

Name: _____

Student ID: _____

ECON 0150 | MiniExam 3 | Fall 2025

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Q1. A class's average sleep time follows an *exponential* distribution with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours.

a) If you sample one student ($n = 1$), what is the sampling distribution of the sample mean?

Shape: _____

Mean: _____

Standard error: _____

b) If you sample 36 students ($n = 36$), what is the sampling distribution of the sample mean?

Shape: _____

Mean: _____

Standard error: _____

c) If you sample one student ($n = 100$), what is the sampling distribution of the sample mean?

Shape: _____

Mean: _____

Standard error: _____

this was confusing

Q2. You take 1000 samples ($n = 64$) of classes, each with sleep times following an *exponential* distribution with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours (same as in Q1).

a) If you were to plot a histogram of the sample means student's sleep times, describe the distribution you would expect to see:

Shape: _____

Mean: _____

Standard error: _____

b) According to the Central Limit Theorem, which statement is correct?

- The sample mean will equal the population mean when n is large enough
- The individual data points in a sample will follow a normal distribution
- The distribution of sample means will approach a normal distribution
- The population distribution must be normal for the theorem to apply

Q3. You are interested in whether students sleep on average 8 hours per night. You take one sample of 100 students ($n = 100$) with an average sleep time (\bar{x}) of 7.5 hours and standard deviation (S) of 1. You have decided in advance to reject the null hypothesis if it lies 3 standard errors away from the sample mean.

a) Describe the sampling distribution.

Shape: _____

Mean: _____

Standard error: _____

b) Construct the confidence interval for your test.

Lower Bound: _____

Upper Bound: _____

c) Use a figure of the probability density function of the sampling distribution to show the confidence interval for your test.

d) Using this confidence interval, are you able to reject the null hypothesis? YES / NO

Q4. A researcher conducts a test of whether students sleep on average 7.8 hours per night with a p-value of 0.12. Describe in one sentence what this p-value means.

Name: Henry Cooper

Student ID: 4730704

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Q1. A class's average sleep time follows an *exponential distribution* with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours.

a) If you sample one student ($n = 1$), what is the sampling distribution of the sample mean?

Shape: Exponential

Mean: 8

Standard error: 1.5

b) If you sample 36 students ($n = 36$), what is the sampling distribution of the sample mean?

Shape: Approx. Normal

Mean: 8

Standard error: 1.5/6

$$SE = \frac{1.5}{\sqrt{36}} = \frac{1.5}{6}$$

c) If you sample one student ($n = 100$), what is the sampling distribution of the sample mean?

Shape: Approx. Normal

Mean: 8

Standard error: 1.5/10

$$SE = \frac{1.5}{\sqrt{100}} = \frac{1.5}{10}$$

Q2. You take 1000 samples ($n = 64$) of classes, each with sleep times following an *exponential* distribution with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours (same as in Q1).

a) If you were to plot a histogram of the sample means student's sleep times, describe the distribution you would expect to see:

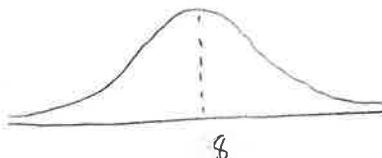
Shape: Approx. Normal

Mean: 8

1.5

$$\frac{1.5}{\sqrt{64}} = \frac{1.5}{8}$$

Standard error: $\frac{1.5}{\sqrt{64}}$



b) According to the Central Limit Theorem, which statement is correct?

- The sample mean will equal the population mean when n is large enough
- The individual data points in a sample will follow a normal distribution

The distribution of sample means will approach a normal distribution

- The population distribution must be normal for the theorem to apply

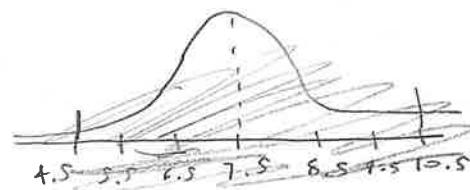
Q3. You are interested in whether students sleep on average 8 hours per night. You take one sample of 100 students ($n = 100$) with an average sleep time (\bar{x}) of 7.5 hours and standard deviation (S) of 1. You have decided in advance to reject the null hypothesis if it lies 3 standard errors away from the sample mean.

a) Describe the sampling distribution.

Shape: Approx. Normal

Mean: 7.5

Standard error: $\frac{1}{\sqrt{100}} = 0.1$

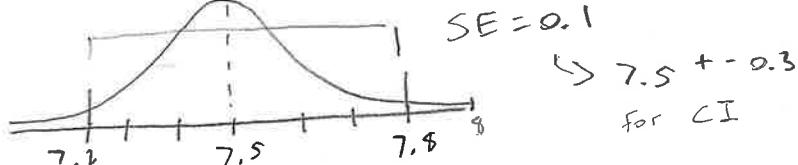


b) Construct the confidence interval for your test.

Lower Bound: 7.2

Upper Bound: 7.8

c) Use a figure of the probability density function of the sampling distribution to show the confidence interval for your test.



d) Using this confidence interval, are you able to reject the null hypothesis? YES / NO

Q4. A researcher conducts a test of whether students sleep on average 7.8 hours per night with a p-value of 0.12. Describe in one sentence what this p-value means.

This p-value means that there will be extremes or surprising results at 7.8 hours or more, 12% of the time.

Name: Coco Reed

Student ID: 4531679

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Q1. A class's average sleep time follows an *exponential* distribution with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours.

a) If you sample one student ($n = 1$), what is the sampling distribution of the sample mean?

Shape: exponential

Mean: 8

Standard error: 1.5

b) If you sample 36 students ($n = 36$), what is the sampling distribution of the sample mean?

Shape: approx normal

Mean: 8

Standard error: 8 / √36

c) If you sample one student ($n = 100$), what is the sampling distribution of the sample mean?

Shape: approx normal

Mean: 8

Standard error: 8 / √100

Q2. You take 1000 samples ($n = 64$) of classes, each with sleep times following an *exponential* distribution with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours (same as in Q1).

a) If you were to plot a histogram of the sample means student's sleep times, describe the distribution you would expect to see:

Shape: exponential

Mean: 8

Standard error: $8/\sqrt{64} = 1$

b) According to the Central Limit Theorem, which statement is correct?

- The sample mean will equal the population mean when n is large enough
- The individual data points in a sample will follow a normal distribution
- The distribution of sample means will approach a normal distribution
- The population distribution must be normal for the theorem to apply

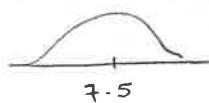
Q3. You are interested in whether students sleep on average 8 hours per night. You take one sample of 100 students ($n = 100$) with an average sleep time (\bar{x}) of 7.5 hours and standard deviation (S) of 1. You have decided in advance to reject the null hypothesis if it lies 3 standard errors away from the sample mean.

a) Describe the sampling distribution.

$$n = 100 \quad \bar{x} = 7.5 \quad S = 1$$

Shape: normal

$$df = 99$$



Mean: 7.5

Standard error: $1/100 = 1/10 = 0.1$ $\bar{x} \sim t_{99} = ($ $7.5 \pm 3(0.1)$ 7.5 ± 0.3)

$$\begin{array}{r} 97.5 \\ \times 0.99 \\ \hline 16750 \\ + 6750 \\ \hline 7425 \end{array}$$

b) Construct the confidence interval for your test.

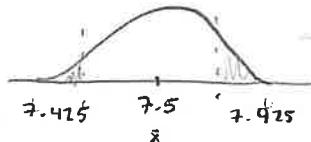
Lower Bound: $7.5 - 3(0.1)$

$$= 7.5 - 3 = 7.2$$

Upper Bound: $7.5 + 3(0.1)$

$$= 7.5 + 3 = 7.8$$

c) Use a figure of the probability density function of the sampling distribution to show the confidence interval for your test.



d) Using this confidence interval, are you able to reject the null hypothesis?

YES / NO

Q4. A researcher conducts a test of whether students sleep on average 7.8 hours per night with a p-value of 0.12. Describe in one sentence what this p-value means.

If the null hypothesis is true, we would expect to see \bar{x} this far from the mean 12% of the time.
(7.8)

Name: David Hargraves

Student ID: 4618322

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Q1. A class's average sleep time follows an *exponential* distribution with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours.

a) If you sample one student ($n = 1$), what is the sampling distribution of the sample mean?

Shape: normal

Mean: 8

Standard error: 1.5

b) If you sample 36 students ($n = 36$), what is the sampling distribution of the sample mean?

Shape: approx. normal

Mean: 8

$$\frac{1.5}{\sqrt{36}} = \frac{1.5}{6} = \frac{1}{4}$$

Standard error: $\frac{1}{4}$

c) If you sample one student ($n = 100$), what is the sampling distribution of the sample mean?

Shape: approx. normal

Mean: 8

Standard error: $\frac{1.5}{\sqrt{100}}$

$$\frac{1.5}{\sqrt{100}} = \frac{1.5}{10}$$

Q2. You take 1000 samples ($n = 64$) of classes, each with sleep times following an *exponential* distribution with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours (same as in Q1).

a) If you were to plot a histogram of the sample means student's sleep times, describe the distribution you would expect to see:

Shape: approx. normal

Mean: 8

Standard error: 1.5

b) According to the Central Limit Theorem, which statement is correct?

- The sample mean will equal the population mean when n is large enough
- The individual data points in a sample will follow a normal distribution
- The distribution of sample means will approach a normal distribution
- The population distribution must be normal for the theorem to apply

Q3. You are interested in whether students sleep on average 8 hours per night. You take one sample of 100 students ($n = 100$) with an average sleep time (\bar{x}) of 7.5 hours and standard deviation (S) of 1. You have decided in advance to reject the null hypothesis if it lies 3 standard errors away from the sample mean.

a) Describe the sampling distribution.

Shape: approx. normal

Mean: 7.5

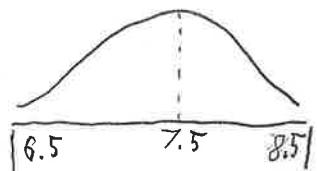
Standard error: 1

b) Construct the confidence interval for your test.

