

Stat 22000 Summer 2020 Homework 9

All page, section, and exercise numbers below refer to the course text (*OpenIntro Statistics*, 3rd edition, by Diez, Barr, and Cetinkaya-Rundel).

Reading: Section 4.1, 4.4 and 4.2 (Please read in this order)

Problems for Self-Study : (Do Not Turn In)

- Exercise 4.33, 4.35, 4.37, 4.39, 4.41, 4.13 on p.207-217
- Answers can be found at the end of the book (p.413-415).

Problems to Turn In: due **midnight of Thursday, July 16, on Canvas.**

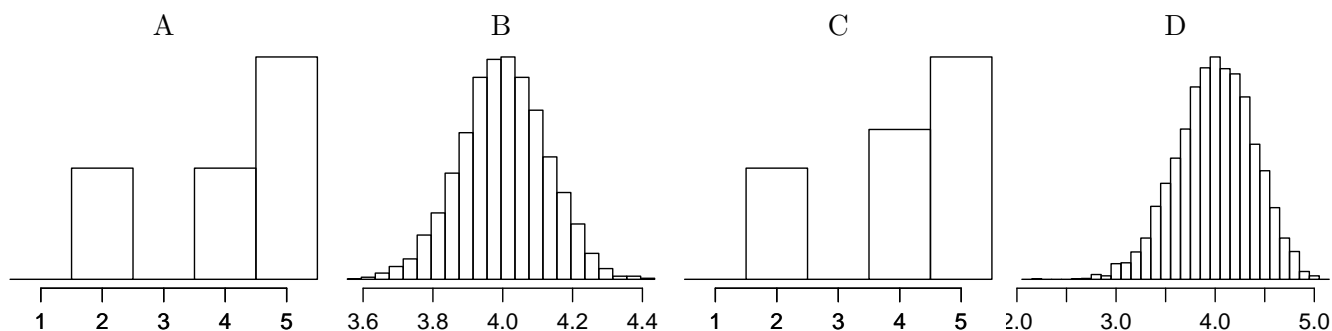
1. Suppose if an introductory statistics textbook was given to all potential readers for review in 1-to-5 stars rating system, with 5 stars being the best, the population distribution of the ratings would be as follows:

50% of the readers give 5 stars, 25% give 4 stars, 25% of the readers give 2 stars.

Of course it is impossible to ask all potential readers to rate the textbook. So the book seller samples potential readers from the population and ask them to rate the book.

The following graphs are

- (1) Histogram of the ratings given by all potential readers
- (2) Histogram of the ratings given by 100 randomly sampled readers
- (3) Histogram of 5000 sample means of the ratings from random samples of each size 10
- (4) Histogram of 5000 sample means of the ratings from random samples of each size 100



Determine which graph (A, B, C, or D) is which and explain your reasoning.

2. The 2008 General Social Survey asked, “*What do you think is the ideal number of children for a family to have?*” The 678 females who responded had a median of 2, mean of 3.22, and standard deviation of 1.99.
 - (a) What is the point estimate of the population mean (mean of ideal number of children answered by all U.S. women)?
 - (b) Find the standard error of the sample mean.
 - (c) Verify that the 99% confidence interval for the population mean is (3.02, 3.42).
 - (d) Is it plausible that the population mean is 2? Explain.

3. Continue the previous problem. Determine whether the following statements are true or false, and explain your reasoning.
- (a) From the data summary, the distribution of the sample is not normal.
 - (b) This confidence interval $(3.02, 3.42)$ is not valid since the distribution of the sample is not normal
 - (c) We are 99% confident that the average of the ideal number of children in a family answered by the 678 females in the sample is between 3.02 and 3.42.
 - (d) 99% the women in the samples thought that the ideal number of children is between 3.02 and 3.42.
 - (e) If a new sample was taken, we are 99% confident that the sample mean of the new sample would lie between 3.02 and 3.42.
 - (f) The margin of error of the 99% confidence interval $(3.02, 3.42)$ is 0.2.
 - (g) In order to decrease the margin of error of a 99% confidence interval by half, we would need to use a sample twice as large.
 - (h) A 95% confidence interval would be narrower than the 99% confidence interval since we don't need to be as sure about our estimate.