WS #7 - Sampling
Monday, September 22, 2025

Math 154 - Jo Hardin

Name: _____

Names of people you worked with: _____

Dog or cat?

Task: In class we talked about three different types of simulation methods, sampling, shuffling, and resampling. All of them use the R function `sample()`. For each scenario, answer the following:

- Does the `sample()` function use `replace = TRUE` or `replace = FALSE`?
- How many times / items do you sample?

1. Mimic flipping a fair coin 47 times. The data are coded: `flips <- c("H", "T")`.
2. You have 5000 different coins in a hat, and they all have a different probability of heads (e.g., `heads_prop = ` $p_1, p_2, ..., p_{5000}$). You'd like to simulate from the population of coins using 100 different coins (one flip for each coin).
3. From your senior thesis, you have a dataset which includes the average weight eaten per day for each of 75 mice. You think your dataset is a pretty good representation of how much all lab mice eat, and you'd like to use it as if to simulate from a population. You'll use the simulation to create many "typical" labs with 75 mice.
4. You believe there is an association between lemur species and lemur weight. You have measured 2000 lemurs, and you plan to randomly assign the weight measurements across the recorded species to visualize what the relationship (between weight and species) would be if there was no association.

Solution:

1. `sample(flips, 47, replace = TRUE)`
2. `sample(heads_prop, 100, replace = FALSE)`
3. `sample(mice_eat, 75, replace = TRUE)`
4. `sample(lemur_weight, 2000, replace = FALSE)`