Benjamin Walter **cve303**
Assignment Point_Estimation due 04/14/2019 at 08:00pm EEST

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1. **(1 point)** Library/ASU-topics/setStat/di4.pg

A variable of a population has a mean of $\mu = 200$ and a standard deviation of $\sigma = 28$.

a. The sampling distribution of the sample mean for samples of size 49 is approximately normally distributed with mean _____ and standard deviation _____.

b. For part (a) to be true, what assumption did you make about the distribution of the variable under consideration?

- A. Uniform distribution.
- B. No assumption was made.
- C. Normal distribution.

c. Is the statement in part (a) still true if the sample size is 16 instead of 49? Why or why not?

- A. Yes, the sampling distribution of the sample mean is always normal.
- B. No, the sampling distribution of the sample mean is never normal for sample size less than 30.
- C. No. Because the distribution of the variable under consideration is not specified, a sample size of at least 30 is needed for part (a) to be true.

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2. **(1 point)** Library/CollegeOfIdaho/setStatistics_Ch11SamplingDistributions/11Stats_05_SamplingDistns.pg

For the following problems, select the best response:

(a) The sampling distribution of a statistic is

- A. the probability that we obtain the statistic in repeated random samples.
- B. the mechanism that determines whether or not randomization was effective.
- C. the distribution of values taken by a statistic in all possible samples of the same size from the same population.
- D. the extent to which the sample results differ systematically from the truth.

(b) A statistic is said to be unbiased if

- A. the survey used to obtain the statistic was designed so as to avoid even the hint of racial or sexual prejudice.
- B. the mean of its sampling distribution is equal to the true value of the parameter being estimated.
- C. both the person who calculated the statistic and the subjects whose responses make up the statistic were truthful.
- D. it is used for only honest purposes.

(c) Sampling variation is caused by

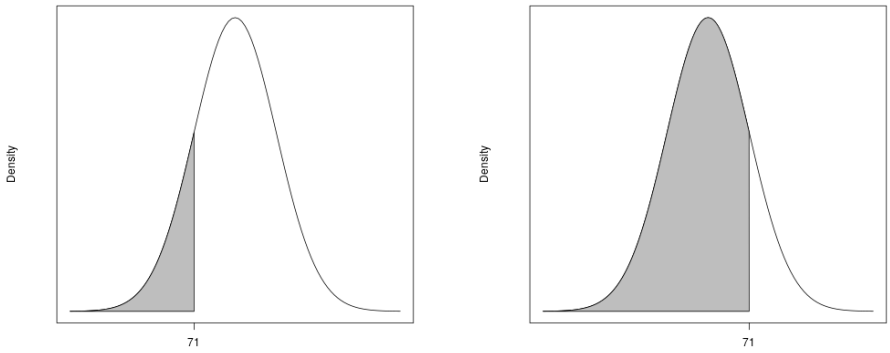
- A. changes in a population parameter from sample to sample.
- B. systematic errors in our procedure.
- C. random selection of a sample.
- D. changes in a population parameter that cannot be predicted.

A random sample of 20 junior managers working for corporations in a large city centre was taken in order to estimate the average daily commuting times for all such managers. Suppose that the population times for all such managers has mean 67 minutes and standard deviation 18 minutes. Answer the following questions, for probability values, you can enter R code or numbers.

(a) Find the standard error of the sample mean commuting time.
$\sigma_{\overline{X}} =$ ___

(b) Consider that the sampling distribution of the sample mean follows the normal distribution. The probability that the sample mean is less than 71 minutes is shown as the shaded area in which of the following graphs?

[Choose/(1)/(2)]



(1) (2)

(Click on a graph to enlarge it.)

(c) Find the probability that the sample mean is less than 71 minutes.
$P(\overline{X} < 71) =$ _____

(d) When the sample size is increased, the standard error of the sample mean will:

- A. decrease
- B. increase
- C. stay the same

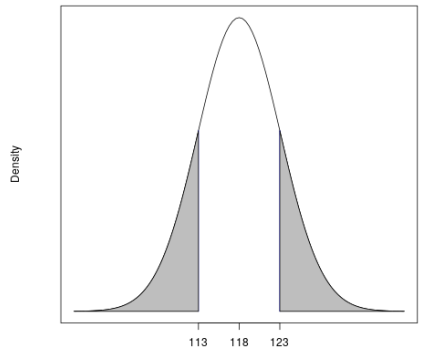
(e) When the sample size is increased, the probability that the sample mean is less than 71 minutes will:

- A. stay the same
- B. decrease
- C. increase

Suppose that for the population of Canada the average daily consumption of sugar is 118 grams (or 28 teaspoons) with standard deviation σ = 30 grams. A research study collects data from a random sample of 35 Canadians.

(a) Consider that the sampling distribution of the sample mean follows the normal distribution. Find the probability that the sample mean differs from the population mean by more than 5 grams. This is the the shaded area in the graph.

$P\left(\left|\overline{X} - \mu\right| > 5\right) =$ _____

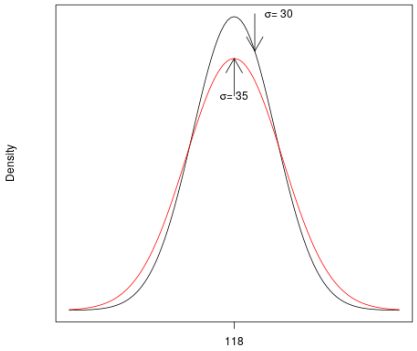


(b) When the sample size is increased, the population standard deviation will:

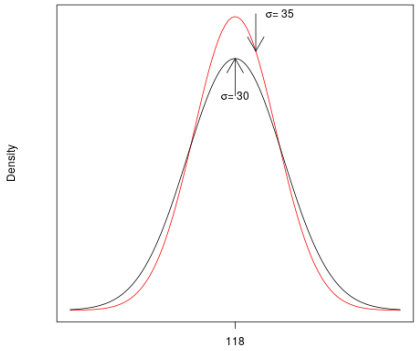
- A. stay the same
- B. decrease
- C. increase

(c) Suppose the population standard deviation was 35 grams instead of 30 grams. Which of the following graphs depicts how this will change the shape of the sampling distribution of the sample mean?

[Choose/(1)/(2)]



(1)



(2)

(Click on a graph to enlarge it.)

(d) If the population standard deviation increases, the probability that the sample mean differs from the population mean by more than 5 grams (the calculation in (a)) will:

- A. decrease
- B. increase
- C. stay the same