Equitable Equations: *Sampling distributions*

Problem 1

The heights of four friends, in centimeters, are 160, 165, 170, and 185.

(a) Compute the mean μ and standard deviation σ of their heights.

(b) List all possible random samples of size 2 (with replacement). Compute the sample mean $\overline{x}$ of each. *Hint:* order doesn't matter, so there are 10 possibilities.

(c) Compute the mean $\mu_{\overline{x}}$ and standard deviation $\sigma_{\overline{x}}$ of these 10 values of $\overline{x}$. This is the mean and standard deviation of the sampling distribution of the sample mean.

(d) Verify that $\mu_{\overline{x}} = \mu$ and $\sigma_{\overline{x}} = \sigma/\sqrt{n}$ in this case.

Problem 2

On average, Americans consume 90 bananas per year. The standard deviation is 12 pounds. Random samples of size 25 are taken from this population. What is the mean and standard deviation of the sample mean?

Problem 3

Repeat Problem 2 using samples of size 100.