Lower Bound: 6.5

Upper Bound: 8.5

c) Use a figure of the probability density function of the sampling distribution to show the confidence interval for your test.



d) Using this confidence interval, are you able to reject the null hypothesis? YES / NO

Q4. A researcher conducts a test of whether students sleep on average 7.8 hours per night with a p-value of 0.12. Describe in one sentence what this p-value means.

This p-value means that the researcher is 88% confident that students sleep on average 7.8 hours per night.

Name: Will Brubaker

Student ID: 4547937

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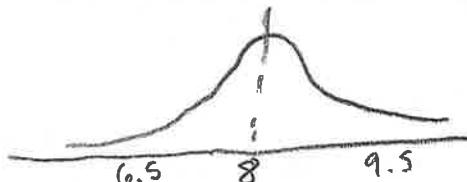
Q1. A class's average sleep time follows an *exponential distribution* with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours.

a) If you sample one student ($n = 1$), what is the sampling distribution of the sample mean?

Shape: Uniform

Mean: 8

Standard error: 1.5

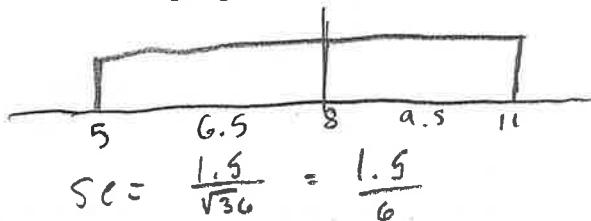


b) If you sample 36 students ($n = 36$), what is the sampling distribution of the sample mean?

Shape: Approx normal

Mean: 8

Standard error: 1.5/6

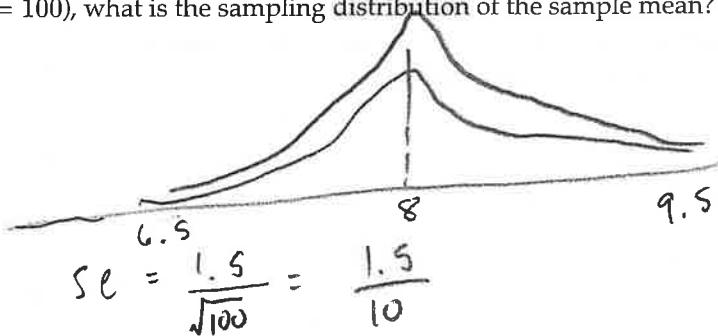


c) If you sample one student ($n = 100$), what is the sampling distribution of the sample mean?

Shape: Approx. normal

Mean: 8

Standard error: 1.5/10



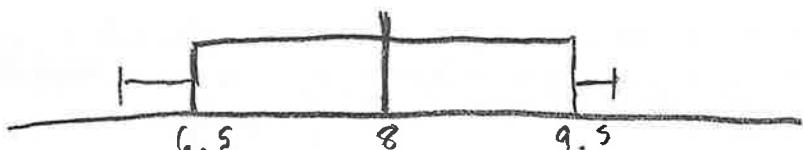
Q2. You take 1000 samples ($n = 64$) of classes, each with sleep times following an *exponential* distribution with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours (same as in Q1).

a) If you were to plot a histogram of the sample means student's sleep times, describe the distribution you would expect to see:

Shape: Uniform

Mean: 8

Standard error: $1.5/8$



b) According to the Central Limit Theorem, which statement is correct?

- The sample mean will equal the population mean when n is large enough
- The individual data points in a sample will follow a normal distribution
- The distribution of sample means will approach a normal distribution
- The population distribution must be normal for the theorem to apply

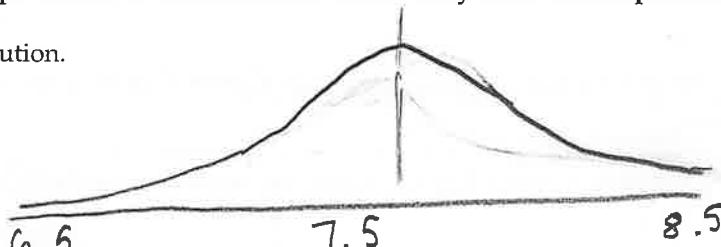
Q3. You are interested in whether students sleep on average 8 hours per night. You take one sample of 100 students ($n = 100$) with an average sleep time (\bar{x}) of 7.5 hours and standard deviation (S) of 1. You have decided in advance to reject the null hypothesis if it lies 3 standard errors away from the sample mean.

a) Describe the sampling distribution.

Shape: APPROX. Norm.

Mean: 7.5

Standard error: $1/\sqrt{100} = 1/10$



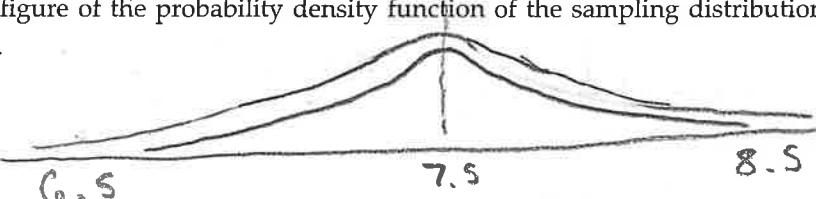
$$Se = \frac{1}{\sqrt{100}} = \frac{1}{10}$$

b) Construct the confidence interval for your test.

Lower Bound: $[6.5 \pm 1]$

Upper Bound: $[8.5 \pm 1]$

c) Use a figure of the probability density function of the sampling distribution to show the confidence interval for your test.



d) Using this confidence interval, are you able to reject the null hypothesis? YES NO

Q4. A researcher conducts a test of whether students sleep on average 7.8 hours per night with a p-value of 0.12. Describe in one sentence what this p-value means.

Name: Mirabelle Schiller

Student ID: 4652946

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Q1. A class's average sleep time follows an *exponential* distribution with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours.

a) If you sample one student ($n = 1$), what is the sampling distribution of the sample mean?

Shape: exponential

Mean: 8

Standard error: 1.5 $SE = \frac{\sigma}{\sqrt{n}} = \frac{1.5}{\sqrt{1}} = 1.5$

b) If you sample 36 students ($n = 36$), what is the sampling distribution of the sample mean?

Shape: exponential

Mean: 8

Standard error: 1/4 $SE = \frac{1.5}{\sqrt{36}} = \frac{1.5}{6} = \frac{1}{4}$

c) If you sample one student ($n = 100$), what is the sampling distribution of the sample mean?

Shape: exponential

Mean: 8

Standard error: 0.15 $SE = \frac{1.5}{\sqrt{100}} = \frac{1.5}{10} = 0.15$

Q2. You take 1000 samples ($n = 64$) of classes, each with sleep times following an *exponential* distribution with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours (same as in Q1).

a) If you were to plot a histogram of the sample means student's sleep times, describe the distribution you would expect to see:

Shape: exponential / skewed

Mean: 8

$$\text{Standard error: } \frac{3}{16} \quad Se = \frac{1.5}{\sqrt{64}} = \frac{1.5}{8} = \frac{3}{16}$$

b) According to the Central Limit Theorem, which statement is correct?

- The sample mean will equal the population mean when n is large enough
- The individual data points in a sample will follow a normal distribution
- The distribution of sample means will approach a normal distribution
- The population distribution must be normal for the theorem to apply

Q3. You are interested in whether students sleep on average 8 hours per night. You take one sample of 100 students ($n = 100$) with an average sleep time (\bar{x}) of 7.5 hours and standard deviation (S) of 1. You have decided in advance to reject the null hypothesis if it lies 3 standard errors away from the sample mean.

a) Describe the sampling distribution.

Shape: APPROX. normal

$$\begin{aligned} n &= 100 \\ \bar{x} &= 7.5 \\ S &= 1 \end{aligned}$$

Mean: 7.5

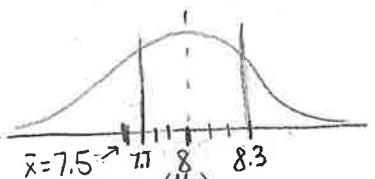
$$\text{Standard error: } \frac{1}{10} \quad Se = \frac{1}{\sqrt{100}} = \frac{1}{10}$$

b) Construct the confidence interval for your test.

Lower Bound: 7.7

Upper Bound: 8.3

c) Use a figure of the probability density function of the sampling distribution to show the confidence interval for your test.



d) Using this confidence interval, are you able to reject the null hypothesis? YES / NO

Q4. A researcher conducts a test of whether students sleep on average 7.8 hours per night with a p-value of 0.12. Describe in one sentence what this p-value means.

If the null hypothesis were true, we'd see results as extreme or more extreme than 7.8 hours 12% of the time.

Name: Riley Henderson

Student ID: _____

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Q1. A class's average sleep time follows an exponential distribution with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours.

a) If you sample one student ($n = 1$), what is the sampling distribution of the sample mean?

Shape: exponential

Mean: 8

Standard error: 1.5

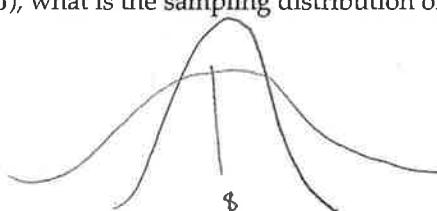
$$SE = \frac{\sigma}{\sqrt{n}} = \frac{1.5}{\sqrt{1}} = 1.5$$

b) If you sample 36 students ($n = 36$), what is the sampling distribution of the sample mean?

Shape: approx normal

Mean: 8

Standard error: 1.5/6



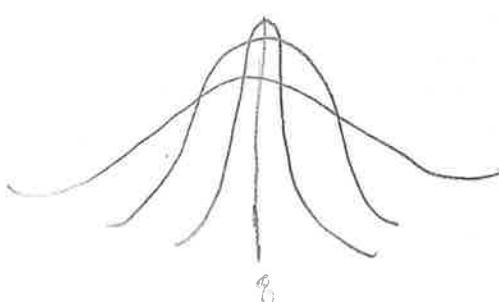
$$SE = \frac{\sigma}{\sqrt{n}} = \frac{1.5}{\sqrt{36}} = \frac{1.5}{6}$$

c) If you sample one student ($n = 100$), what is the sampling distribution of the sample mean?

