

**Study Guide for the Final
Math 1040**

Chapter 1. (Mostly Vocabulary)

- (a) Populations (and parameters) vs Samples (and statistics)
- (b) Descriptive vs Inferential Statistics
- (c) Qualitative vs Quantitative Data
- (d) Classifying data by level of measurement.
- (e) Types of data collection.
- (f) Types of sampling techniques.

Chapter 2. (Descriptive Statistics)

- (a) Given a list of numbers and a number of classes:
 - Create a table with frequencies, relative and cumulative frequencies
 - Construct a frequency and cumulative frequency histogram.
 - Construct a frequency polygon and an ogive.
- (b) Given a list of numbers, construct stem/leaf and dot plots.
- (c) Construct a pie chart for quantitative/qualitative paired data.
- (d) Construct a scatter plot for quantitative/quantitative paired data.
- (e) Given raw data (a list of numbers):
 - Compute the mean, median and mode.
 - Compute the variances (deviations), and their squares
 - Compute the standard deviation.
- (f) Given grouped data (individual or in classes):
 - Compute the weighted mean
 - Compute the sample standard deviation
- (g) Use the Empirical Rule for (nearly) normal distributions.
- (h) Use Chebychev's Theorem with no assumptions on the distribution.
- (i) Find quartiles and draw a box-and-whiskers graph.
- (j) Find percentiles.
- (k) Understand z -scores associated to a data point (x), if you are given a mean (μ) and a standard deviation (σ), and be able to determine whether a data point is "unusual."

Chapter 3. (Probability)

- (a) What is $P(A)$? What is $P(A|B)$?
- (b) Theoretical Probabilities: coin flips and cards. Tree diagrams.
- (c) Read empirical probabilities from a table.
- (d) The multiplication rule: $P(A \text{ and } B) = P(A|B) \cdot P(B)$

What does it mean for A and B to be independent?

- (e) The addition rule: $P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$.

What does it mean for A and B to be mutually exclusive?

- (f) Probability of the complement of an event: $P(\text{not } A) = 1 - P(A)$.
- (g) Counting. Permutations and Combinations.

${}_n C_x$ = the number of ways of choosing x objects from n objects

${}_n P_x$ = the number of ways of choosing x **ordered** objects from n

Chapter 4. (Discrete Probability Distributions)

- (a) Compute expected values and standard deviations from a table.
- (b) What is a binomial experiment? What are n, x, p, q ?

Be able to use the formulas for $P(x)$, mean and standard deviation.

Chapter 5. (Normal Probability Distributions)

- (a) Review the conversion from x to z and back again.
- (b) Look up probabilities from z -scores and convert to percentiles.
- (c) Look up z -scores from probabilities (percentiles).

Chapter 9. (Correlation and Regression)

From a list of ordered pairs of data,

- (a) Review how to make the scatter plot.
- (b) Know what the correlation coefficient is telling you.
- (c) Use the formulas to compute the regression line (line of best fit).
- (d) Use the regression line to make predictions.