Math 10 Spring 2010 Final Exam Topics

(1) Probability (Part IV)
   (a) Counting: multiplication principle, inclusion-exclusion principle, combinations
   (b) Concepts: conditional probability, independence, mutual exclusivity, drawing with or without replacement
   (c) Combining probabilities: multiplication rule (conditional probability), inclusion-exclusion principle (special cases: addition rule, inverse/negation rule)

(2) Descriptive statistics of one and two variables (Parts II and III)
   (a) Visual representations: histograms, scatter plots, SD line, regression line, graph of averages, graph of residuals
   (b) Summary values: mean, median, mode, range, quartiles, percentiles, standard deviation, correlation coefficient
   (c) Other calculations: regression line equation, average y associated with x (shows regression effect), r.m.s. error
   (d) Normal curve: standard unit conversion, areas under curve, normal curve within a vertical strip of a scatter plot
   (e) Manipulations: change of scale, residuals
   (f) Hazards: error, bias, outliers, ecological correlation, drawing causation conclusions, regression fallacy, application of homoscedastic techniques to heteroscedastic data, problems with the data itself

(3) Box models and sampling (Parts V and VI)
   (a) Box models for chance processes involving sums (outcome values, money won, counting); box models to approximate populations from samples
   (b) Calculations: expected value, standard error (useful shortcut when only two values) – for box model, for sample when population is known (drawing with versus without replacement), to approximate population when only sample is known (bootstrap method), or for averages
   (c) Principles: law of averages, central limit theorem
   (d) Confidence intervals

(4) Tests of significance (Part VIII)
   (a) Null and alternative hypothesis
   (b) z-test
   (c) Two-sample z-test for independent samples
   (d) χ^2 test for distribution or independence
   (e) P values that are statistically significant or "too good to be true"