Shape: approx normal

Mean: 8

Standard error: 1.5/100



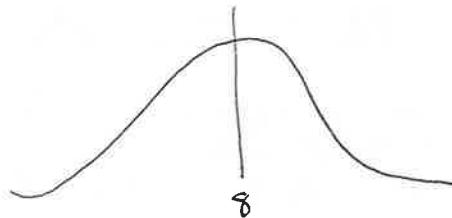
Q2. You take 1000 samples ($n = 64$) of classes, each with sleep times following an *exponential* distribution with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours (same as in Q1).

a) If you were to plot a histogram of the sample means student's sleep times, describe the distribution you would expect to see:

Shape: approx normal $SE = \frac{\sigma}{\sqrt{n}} = \frac{1.5}{\sqrt{64}} = \frac{1.5}{8}$

Mean: 8

Standard error: $1.5/8$



b) According to the Central Limit Theorem, which statement is correct?

- The sample mean will equal the population mean when n is large enough
- The individual data points in a sample will follow a normal distribution
- The distribution of sample means will approach a normal distribution
- The population distribution must be normal for the theorem to apply

← Null

Q3. You are interested in whether students sleep on average 8 hours per night. You take one sample of 100 students ($n = 100$) with an average sleep time (\bar{x}) of 7.5 hours and standard deviation (S) of 1. You have decided in advance to reject the null hypothesis if it lies 3 standard errors away from the sample mean.

a) Describe the sampling distribution.

Shape: approx normal

$$SE = \frac{\sigma}{\sqrt{n}} = \frac{1}{\sqrt{100}} = \frac{1}{10}$$

Mean: 7.5

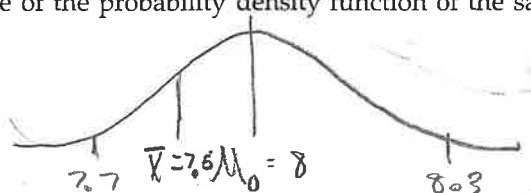
Standard error: $1/10$

b) Construct the confidence interval for your test.

Lower Bound: 7.7

Upper Bound: 8.3

c) Use a figure of the probability density function of the sampling distribution to show the confidence interval for your test.



d) Using this confidence interval, are you able to reject the null hypothesis? YES / NO

Q4. A researcher conducts a test of whether students sleep on average 7.8 hours per night with a p-value of 0.12. Describe in one sentence what this p-value means.

null

If students sleep 7.8 hours per night, we'd observe a sample mean as or more extreme 12% of the time.

Name: Shin Thant Wadi Aung

Student ID: 4699806

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Q1. A class's average sleep time follows an exponential distribution with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours.

a) If you sample one student ($n = 1$), what is the sampling distribution of the sample mean?

Shape: exponential

Mean: 8

Standard error: 1.5

b) If you sample 36 students ($n = 36$), what is the sampling distribution of the sample mean?

Shape: approximately normal

Mean: 8

Standard error: 0.25

$$SE = \frac{\sigma}{\sqrt{n}} = \frac{1.5}{\sqrt{36}} = \frac{1.5}{6} = 0.25$$

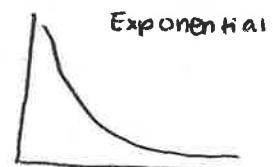
c) If you sample one student ($n = 100$), what is the sampling distribution of the sample mean?

Shape: approximately normal

Mean: 8

Standard error: 0.15

$$SE = \frac{\sigma}{\sqrt{n}} = \frac{1.5}{\sqrt{100}} = \frac{1.5}{10} = 0.15$$



Q2. You take 1000 samples ($n = 64$) of classes, each with sleep times following an *exponential* distribution with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours (same as in Q1).

a) If you were to plot a histogram of the sample means student's sleep times, describe the distribution you would expect to see:

Shape: approximately normal

Mean: 8

Standard error: 0.1875

$$SE = \frac{\sigma}{\sqrt{n}} = \frac{1.5}{\sqrt{64}} = \frac{1.5}{8} = \frac{3}{16} = 0.1875$$

b) According to the Central Limit Theorem, which statement is correct?

- The sample mean will equal the population mean when n is large enough
- The individual data points in a sample will follow a normal distribution
- The distribution of sample means will approach a normal distribution
- The population distribution must be normal for the theorem to apply

$$H_0: \mu = 8$$

Q3. You are interested in whether students sleep on average 8 hours per night. You take one sample of 100 students ($n = 100$) with an average sleep time (\bar{x}) of 7.5 hours and standard deviation (S) of 1. You have decided in advance to reject the null hypothesis if it lies 3 standard errors away from the sample mean.

a) Describe the sampling distribution.

Shape: approximately normal

$$UB = 7.5 + 3(0.1) = 7.8$$

Mean: 7.5

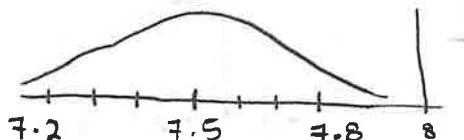
$$LB = 7.5 - 3(0.1) = 7.2$$

b) Construct the confidence interval for your test.

Lower Bound: 7.2

Upper Bound: 7.8

c) Use a figure of the probability density function of the sampling distribution to show the confidence interval for your test.



d) Using this confidence interval, are you able to reject the null hypothesis? YES NO

8 is above the interval.

Q4. A researcher conducts a test of whether students sleep on average 7.8 hours per night with a p-value of 0.12. Describe in one sentence what this p-value means.

If the null hypothesis were true (7.8 hour of sleep per night),

We'd see results this extreme or more extreme about 12% of the time.

Name: Chase Charles

Student ID: 4861746

ECON 0150 | MiniExam 3 | Fall 2025

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Q1. A class's average sleep time follows an *exponential* distribution with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours.

a) If you sample one student ($n = 1$), what is the sampling distribution of the sample mean?

Shape: Uniform

$$\frac{1.5}{8}$$

Mean: 8

Standard error: $\frac{1.5}{\sqrt{8}}$

b) If you sample 36 students ($n = 36$), what is the sampling distribution of the sample mean?

Shape: Approx Normal

$$\frac{1.5}{\sqrt{36}} \quad \frac{1.5}{6}$$

Mean: 8

Standard error: $\frac{1.5}{\sqrt{36}}$

c) If you sample one student ($n = 100$), what is the sampling distribution of the sample mean?

Shape: Approx normal

$$\frac{1.5}{\sqrt{100}} \quad \frac{1.5}{10}$$

Mean: 8

Standard error: $\frac{1.5}{\sqrt{100}}$

Q2. You take 1000 samples ($n = 64$) of classes, each with sleep times following an *exponential* distribution with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours (same as in Q1).

a) If you were to plot a histogram of the sample means student's sleep times, describe the distribution you would expect to see:

Shape: exponential

Mean: 8

Standard error: $\frac{1.5}{\sqrt{64}}$

b) According to the Central Limit Theorem, which statement is correct?

- The sample mean will equal the population mean when n is large enough
- The individual data points in a sample will follow a normal distribution

The distribution of sample means will approach a normal distribution

- The population distribution must be normal for the theorem to apply

Q3. You are interested in whether students sleep on average 8 hours per night. You take one sample of 100 students ($n = 100$) with an average sleep time (\bar{x}) of 7.5 hours and standard deviation (S) of 1. You have decided in advance to reject the null hypothesis if it lies 3 standard errors away from the sample mean.

a) Describe the sampling distribution.

Shape: uniform

Mean: 7.5

$$\frac{1}{\sqrt{100}}$$

Standard error: $\frac{1}{\sqrt{100}}$

b) Construct the confidence interval for your test.

Lower Bound: 7.2

Upper Bound: 7.8

c) Use a figure of the probability density function of the sampling distribution to show the confidence interval for your test.



d) Using this confidence interval, are you able to reject the null hypothesis? YES NO

Q4. A researcher conducts a test of whether students sleep on average 7.8 hours per night with a p-value of 0.12. Describe in one sentence what this p-value means.

If students sleep for an average of 7.8 hours, we'd notice a difference 12% of the time

Name: Alyssa Bisram

Student ID: 4565158

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Q1. A class's average sleep time follows an *exponential* distribution with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours.

a) If you sample one student ($n = 1$), what is the sampling distribution of the sample mean?

Shape: exponential

Mean: 8

Standard error: 1.5

b) If you sample 36 students ($n = 36$), what is the sampling distribution of the sample mean?

Shape: Chi-square

Mean: 8

Standard error: 1.5

c) If you sample ~~one~~¹⁰⁰ student ($n = 100$), what is the sampling distribution of the sample mean?

Shape: Normal

Mean: 8

Standard error: 1.5

Q2. You take 1000 samples ($n = 64$) of classes, each with sleep times following an *exponential* distribution with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours (same as in Q1).

a) If you were to plot a histogram of the sample means student's sleep times, describe the distribution you would expect to see:

Shape: Normal

Mean: 8

Standard error: 1.5

b) According to the Central Limit Theorem, which statement is correct?

The sample mean will equal the population mean when n is large enough

The individual data points in a sample will follow a normal distribution

The distribution of sample means will approach a normal distribution

The population distribution must be normal for the theorem to apply

Q3. You are interested in whether students sleep on average 8 hours per night. You take one sample of 100 students ($n = 100$) with an average sleep time (\bar{x}) of 7.5 hours and standard deviation (S) of 1. You have decided in advance to reject the null hypothesis if it lies 3 standard errors away from the sample mean.

a) Describe the sampling distribution.

Shape: Normal

Mean: 7.5

Standard error: 1

b) Construct the confidence interval for your test.

Lower Bound: 4.5

Upper Bound: 10.5

c) Use a figure of the probability density function of the sampling distribution to show the confidence interval for your test.

$$P(x) \quad 4.5 < x < 10.5 \quad 7.5 \pm 3$$

d) Using this confidence interval, are you able to reject the null hypothesis? YES / NO

Q4. A researcher conducts a test of whether students sleep on average 7.8 hours per night with a p-value of 0.12. Describe in one sentence what this p-value means.

