Central Limit Theorem: Practice (modified R. Bloom)*

Roberta Bloom

Based on *Central Limit Theorem: Practice*† by

Susan Dean

Barbara Illowsky, Ph.D.

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Abstract

This module contains practice problems for the Central Limit Theorem from Collaborative Statistics by Susan Dean and Dr. Barbara Illowsky. The problems relating to Central Limit Theorem for averages have not been changed in this module. The problems relating to Central Limit Theorem for sums have been removed from this module.

1 Student Learning Outcomes

- The student will explore the properties of data through the Central Limit Theorem.

2 Given

Yoonie is a personnel manager in a large corporation. Each month she must review 16 of the employees. From past experience, she has found that the reviews take her approximately 4 hours each to do with a population standard deviation of 1.2 hours. Let X be the random variable representing the time it takes her to complete one review. Assume X is normally distributed. Let $\overline{X}$ be the random variable representing the average time to complete the 16 reviews. Let ΣX be the total time it takes Yoonie to complete all of the month's reviews.

3 Distribution

Complete the distributions.

1. $X \sim$
2. $\overline{X} \sim$

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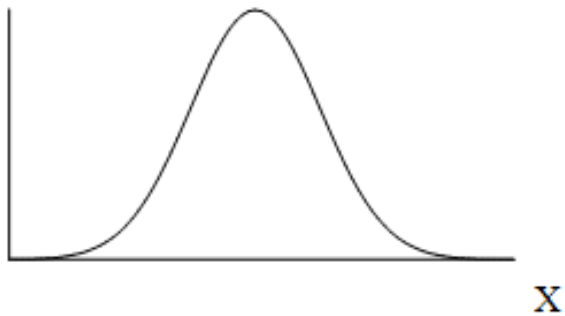
4 Graphing Probability

For each problem below:

a. Sketch the graph. Label and scale the horizontal axis. Shade the region corresponding to the probability.
b. Calculate the value.

Exercise 1 ***(Solution on p. 4.)***

Find the probability that **one** review will take Yoonie from 3.5 to 4.25 hours.



a.
b. $P($ _____ <X< _____ = _____

Exercise 2 ***(Solution on p. 4.)***

Find the probability that the **average** of a month's reviews will take Yoonie from 3.5 to 4.25 hrs.

a.
b. $P(\ ) =$_____

Exercise 3 ***(Solution on p. 4.)***

Find the 95th percentile for the **average** time to complete one month's reviews.

a.
b. The 95th Percentile=

5 Discussion Question

Exercise 4

What causes the probabilities in Exercise and Exercise to differ?

Solutions to Exercises in this Module

Solution to Exercise (p. 2)

b. 3.5, 4.25, 0.2441

Solution to Exercise (p. 2)

b. 0.7499

NOTE:. When calculating the standard deviation for the mean using the Central Limit Theorem in this problem, the sample size is n = 16, the number of reviews she completes in a month.

Solution to Exercise (p. 2)

b. 4.49 hours