap B) \quad \text{if not disjoint}$$

- sampling with/without replacement
- Random Variables
  - Discrete
  - Continuous
    - Probability Distributions for discrete r.v.
    - density functions for continuous r.v
      - Uniform
      - Normal
    - Working out the mean and variance of a r.v.
    - Computing probabilities for ~~a~~ normal distribution
      - Standard Normal Distribution
      - Standardizing a general Normal R.V.

What would I suggest you focus your review on?

- Correlation – Steps for computing ie
  1. Compute Σx_i, Σy_i, $\bar{x}$, $\bar{y}$
  2. Compute Σx_i^2, Σy_i^2, s_x, s_y
  3. Compute $\Sigma x_i y_i$
  4. $r = \frac{1}{n-1} \frac{1}{s_x} \frac{1}{s_y} \left(\Sigma x_i y_i - n \bar{x} \bar{y} \right)$

  – How to interpret using magnitude and sign

- boxplots – how to compute Median
  LQ
  UQ
  IQR

  – how to determine outliers using 1.5 IQR criterion

  – how to draw (including showing outliers)

- probability
  - Computing probabilities in sampling with and without replacement situations
  - Determing probabilities of intersections and unions.

- Normal distribution
  - Using the standard Normal Table
  - Figuring out probabilities for normal distribution situations with non zero mean and stdev ≠ 1.