There's a 12% chance of observing values more extreme than 7.8 hours.

Name: Marlaina Wakim

Student ID: 4565599

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Q1. A class's average sleep time follows an *exponential* distribution with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours.

a) If you sample one student ($n = 1$), what is the sampling distribution of the sample mean?

Shape: exponential distribution

Mean: 8 hrs

$$\frac{1.5}{\sqrt{1}} = 1.5$$

Standard error: 1.5

b) If you sample 36 students ($n = 36$), what is the sampling distribution of the sample mean?

Shape: roughly Normal

Mean: 8

$$\frac{1.5}{\sqrt{36}} = \frac{1.5}{6}$$

Standard error: $\frac{1.5}{6} = 1/4$

c) If you sample ~~one~~ student ($n = 100$), what is the sampling distribution of the sample mean?

Shape: Approx. Normal

Mean: 8

$$\frac{1.5}{\sqrt{100}} = \frac{1.5}{10}$$

Standard error: $\frac{1.5}{10}$

Q2. You take 1000 samples ($n = 64$) of classes, each with sleep times following an *exponential* distribution with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours (same as in Q1).

a) If you were to plot a histogram of the sample means student's sleep times, describe the distribution you would expect to see:

Shape: Approx. Normal

Mean: 8

$$\frac{1.5}{\sqrt{64}} = \frac{1.5}{8}$$

Standard error: $\frac{1.5}{8}$

b) According to the Central Limit Theorem, which statement is correct?

- The sample mean will ~~equal~~ the population mean when n is large enough
- The individual data points ~~in a~~ sample will follow a normal distribution
- The distribution of sample means will approach a normal distribution
- The population distribution must be normal for the theorem to apply

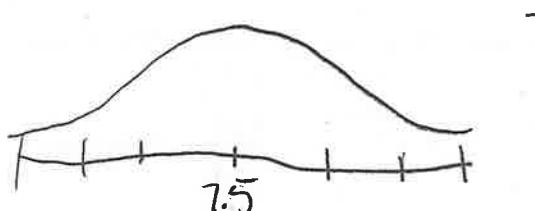
Q3. You are interested in whether students sleep on average 8 hours per night. You take one sample of 100 students ($n = 100$) with an average sleep time (\bar{x}) of 7.5 hours and standard deviation (S) of 1. You have decided in advance to reject the null hypothesis if it lies 3 standard errors away from the sample mean.

a) Describe the sampling distribution.

Shape: t-distribution

Mean: 7.5

Standard error: $\frac{1}{10}$



T-test!

$$= \frac{1}{\sqrt{100}} = \frac{1}{10}$$

b) Construct the confidence interval for your test.

Lower Bound: 4.5

Upper Bound: 10.5

c) Use a figure of the probability density function of the sampling distribution to show the confidence interval for your test.

d) Using this confidence interval, are you able to reject the null hypothesis? YES NO

Q4. A researcher conducts a test of whether students sleep on average 7.8 hours per night with a p-value of 0.12. Describe in one sentence what this p-value means.

fail to reject H_0 . The probability of observing a test statistic at least as extreme as hours

Name: Isha Nathan

Student ID: 4641681

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Q1. A class's average sleep time follows an *exponential* distribution with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours.

a) If you sample one student ($n = 1$), what is the sampling distribution of the sample mean?

Shape: exponential

Mean: 8

Standard error: 1.5

$$\frac{1.5}{\sqrt{1}} = \frac{1.5}{1} = 1.5$$

b) If you sample 36 students ($n = 36$), what is the sampling distribution of the sample mean?

Shape: approximately normal

Mean: 8

Standard error: 0.25

$$\frac{1.5}{\sqrt{36}} = \frac{1.5}{6} =$$

c) If you sample one student ($n = 100$), what is the sampling distribution of the sample mean?

Shape: approximately normal

Mean: 8

Standard error: 0.15

$$\frac{1.5}{\sqrt{100}} = \frac{1.5}{10} = 0.15$$

Q2. You take 1000 samples ($n = 64$) of classes, each with sleep times following an *exponential* distribution with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours (same as in Q1).

a) If you were to plot a histogram of the sample means student's sleep times, describe the distribution you would expect to see:

Shape: approximately normal

Mean: 8

Standard error: 0.1875 $\frac{1.5}{\sqrt{64}} = \frac{1.5}{8} = 0.1875$

b) According to the Central Limit Theorem, which statement is correct?

- The sample mean will equal the population mean when n is large enough
- The individual data points in a sample will follow a normal distribution
- The distribution of sample means will approach a normal distribution
- The population distribution must be normal for the theorem to apply

Q3. You are interested in whether students sleep on average 8 hours per night. You take one sample of 100 students ($n = 100$) with an average sleep time (\bar{x}) of 7.5 hours and standard deviation (S) of 1. You have decided in advance to reject the null hypothesis if it lies 3 standard errors away from the sample mean.

a) Describe the sampling distribution.

Shape: approximately normal

Mean: 7.5

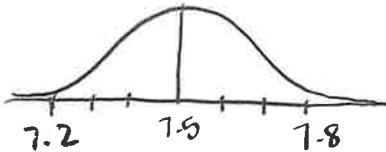
Standard error: 0.1 $\frac{1}{\sqrt{100}} = \frac{1}{10} = 0.1$

b) Construct the confidence interval for your test.

Lower Bound: 7.2

Upper Bound: 7.8

c) Use a figure of the probability density function of the sampling distribution to show the confidence interval for your test.



d) Using this confidence interval, are you able to reject the null hypothesis? YES / NO

Q4. A researcher conducts a test of whether students sleep on average 7.8 hours per night with a p-value of 0.12. Describe in one sentence what this p-value means.

We would observe an average of 7.8 hours or more extreme 12% of the time

Name: Griffin Holcomb

Student ID: 4556790

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$$\bar{X} = \frac{(\mu - SE)}{n}$$

$$\sigma = 1.5$$

$$8 = 1.5$$

Q1. A class's average sleep time follows an *exponential distribution* with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours.

a) If you sample one student ($n = 1$), what is the sampling distribution of the sample mean?

Shape: Uniform

Mean: 8

Standard error: 1.5



$$\frac{1.5}{\sqrt{1}} = 1.5$$

b) If you sample 36 students ($n = 36$), what is the sampling distribution of the sample mean?

Shape: approx norm.

Mean: 8

Standard error: 0.25

$$\frac{1.5}{\sqrt{36}} = \frac{1.5}{6} = 0.25$$

c) If you sample ¹⁰⁰~~one~~ student ($n = 100$), what is the sampling distribution of the sample mean?

Shape: approx norm.

Mean: 8

Standard error: 0.15

$$\frac{1.5}{\sqrt{100}} = \frac{1.5}{10} = 0.15$$

Q2. You take 1000 samples ($n = 64$) of classes, each with sleep times following an *exponential distribution* with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours (same as in Q1).

a) If you were to plot a histogram of the sample means student's sleep times, describe the distribution you would expect to see:

Shape: approx norm,

Mean: 8

Standard error: 0.1875

$$\frac{1.5}{\sqrt{64}} = \frac{1.5}{8} = 0.1875$$

b) According to the Central Limit Theorem, which statement is correct?

The sample mean will equal the population mean when n is large enough

The individual data points in a sample will follow a normal distribution

The distribution of sample means will approach a normal distribution

The population distribution must be normal for the theorem to apply

Q3. You are interested in whether students sleep on average 8 hours per night. You take one sample of 100 students ($n = 100$) with an average sleep time (\bar{x}) of 7.5 hours and standard deviation (S) of 1. You have decided in advance to reject the null hypothesis if it lies 3 standard errors away from the sample mean.

a) Describe the sampling distribution.

Shape: approx. norm

Mean: 7.5

Standard error: 0.3

7.5

\bar{x}

$7.5 \pm 3 \cdot 0.3$

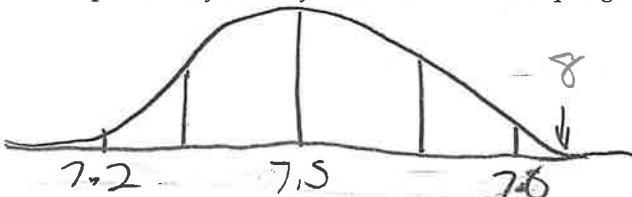
$$3 \cdot \frac{1}{\sqrt{100}} = 0.3$$

b) Construct the confidence interval for your test.

Lower Bound: 7.2

Upper Bound: 7.8

c) Use a figure of the probability density function of the sampling distribution to show the confidence interval for your test.



d) Using this confidence interval, are you able to reject the null hypothesis?

YES NO

Q4. A researcher conducts a test of whether students sleep on average 7.8 hours per night with a p-value of 0.12. Describe in one sentence what this p-value means.

If we reject null hypothesis, then there is a probability of 0.12 of observing an extreme of 7.8 hours of sleep in a given observation

Name: Nick Sokołowski

Student ID: 4711981

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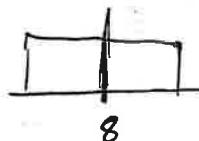
NJS I will not communicate directly or indirectly with others during the MiniExam.

Q1. A class's average sleep time follows an *exponential distribution* with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours.

$$se = \frac{\sigma}{\sqrt{n}}$$

a) If you sample one student ($n = 1$), what is the sampling distribution of the sample mean?

Shape: Uniform



$$\frac{1.5}{1} = 1.5$$

Mean: 8

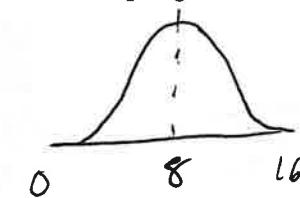
Standard error: 1.5

b) If you sample 36 students ($n = 36$), what is the sampling distribution of the sample mean?

