

The Central Limit Theorem for Sample Means (Exercises)

Use the following information to answer the next six exercises: 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 four 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 \bar{X} be the random variable representing the mean time to complete the 16 reviews. Assume that the 16 reviews represent a random set of reviews.

? Example 1

What is the mean, standard deviation, and sample size?

Answer

mean = 4 hours; standard deviation = 1.2 hours; sample size = 16

Exercise 2

Complete the distributions.

1. $X \sim \text{_____}(\text{_____,} \text{_____})$
2. $\bar{X} \sim \text{_____}(\text{_____,} \text{_____})$

? Example 3

Find the probability that **one** review will take Yoonie from 3.5 to 4.25 hours. Sketch the graph, labeling and scaling the horizontal axis. Shade the region corresponding to the probability.

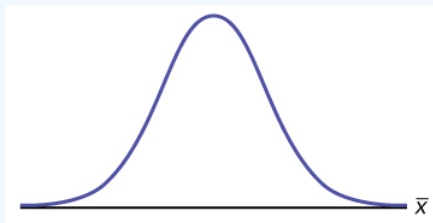


Figure 2.

2. $P(\text{_____} < x < \text{_____}) = \text{_____}$

Answer

1. Check student's solution.
2. 3.5, 4.25, 0.2441

Exercise 4

Find the probability that the **mean** of a month's reviews will take Yoonie from 3.5 to 4.25 hrs. Sketch the graph, labeling and scaling the horizontal axis. Shade the region corresponding to the probability.

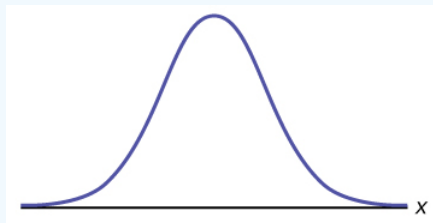


Figure 3.

2. $P(\text{_____}) = \text{_____}$

? Example 5

What causes the probabilities in Exercise and Exercise to be different?

Answer

The fact that the two distributions are different accounts for the different probabilities.

Exercise 6

Find the 95th percentile for the mean time to complete one month's reviews. Sketch the graph.

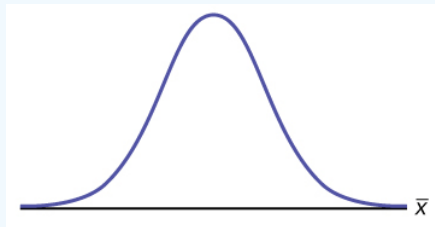


Figure 4.

a. The 95th Percentile = _____

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