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## Question 3

A very large company has its headquarters in a 15-story downtown office building. The morning commute time for employees of this company is normally distributed with a mean of 28 minutes and a standard deviation of 11 minutes.

The company in the building next door samples 23 of its employees and finds that their mean commute time is 35.1 minutes. Is there evidence that their commute time is longer than the other company's, or is this just random sampling error?

Use the **Central Limit Theorem** to determine if this sample mean is likely to be observed, assuming commute time is the same for both companies.

(1/1 point)

3a. What is the expected mean in minutes of the sampling distribution for samples of size  $n=23$ ? (Report as a whole number)

✓ Answer: 28

You have used 1 of 1 submissions

(1/1 point)

3b. What is the expected standard error of the sampling distribution for samples of  $n=23$ ? (Round to 2 decimal places.)

✓ Answer: 2.29

*You have used 1 of 1 submissions*

(1/1 point)

3c. What is the z-score for the neighboring company's sample mean?  
(Round to 1 decimal place.)

✓ Answer: 3.1

*You have used 1 of 1 submissions*

(1/1 point)

3d. What is the probability of observing a sample mean this high (or higher), if the employees really do commute the same amount of time?

☐ About 0.1☐ About 0.01☒ Less than 0.001 ✓*You have used 1 of 1 submissions*

(1/1 point)

3e. What should we conclude about the sample mean of 35.1 minutes?

☐ It is a sample mean that is likely be observed.☒ It is a sample mean that is not likely to be observed. ✓

*You have used 1 of 1 submissions*

(1/1 point)

3f. What should we conclude about the commute time of the employees in the building next door?

☐ The average commute time is probably the SAME as the large company next door (our original population). The difference in sample means is probably random sampling error.

☒ Their average commute time is probably NOT the same as the large company next door (our original population). ✓

*You have used 1 of 1 submissions*

(1/1 point)

3g. What must we assume about the 23 people that were sampled for our conclusion to be valid?

☐ Their average commute time cannot exceed 28 minutes.

☐ They must all have the same type of job.

☒ They must be a representative sample of employees at the company. ✓

☐ They must live no more than 20 miles from downtown, because that would increase commute time.

*You have used 1 of 1 submissions*

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