Shape: approx. Normal

Mean: 8

Standard error: $\frac{1.5}{6} = \frac{1}{4}$



$$se = \frac{1.5}{\sqrt{36}} = \frac{1.5}{6}$$

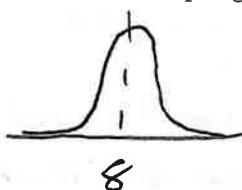
$$\frac{3}{6} = \frac{3}{12} = \frac{1}{4}$$

c) If you sample one student ($n = 100$), what is the sampling distribution of the sample mean?

Shape: approx. Normal

Mean: 8

Standard error: $\frac{1.5}{10} = \frac{3}{20}$



$$se = \frac{1.5}{\sqrt{100}} = \frac{1.5}{10}$$

$$\frac{3}{10} = \frac{3}{20}$$

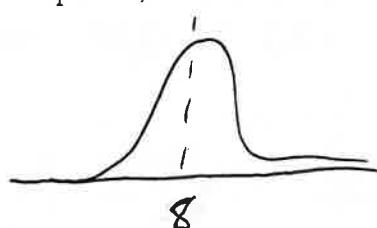
earlier

Q2. You take 1000 samples ($n = 64$) of classes, each with sleep times following an *exponential* distribution with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours (*same as in Q1*).

a) If you were to plot a histogram of the sample means student's sleep times, describe the distribution you would expect to see:

Shape: Approx. Normal

$$\frac{1.5}{\sqrt{64}} = \frac{1.5}{8}$$



Mean: 8

$$\frac{3}{8} = \frac{3}{16}$$

Standard error: $\frac{3}{16}$

b) According to the Central Limit Theorem, which statement is correct?

- The sample mean will equal the population mean when n is large enough
 - The individual data points in a sample will follow a normal distribution
 - The distribution of sample means will approach a normal distribution
 - The population distribution must be normal for the theorem to apply

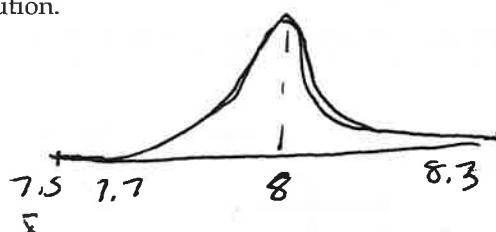
Q3. You are interested in whether students sleep on average 8 hours per night. You take one sample of 100 students ($n = 100$) with an average sleep time (\bar{x}) of 7.5 hours and standard deviation (S) of 1. You have decided in advance to reject the null hypothesis if it lies 3 standard errors away from the sample mean.

a) Describe the sampling distribution.

Shape: Approx. Normal

$$\frac{1}{\sqrt{100}} = \frac{1}{10}$$

Mean: 7.5

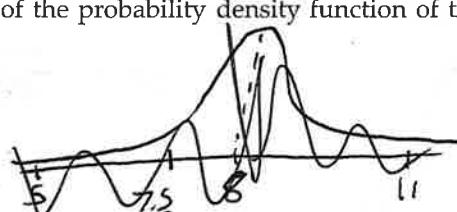


b) Construct the confidence interval for your test.

Lower Bound: 7.7

Upper Bound: m 8.3

c) Use a figure of the probability density function of the sampling distribution to show the confidence interval for your test.



~~We are not very confident
that the average sleep time
is not 7.5~~

YES YES NO

We are confident
that the avg. sleep
time is not 7.5

d) Using this confidence interval, are you able to reject the null hypothesis?

YES NO

Q4. A researcher conducts a test of whether students sleep on average 7.8 hours per night with a p-value of 0.12. Describe in one sentence what this p-value means.

If the null hypothesis is true, we would expect to see results that are either as extreme or more extreme 12% of the time. ~~With students poly sleep on avg. 7.50~~
~~Across a night~~

Name: Jou Lis

Student ID: 4565604

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$$\frac{\sigma}{\sqrt{n}} \leftarrow SE$$

Q1. A class's average sleep time follows an *exponential* distribution with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours.

a) If you sample one student ($n = 1$), what is the sampling distribution of the sample mean?

Shape: 7

Mean: 8

Standard error: 1.5 $\frac{1.5}{\sqrt{1}} = 1.5$

b) If you sample 36 students ($n = 36$), what is the sampling distribution of the sample mean?

Shape: approaching normal 7

Mean: approximately 8

Standard error: 0.25 $\frac{1.5}{\sqrt{36}}$
hundred

c) If you sample one student ($n = 100$), what is the sampling distribution of the sample mean?

Shape: approximately normal 7

Mean: approximately 8

Standard error: 0.15 $\frac{1.5}{\sqrt{100}}$

Q2. You take 1000 samples ($n = 64$) of classes, each with sleep times following an *exponential* distribution with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours (same as in Q1).

a) If you were to plot a histogram of the sample means student's sleep times, describe the distribution you would expect to see:

Shape: approximately normal 

Mean: approximately 8

Standard error: 0.1875

b) According to the Central Limit Theorem, which statement is correct?

- The sample mean will equal the population mean when n is large enough
- The individual data points in a sample will follow a normal distribution
- The distribution of sample means will approach a normal distribution
- The population distribution must be normal for the theorem to apply

Q3. You are interested in whether students sleep on average 8 hours per night. You take one sample of 100 students ($n = 100$) with an average sleep time (\bar{x}) of 7.5 hours and standard deviation (S) of 1. You have decided in advance to reject the null hypothesis if it lies 3 standard errors away from the sample mean.

a) Describe the sampling distribution.

Shape: approximately normal

Mean: approximately 7.5

Standard error: 0.1 $\frac{1}{\sqrt{100}} = 0.1$

b) Construct the confidence interval for your test.

Lower Bound: 7.2

Upper Bound: 7.8

c) Use a figure of the probability density function of the sampling distribution to show the confidence interval for your test.



d) Using this confidence interval, are you able to reject the null hypothesis? YES / NO

Q4. A researcher conducts a test of whether students sleep on average 7.8 hours per night with a p-value of 0.12. Describe in one sentence what this p-value means.

The p-value of 0.12 signifies the chance (either way) from the average that will allow you to accept the null hypothesis.

Name: Connor McCollick

Student ID: 4551099

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Q1. A class's average sleep time follows an *exponential* distribution with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours.

a) If you sample one student ($n = 1$), what is the sampling distribution of the sample mean?

Shape: Exponential

Mean: 8

Standard error: 1.5

b) If you sample 36 students ($n = 36$), what is the sampling distribution of the sample mean?

Shape: Approximately normal

Mean: 8

Standard error: 1.5/6 or .25

c) If you sample one student ($n = 100$), what is the sampling distribution of the sample mean?

Shape: Normal

Mean: 8

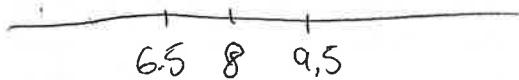
Standard error: 1.5/10 or .15

Q2. You take 1000 samples ($n = 64$) of classes, each with sleep times following an *exponential* distribution with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours (same as in Q1).

a) If you were to plot a histogram of the sample means student's sleep times, describe the distribution you would expect to see:

Shape: Approx. Normal

Mean: 8



Standard error: $1.5/8$ or .1875

b) According to the Central Limit Theorem, which statement is correct?

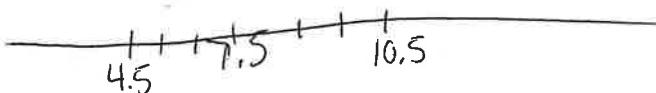
- The sample mean will equal the population mean when n is large enough
- The individual data points in a sample will follow a normal distribution
- The distribution of sample means will approach a normal distribution
- The population distribution must be normal for the theorem to apply

Q3. You are interested in whether students sleep on average 8 hours per night. You take one sample of 100 students ($n = 100$) with an average sleep time (\bar{x}) of 7.5 hours and standard deviation (S) of 1. You have decided in advance to reject the null hypothesis if it lies 3 standard errors away from the sample mean.

a) Describe the sampling distribution.

Shape: Approx. Normal

Mean: 7.5



Standard error: $1/10$ or .1

b) Construct the confidence interval for your test.

Lower Bound: 4.5

Upper Bound: 10.5

c) Use a figure of the probability density function of the sampling distribution to show the confidence interval for your test.

d) Using this confidence interval, are you able to reject the null hypothesis? YES / NO

Q4. A researcher conducts a test of whether students sleep on average 7.8 hours per night with a p-value of 0.12. Describe in one sentence what this p-value means.

We should observe sleep times outside the standard deviation 12% of time

Name: Medha Pendota

Student ID: 4722507

ECON 0150 | MiniExam 3 | Fall 2025

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Q1. A class's average sleep time follows an *exponential* distribution with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours.

a) If you sample one student ($n = 1$), what is the sampling distribution of the sample mean?

Shape: uniform

Mean: 8 hours

Standard error: $\frac{1.5}{\sqrt{1}}$



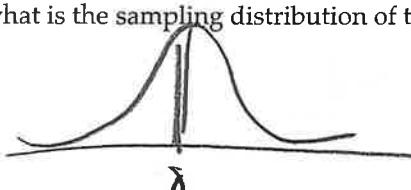
$$\frac{1.5}{\sqrt{8}} =$$

b) If you sample 36 students ($n = 36$), what is the sampling distribution of the sample mean?

Shape: Approx Normal

Mean: 8 hours

Standard error: $\frac{1.5}{\sqrt{36}}$



$$se = \frac{1.5}{\sqrt{36}}$$

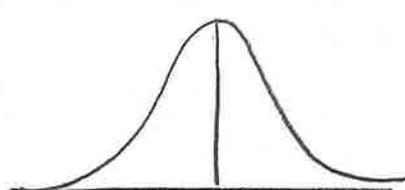
$$= \frac{1.5}{6} \rightarrow$$

c) If you sample one student ($n = 100$), what is the sampling distribution of the sample mean?

