Worksheet 14 - Sampling distribution of x-bar

Monday, March 23, 2026

Math 58B - Jo Hardin

Name: _____

Names of people you worked with: _____

What variables are you and your group planning to collect data on for the Islands project?
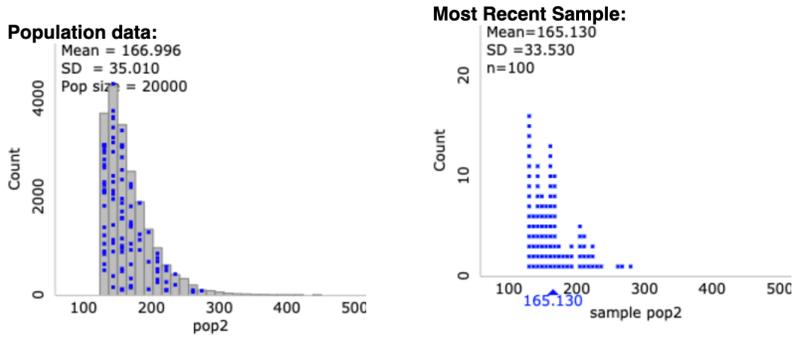
Task: Consider the Ethan Allen example. Recall that we are assuming that the CDC information on weights is a reasonably accurate description of the people who board the Ethan Allen ($\mu = 167$lbs and $\sigma = 35$lbs).

Roughly sketch three curves. For each curve, indicate at least three values (numbers) on the x-axis.

1. A histogram describing the weights of 100 randomly sampled individuals.
2. A histogram describing the sample means of 5000 different samples, each sample includes 100 random people.
3. A histogram describing the T score of 5000 different samples (from a population of $\mu = 167$lbs and $\sigma = 35$lbs), each sample includes 100 random people.

Solution:

1. Likely the distribution is skewed right. The x-axis should have weights (i.e., be in lbs) you would expect to see in the population.

Population data:
Mean = 166.996
SD = 35.010
Pop size = 20000

Most Recent Sample:
Mean=165.130
SD =33.530
n=100

2. The sampling distribution of the sample mean should be centered at 167lbs with a standard deviation of 3.5lbs. Again, the units on the x-axis are lbs. Pay attention to how much more narrow the sampling distribution of the mean is as compared to the population distribution or the data distribution.

Mean=166.941
SD =3.527
Num samples=5001
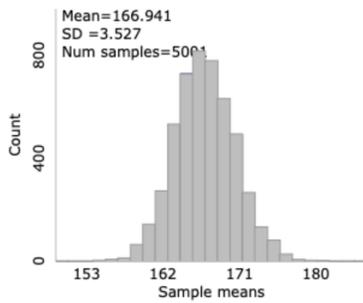
3. The sampling distribution of the T score should be centered at 0 with a spread that is only slightly wider than a N(0,1). Notice that the x-axis is no longer in units of "lbs". Instead, the x-axis is scaled, akin to using Z scores.

Mean=-0.095
SD =1.050
Num samples=5001

2