Exam 1 Objectives

For Exam #1, a well-prepared student should be able to

- distinguish between categorical and quantitative variables
- distinguish between a variable and a value
- read context to determine what each variable measures and how it is measured (including units when relevant)
- construct an appropriate graph (bar graph, pie chart, stemplot, histogram, boxplot, time plot) and use it to identify key features of a distribution (shape and, if relevant, center and spead)
- identify potential outliers and make a judgment on how to deal with each in analyzing the distribution
- compute relevant quantities for a distribution (median, quartiles, IQR, mean, standard deviation) and use these to quantify key features of a distribution
- understand which measures are resistant and which are not resistant
- use the $1.5 \times$ IQR rule to identify potential outliers
- state the defining features of a density curve
- understand the connection between a distribution and a density curve
- connect the area of a region under a density curve with a proportion of observations
- recognize the key features of a normal density curve and approximately locate the mean and standard deviation
- use the 68-95-99.7 rule to quickly determine proportions for "nice" ranges of a normally distributed variable
- standardize values (i.e., compute z-scores) for a normally distributed variable
- use standardized values and a standard normal table to determine a proportion for a given range of a normally distributed variable
- use standardized values and a standard normal table to determine a range for a given proportion of a normally distributed variable
- assess the normality of a distribution using a normal quantile plot
- construct a scatterplot and use it to identify/describe a potential association between two variables
- distinguish between an explantory variable and a response variable when appropriate
- calculate the correlation for a pair of variables and use it to quantify the direction and strength of a linear association
- estimate a regression line for a given scatterplot showing evidence of a linear relationship
- calulate the slope and intercept of a regression line
- interpret the square of the correlation in terms of regression
- use a regression line to make predictions
- construct a residual plot and use it to analyze the fit of a regression line
- state conclusions with supporting evidence and analysis of strengths and weaknesses in that evidence