Shape: Approx normal

Mean: 8

Standard error: $\frac{1.5}{\sqrt{100}}$



$$\frac{1.5}{\sqrt{100}}$$

Q2. You take 1000 samples ($n = 64$) of classes, each with sleep times following an *exponential* distribution with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours (*same as in Q1*).

a) If you were to plot a histogram of the sample means student's sleep times, describe the distribution you would expect to see:

Shape: approx normal

$$\frac{1.5}{8}$$

Mean: 8

$$1.5/8$$

Standard error: 1.5/8

b) According to the Central Limit Theorem, which statement is correct?

- The sample mean will equal the population mean when n is large enough
- The individual data points in a sample will follow a normal distribution
- The distribution of sample means will approach a normal distribution
- The population distribution must be normal for the theorem to apply

Q3. You are interested in whether students sleep on average 8 hours per night. You take one sample of 100 students ($n = 100$) with an average sleep time (\bar{x}) of 7.5 hours and standard deviation (S) of 1. You have decided in advance to reject the null hypothesis if it lies 3 standard errors away from the sample mean.

a) Describe the sampling distribution.

Shape: _____

$$\frac{1}{\sqrt{100}} = \frac{1}{10}$$

Mean: 7.5

$$1/10$$

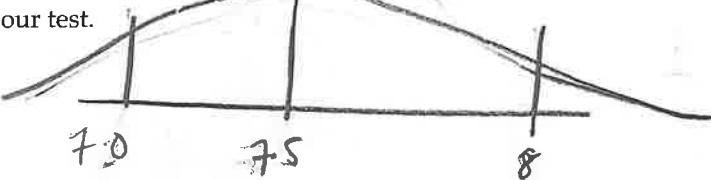
Standard error: 1/10

b) Construct the confidence interval for your test.

Lower Bound: 7.6

Upper Bound: 8.0

c) Use a figure of the probability density function of the sampling distribution to show the confidence interval for your test.



d) Using this confidence interval, are you able to reject the null hypothesis?

YES / NO

Q4. A researcher conducts a test of whether students sleep on average 7.8 hours per night with a p-value of 0.12. Describe in one sentence what this p-value means.

The difference of the value from the expected value
the expected value would be 7.5.

Name: Rylie Teets

Student ID: 4720986

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Academic Conduct Code

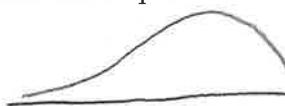
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Q1. A class's average sleep time follows an exponential distribution with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours.

a) If you sample one student ($n = 1$), what is the sampling distribution of the sample mean?

Shape: Skewed left



72

Mean: 8

$$\text{Standard error: } \frac{\sigma}{\sqrt{n}} = \frac{1.5}{\sqrt{1}} = 1.5$$

b) If you sample 36 students ($n = 36$), what is the sampling distribution of the sample mean?

Shape: approx. normal

Mean: 8

$$\text{Standard error: } \frac{\sigma}{\sqrt{n}} = \frac{\frac{3}{2}}{\sqrt{36}} = \frac{\frac{3}{2}}{6} = \frac{3}{12} = \frac{1}{4}$$

c) If you sample 100 students ($n = 100$), what is the sampling distribution of the sample mean?

Shape: approx. normal

Mean: 8

$$\text{Standard error: } \frac{\sigma}{\sqrt{n}} = \frac{\frac{3}{2}}{\sqrt{100}} = \frac{\frac{3}{2}}{10} = \frac{3}{20}$$

Q2. You take 1000 samples ($n = 64$) of classes, each with sleep times following an *exponential* distribution with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours (same as in Q1).

a) If you were to plot a histogram of the sample means student's sleep times, describe the distribution you would expect to see:

Shape: approx. normal

Mean: 8

$$\frac{1.5}{\sqrt{64}} = \frac{1.5}{8} = \frac{\frac{3}{2}}{8} = \frac{3}{16}$$

Standard error: $\frac{3}{16}$

b) According to the Central Limit Theorem, which statement is correct?

- The sample mean will equal the population mean when n is large enough
- The individual data points in a sample will follow a normal distribution
- The distribution of sample means will approach a normal distribution
- The population distribution must be normal for the theorem to apply

Q3. You are interested in whether students sleep on average 8 hours per night. You take one sample of 100 students ($n = 100$) with an average sleep time (\bar{x}) of 7.5 hours and standard deviation (S) of 1. You have decided in advance to reject the null hypothesis if it lies 3 standard errors away from the sample mean.

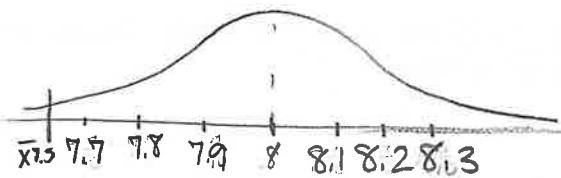
a) Describe the sampling distribution.

Shape: approx. normal

Mean: 7.5

$$\frac{1}{\sqrt{100}} = \frac{1}{10}$$

Standard error: $\frac{1}{10}$

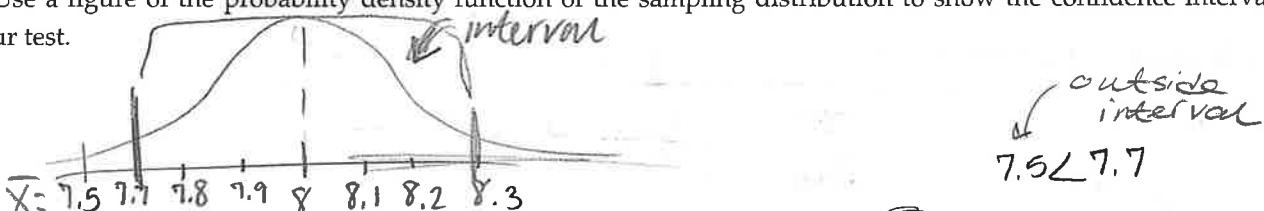


b) Construct the confidence interval for your test.

Lower Bound: 7.7

Upper Bound: 8.3

c) Use a figure of the probability density function of the sampling distribution to show the confidence interval for your test.



d) Using this confidence interval, are you able to reject the null hypothesis? YES / NO

Q4. A researcher conducts a test of whether students sleep on average 7.8 hours per night with a p-value of 0.12. Describe in one sentence what this p-value means.

the p-value means that there's a 12% chance we would observe a value more extreme than 7.8 hours of sleep

Name: Juan Fernandez

Student ID: 4640249

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Q1. A class's average sleep time follows an *exponential* distribution with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours.

a) If you sample one student ($n = 1$), what is the sampling distribution of the sample mean?

Shape: exponential

Mean: 8

Standard error: 1.5 $\frac{1.5}{\sqrt{1}} = \frac{1.5}{1} = 1.5$

b) If you sample 36 students ($n = 36$), what is the sampling distribution of the sample mean?

Shape: approx. normal

$n \geq 30$

Mean: 8

Standard error: 1/4 $\frac{1.5}{\sqrt{36}} = \frac{1.5}{6} = \frac{3}{12} = \frac{1}{4}$

c) If you sample one student ($n = 100$), what is the sampling distribution of the sample mean?

Shape: approx. normal

Mean: 8

Standard error: 3/20 $\frac{1.5}{\sqrt{100}} = \frac{1.5}{10}$

Q2. You take 1000 samples ($n = 64$) of classes, each with sleep times following an *exponential* distribution with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours (same as in Q1).

a) If you were to plot a histogram of the sample means student's sleep times, describe the distribution you would expect to see:

Shape: approx. normal

Mean: 8

Standard error: $\frac{1.5}{\sqrt{64}} = \frac{1.5}{8}$

b) According to the Central Limit Theorem, which statement is correct?

- The sample mean will equal the population mean when n is large enough
- The individual data points in a sample will follow a normal distribution
- The distribution of sample means will approach a normal distribution
- The population distribution must be normal for the theorem to apply

Q3. You are interested in whether students sleep on average 8 hours per night. You take one sample of 100 students ($n = 100$) with an average sleep time (\bar{x}) of 7.5 hours and standard deviation (S) of 1. You have decided in advance to reject the null hypothesis if it lies 3 standard errors away from the sample mean.

a) Describe the sampling distribution.

Shape: approx. normal

Mean: 7.5

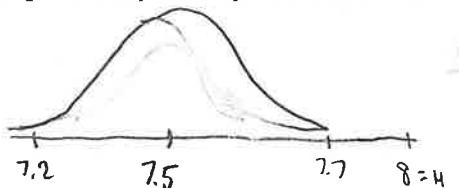
Standard error: $\frac{1}{\sqrt{100}} = \frac{1}{10}$

b) Construct the confidence interval for your test.

Lower Bound: $\frac{72}{10} = 7.2$

Upper Bound: $\frac{77}{10} = 7.7$

c) Use a figure of the probability density function of the sampling distribution to show the confidence interval for your test.



d) Using this confidence interval, are you able to reject the null hypothesis? YES / NO

Q4. A researcher conducts a test of whether students sleep on average 7.8 hours per night with a p-value of 0.12. Describe in one sentence what this p-value means.

if the null were true, the probability of observing a result as extreme or more extreme than our sample is 12%.

Name: Mike Prodecht

Student ID: 7639111

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Q1. A class's average sleep time follows an *exponential* distribution with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours.

a) If you sample one student ($n = 1$), what is the sampling distribution of the sample mean?

Shape: Uniform

Mean: 8

Standard error: 1.5

b) If you sample 36 students ($n = 36$), what is the sampling distribution of the sample mean?

Shape: APPROX. Normal

Mean: 8

Standard error: $\frac{1}{4}$

$$\frac{1.5}{\sqrt{36}} = \frac{1.5}{6} = \frac{1}{4}$$

c) If you sample one student ($n = 100$), what is the sampling distribution of the sample mean?

Shape: APPROX. Normal

Mean: 8

Standard error: $\frac{1.5}{10}$

$$\frac{1.5}{\sqrt{100}} = \frac{1.5}{10}$$

Q2. You take 1000 samples ($n = 64$) of classes, each with sleep times following an *exponential* distribution with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours (same as in Q1).

a) If you were to plot a histogram of the sample means student's sleep times, describe the distribution you would expect to see:

Shape: Approx. Normal

$$\frac{1.5}{\sqrt{64}} = \frac{1.5}{8}$$

Mean: 8

Standard error: $\frac{1.5}{8}$

b) According to the Central Limit Theorem, which statement is correct?

