

## 7.1E: 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 7.1E.1

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

**Answer**

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

### Exercise 7.1E.2

Complete the distributions.

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

### ? Example 7.1E.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.

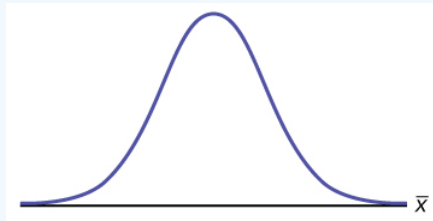


Figure 7.1E.2.

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

**Answer**

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

### Exercise 7.1E.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.

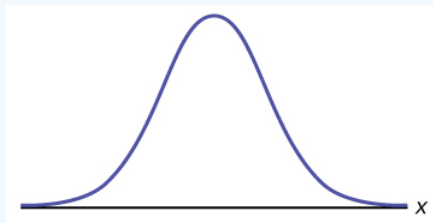


Figure 7.1E.3.

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

### ? Example 7.1E.5

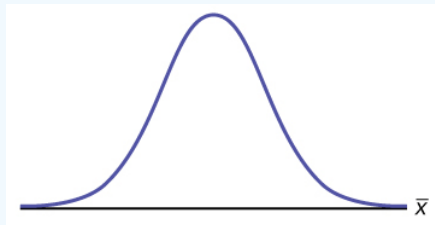
What causes the probabilities in Exercise and Exercise to be different?

#### Answer

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

### Exercise 7.1E.6

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



**Figure 7.1E.4.**

a. The 95<sup>th</sup> Percentile = \_\_\_\_\_

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