

### More Sampling Distributions

**CREDIT:** The questions on this document were written by Erik Packard, PhD, Associate Professor of Mathematics at Colorado Mesa University.

- Problem 3

- Consider a population of size 5 with the following data:

A:6      B:8      C:6      D:15      E:6

- A) Find the population mean and standard deviation.
- B) Draw a histogram for the population using groupings of 5.3 – 6.3, 6.3 – 7.3, etc.
- C) Find all samples of size 2 without replacement and their sample means.
- D) Find the mean and standard deviation of the sample means in part C. (Actually do it. That is, don't use a shortcut.) Did the mean turn out to be the same as in part A? Did the standard deviation come out to be smaller than that from part A?
- E) Draw a histogram for the sample means found in part C. Use the same groupings as in the part B.
- F) Find all samples of size 2 with replacement and their sample means.
- G) Find the mean and standard deviation of the sample means in part F. (Actually do it. That is, don't use a shortcut.) Did the mean turn out to be the same as in part A? Did the standard deviation obey the following formula?

$$\sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}}$$

- H) Draw a histogram for the sample means found in part F. Use the same groupings as in part B.