- The sample mean will equal the population mean when n is large enough
- The individual data points in a sample will follow a normal distribution
- The distribution of sample means will approach a normal distribution
- The population distribution must be normal for the theorem to apply

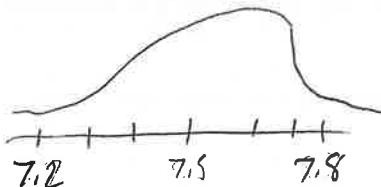
Q3. You are interested in whether students sleep on average 8 hours per night. You take one sample of 100 students ($n = 100$) with an average sleep time (\bar{x}) of 7.5 hours and standard deviation (S) of 1. You have decided in advance to reject the null hypothesis if it lies 3 standard errors away from the sample mean.

a) Describe the sampling distribution.

Shape: Approx. Normal

Mean: 7.5 $\frac{1}{\sqrt{100}} = \frac{1}{10}$

Standard error: $\frac{1}{10}$

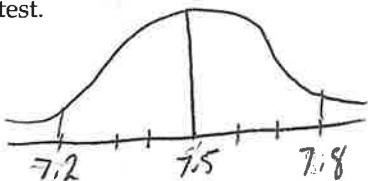


b) Construct the confidence interval for your test.

Lower Bound: 7.2

Upper Bound: 7.8

c) Use a figure of the probability density function of the sampling distribution to show the confidence interval for your test.



d) Using this confidence interval, are you able to reject the null hypothesis?

YES / NO

Q4. A researcher conducts a test of whether students sleep on average 7.8 hours per night with a p-value of 0.12. Describe in one sentence what this p-value means.

We are significantly confident that a student with an average of 7.8 hours of sleep falls within our interval 12% of the time

Name: Amina Taiwan

Student ID: 4782263

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Q1. A class's average sleep time follows an exponential distribution with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours.

a) If you sample one student ($n = 1$), what is the sampling distribution of the sample mean?

Shape: Uniform

Mean: 8

Standard error: 1.5 $SE = \frac{\sigma}{\sqrt{n}} = \frac{1.5}{\sqrt{1}} = 1.5$

b) If you sample 36 students ($n = 36$), what is the sampling distribution of the sample mean?

Shape: Aprox. Normal

Mean: 8

Standard error: 0.25 $SE = \frac{1.5}{\sqrt{36}} = 0.25$

c) If you sample 100 student ($n = 100$), what is the sampling distribution of the sample mean?

Shape: Aprox. Normal

Mean: 8

Standard error: 0.15 $SE = \frac{1.5}{\sqrt{100}} = 0.15$

Q2. You take 1000 samples ($n = 64$) of classes, each with sleep times following an *exponential* distribution with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours (same as in Q1).

a) If you were to plot a histogram of the sample means student's sleep times, describe the distribution you would expect to see:

Shape: Aprox. Normal

Mean: 8

$$\text{Standard error: } 0.1875 \quad SE = \frac{\sigma}{\sqrt{n}} = \frac{1.5}{\sqrt{64}} = 0.1875$$

b) According to the Central Limit Theorem, which statement is correct?

- The sample mean will equal the population mean when n is large enough
- The individual data points in a sample will follow a normal distribution
- The distribution of sample means will approach a normal distribution
- The population distribution must be normal for the theorem to apply

Q3. You are interested in whether students sleep on average 8 hours per night. You take one sample of 100 students ($n = 100$) with an average sleep time (\bar{x}) of 7.5 hours and standard deviation (S) of 1. You have decided in advance to reject the null hypothesis if it lies 3 standard errors away from the sample mean.

a) Describe the sampling distribution.

Shape: Aprox. Normal

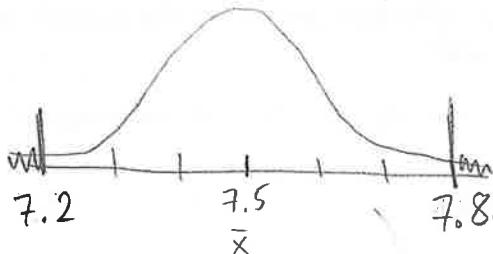
Mean: 7.5

$$\text{Standard error: } \frac{1}{10} \quad \frac{\sigma}{\sqrt{n}} = \frac{1}{\sqrt{100}} = \frac{1}{10}$$

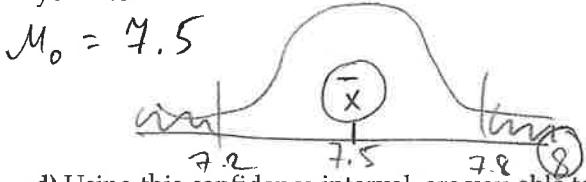
b) Construct the confidence interval for your test.

Lower Bound: 7.2

Upper Bound: 7.8



c) Use a figure of the probability density function of the sampling distribution to show the confidence interval for your test.



Do not reject H_0

We are confident that avg. sleep is 7.5.

d) Using this confidence interval, are you able to reject the null hypothesis?

YES NO

Q4. A researcher conducts a test of whether students sleep on average 7.8 hours per night with a p-value of 0.12. Describe in one sentence what this p-value means.

If students slept on avg 7.8 hours per night, we'd observe a difference of 7.8 or more extreme 12% of the time.

Name: Ragan Liebsch

Student ID: 461 4370

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Q1. A class's average sleep time follows an *exponential* distribution with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours.

a) If you sample one student ($n = 1$), what is the sampling distribution of the sample mean?

Shape: exponential

Mean: 8

Standard error: 1.5

b) If you sample 36 students ($n = 36$), what is the sampling distribution of the sample mean?

Shape: APPROX NORMAL

Mean: 8

$$\frac{\sigma}{\sqrt{n}} = \frac{1.5}{\sqrt{36}} = \frac{1.5}{6}$$

Standard error: 1.5/6

c) If you sample one student ($n = 100$), what is the sampling distribution of the sample mean?

Shape: APPROX NORMAL

$$\frac{1.5}{\sqrt{100}}$$

Mean: 8

Standard error: 1.5/10

Q2. You take 1000 samples ($n = 64$) of classes, each with sleep times following an *exponential* distribution with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours (same as in Q1).

a) If you were to plot a histogram of the sample means student's sleep times, describe the distribution you would expect to see:

Shape: normal

Mean: 8

Standard error: $1.5/8$

$$\frac{\sigma}{\sqrt{n}} = \frac{1.5}{\sqrt{64}}$$

b) According to the Central Limit Theorem, which statement is correct?

X The sample mean will equal the population mean when n is large enough

X The individual data points in a sample will follow a normal distribution

C The distribution of sample means will approach a normal distribution

CLT says that sample means approximates a normal dist

X The population distribution must be normal for the theorem to apply

Q3. You are interested in whether students sleep on average 8 hours per night. You take one sample of 100 students ($n = 100$) with an average sleep time (\bar{x}) of 7.5 hours and standard deviation (S) of 1. You have decided in advance to reject the null hypothesis if it lies 3 standard errors away from the sample mean. t dist

a) Describe the sampling distribution.

Shape: normal

$$\frac{7.5 - 8}{\sqrt{100}} = -\frac{0.5}{10} = t \text{ stat}$$

Mean: 7.5 hours

Standard error: 3

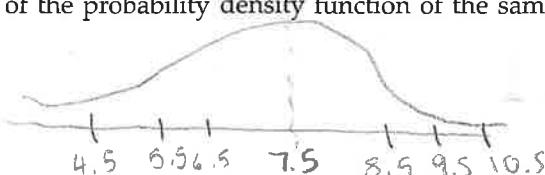
b) Construct the confidence interval for your test.

Lower Bound: 4.5

Upper Bound: 10.5

$CI = 3 \text{ SR. on either side}$

c) Use a figure of the probability density function of the sampling distribution to show the confidence interval for your test.



d) Using this confidence interval, are you able to reject the null hypothesis?

YES / NO

because 8 lies within $(4.5, 10.5)$

Q4. A researcher conducts a test of whether students sleep on average 7.8 hours per night with a p-value of 0.12. Describe in one sentence what this p-value means.

If ... hours per night of sleep effect .., we'd observe a difference of 7.8 or more extreme 12% of the time.

Name: Logan Borger

Student ID: 4726891

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Q1. A class's average sleep time follows an *exponential* distribution with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours.

a) If you sample one student ($n = 1$), what is the sampling distribution of the sample mean?

Shape: Uniform

$$\frac{1.5}{\sqrt{1}} = \frac{1.5}{1} = 1.5$$

Mean: 8

Standard error: 1.5

b) If you sample 36 students ($n = 36$), what is the sampling distribution of the sample mean?

Shape: approx uniform

$$\frac{1.5}{\sqrt{36}} = \frac{1.5}{6}$$

Mean: 8

Standard error: 1.5/6

c) If you sample one student ($n = 100$), what is the sampling distribution of the sample mean?

Shape: approx normal

$$\frac{1.5}{\sqrt{100}} = \frac{1.5}{10}$$

Mean: 8

Standard error: 1.5/10

Q2. You take 1000 samples ($n = 64$) of classes, each with sleep times following an *exponential* distribution with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours (same as in Q1).

a) If you were to plot a histogram of the sample means student's sleep times, describe the distribution you would expect to see:

Shape: Uniform

$$\frac{1.5}{\sqrt{64}} = \frac{1.5}{8}$$

Mean: 8

$$\frac{1.5}{8}$$

Standard error: $\frac{1.5}{8}$

b) According to the Central Limit Theorem, which statement is correct?

