Review

* Model selection
  + Which model is best?
  + R^2
    - How well does our model encompass the data
    - R^2=0.8 then the model represents 80% of variation within the data
    - R^2 will increase with more predictors because it will encompass more variation
    - Favors complex models
  + Akaike Information Criterion
    - AIC weighs the model complexity (number of predictors) against how well the model fits the data
    - Low values are better
    - Penalized for increasing number of parameters
    - AIC = 2k – 2ln(L)
      * K = model parameters
      * L = likelihood, how well our model matches data
* Log transformations
  + Can linearize non-linear functions
  + Stabilize variance
    - Bartlett test: tests for homogeneity of variance
  + Challenges
    - Transformations affect the deterministic and stochastic model components
    - Fixes non-constant variance
    - Data is proportional
      * 1% beetle survival = 2 trees killed per year (not transformed)
      * 1% beetle survival = 6% proportional increase in tree mortality rate (log transformation)
  + Check residuals plot to see if the log transformation was successful
    - Make variance constant
* Resampling methods
  + Resampling with replacement allows us to create many data sets from the original
  + Bootstrap
    - Samples entire rows, preserving the data structure
    - Preserves associations among data columns
  + Monte Carlo
    - Sample predictor and response variables separately
    - Samples each column separately
    - Pairs everything differently
    - No association among columns
    - Behavior of many MC resamplings represents a null distribution