- The sample mean will equal the population mean when n is large enough
- The individual data points in a sample will follow a normal distribution
- The distribution of sample means will approach a normal distribution
- The population distribution must be normal for the theorem to apply

Q3. You are interested in whether students sleep on average 8 hours per night. You take one sample of 100 students ($n = 100$) with an average sleep time (\bar{x}) of 7.5 hours and standard deviation (S) of 1. You have decided in advance to reject the null hypothesis if it lies 3 standard errors away from the sample mean.

a) Describe the sampling distribution.

$$\frac{1}{\sqrt{100}} = \frac{1}{10}$$

Shape: Uniform

Mean: 7.5

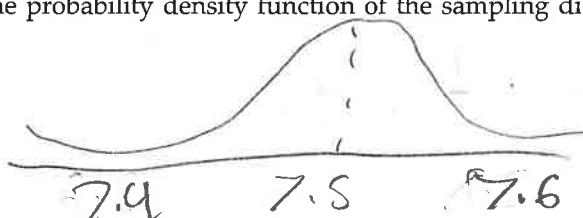
Standard error: $\frac{1}{10}$

b) Construct the confidence interval for your test.

Lower Bound: 7.4

Upper Bound: 7.6

c) Use a figure of the probability density function of the sampling distribution to show the confidence interval for your test.



d) Using this confidence interval, are you able to reject the null hypothesis?

YES NO

Q4. A researcher conducts a test of whether students sleep on average 7.8 hours per night with a p-value of 0.12. Describe in one sentence what this p-value means.

The p-value means that you do not reject the null hypothesis.

Name: Tim Mooney

Student ID: 4482231

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Q1. A class's average sleep time follows an *exponential distribution* with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours.

a) If you sample one student ($n = 1$), what is the sampling distribution of the sample mean?

Shape: uniform

Mean: 8

Standard error: 1.5

b) If you sample 36 students ($n = 36$), what is the sampling distribution of the sample mean?

Shape: approx normal

Mean: 8

Standard error: 1.5/6

c) If you sample ~~one~~ 100 student ($n = 100$), what is the sampling distribution of the sample mean?

Shape: approx normal

Mean: 8

Standard error: 1.5/10

Q2. You take 1000 samples ($n = 64$) of classes, each with sleep times following an *exponential distribution* with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours (same as in Q1).

a) If you were to plot a histogram of the sample means student's sleep times, describe the distribution you would expect to see:

Shape: approx normal

Mean: 8

Standard error: ~~1.5~~

b) According to the Central Limit Theorem, which statement is correct?

- The sample mean will equal the population mean when n is large enough
- The individual data points in a sample will follow a normal distribution
- The distribution of sample means will approach a normal distribution
- The population distribution must be normal for the theorem to apply

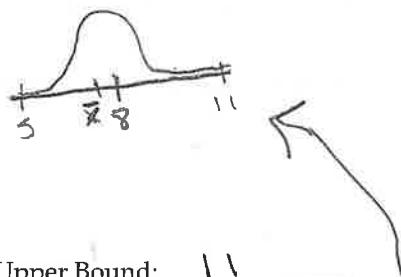
Q3. You are interested in whether students sleep on average 8 hours per night. You take one sample of 100 students ($n = 100$) with an average sleep time (\bar{x}) of 7.5 hours and standard deviation (S) of 1. You have decided in advance to reject the null hypothesis if it lies 3 standard errors away from the sample mean.

a) Describe the sampling distribution.

Shape: approx normal

Mean: 7.5

Standard error: $\frac{1}{10}$



b) Construct the confidence interval for your test.

Lower Bound: 5

Upper Bound: 11

c) Use a figure of the probability density function of the sampling distribution to show the confidence interval for your test.

d) Using this confidence interval, are you able to reject the null hypothesis? YES / NO

Q4. A researcher conducts a test of whether students sleep on average 7.8 hours per night with a p-value of 0.12. Describe in one sentence what this p-value means.

The probability of getting a result as extreme or more than theirs is 12%.

Name: JJ Sensibar

Jonathan
Sensibar

Student ID: 4860646

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Q1. A class's average sleep time follows an *exponential* distribution with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours.

a) If you sample one student ($n = 1$), what is the sampling distribution of the sample mean?

Shape: uniform

Mean: 8 *you don't know, whatever that one sample is, as there is equal chance of all values in the population being pulled as this one random sample*
Standard error: $\frac{1.5}{\sqrt{1}}$ = 1.5

b) If you sample 36 students ($n = 36$), what is the sampling distribution of the sample mean?

Shape: Approximately Normal

Mean: 8

Standard error: $\frac{1.5}{\sqrt{36}}$ = $\frac{1.5}{6}$

c) If you sample one student ($n = 100$), what is the sampling distribution of the sample mean?

Shape: Approximately Normal

Mean: 8

Standard error: $\frac{1.5}{\sqrt{100}}$ = $\frac{1.5}{10}$ = 0.015

Q2. You take 1000 samples ($n = 64$) of classes, each with sleep times following an *exponential* distribution with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours (same as in Q1).

a) If you were to plot a histogram of the sample means student's sleep times, describe the distribution you would expect to see:

Shape: Approximately Normal

Mean: 8

Standard error: $1.5/\sqrt{64}$

b) According to the Central Limit Theorem, which statement is correct?

The sample mean will equal the population mean when n is large enough

The individual data points in a sample will follow a normal distribution

The distribution of sample means will approach a normal distribution ~~Also true but not CLT??~~

The population distribution must be normal for the theorem to apply

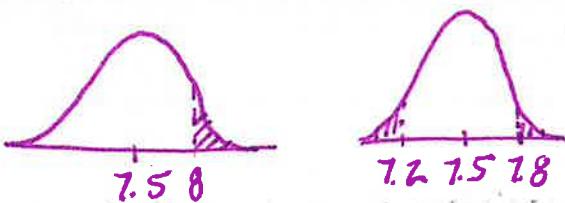
Q3. You are interested in whether students sleep on average 8 hours per night. You take one sample of 100 students ($n = 100$) with an average sleep time (\bar{x}) of 7.5 hours and standard deviation (S) of 1. You have decided in advance to reject the null hypothesis if it lies 3 standard errors away from the sample mean.

a) Describe the sampling distribution.

Shape: Approx. Normal

Mean: 7.5

Standard error: $\frac{1}{\sqrt{100}} = \frac{1}{10}$

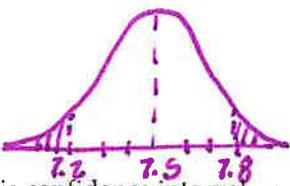


b) Construct the confidence interval for your test.

Lower Bound: 7.2

Upper Bound: 7.8

c) Use a figure of the probability density function of the sampling distribution to show the confidence interval for your test.



d) Using this confidence interval, are you able to reject the null hypothesis?

YES NO

Q4. A researcher conducts a test of whether students sleep on average 7.8 hours per night with a p-value of 0.12. Describe in one sentence what this p-value means.

Assuming students like these sleep on average of 7.8 hours per night, there is a 12% chance of getting results as extreme or more extreme than the ones we got.

Name: Johnny Gerafci

Student ID: 4487372

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Q1. A class's average sleep time follows an *exponential distribution* with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours.

a) If you sample one student ($n = 1$), what is the sampling distribution of the sample mean?

Shape: Uniform

Mean: 8

Standard error: 1.5

b) If you sample 36 students ($n = 36$), what is the sampling distribution of the sample mean?

Shape: Normal

Mean: 8

Standard error: 1.5/6

c) If you sample ~~one~~ student ($n = \underline{100}$), what is the sampling distribution of the sample mean?

Shape: Normal

Mean: 8

Standard error: 1.5/10

Q2. You take 1000 samples ($n = 64$) of classes, each with sleep times following an *exponential* distribution with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours (same as in Q1).

a) If you were to plot a histogram of the sample means student's sleep times, describe the distribution you would expect to see:

Shape: Normal

Mean: 8

Standard error: 1.5/8

b) According to the Central Limit Theorem, which statement is correct?

- The sample mean will equal the population mean when n is large enough
- The individual data points in a sample will follow a normal distribution

The distribution of sample means will approach a normal distribution

- The population distribution must be normal for the theorem to apply

Q3. You are interested in whether students sleep on average 8 hours per night. You take one sample of 100 students ($n = 100$) with an average sleep time (\bar{x}) of 7.5 hours and standard deviation (S) of 1. You have decided in advance to reject the null hypothesis if it lies 3 standard errors away from the sample mean.

a) Describe the sampling distribution.

Shape: t-distribution

Mean: 7.5

Standard error: 1

b) Construct the confidence interval for your test.

Lower Bound: 4.5

Upper Bound: 10.5

c) Use a figure of the probability density function of the sampling distribution to show the confidence interval for your test.



d) Using this confidence interval, are you able to reject the null hypothesis? YES / NO

Q4. A researcher conducts a test of whether students sleep on average 7.8 hours per night with a p-value of 0.12. Describe in one sentence what this p-value means.

This p-value means that there is a 12% probability that a student's average sleep time is outside of the distribution's confidence interval.

Name: Jared Shanken

Student ID: 4723953

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Q1. A class's average sleep time follows an *exponential distribution* with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours.

a) If you sample one student ($n = 1$), what is the sampling distribution of the sample mean?

Shape: Exponential

$$SE = \frac{\sigma}{\sqrt{n}}$$

Mean: 8 hours

$$SE = \frac{1.5}{\sqrt{1}}$$

Standard error: 1.5

b) If you sample 36 students ($n = 36$), what is the sampling distribution of the sample mean?

Shape: APPROX. Normal

$$SE = \frac{\sigma}{\sqrt{n}}$$

Mean: 8 hours

$$SE = \frac{1.5}{\sqrt{36}} = 1.5/6$$

Standard error: 1.5/6

c) If you sample 100 students ($n = 100$), what is the sampling distribution of the sample mean?

Shape: APPROX. Normal

$$SE = \frac{\sigma}{\sqrt{n}}$$

Mean: 8 hours

$$SE = \frac{1.5}{\sqrt{100}} = \frac{1.5}{10}$$

Standard error: 1.5/10

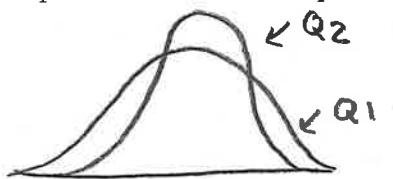
Q2. You take 1000 samples ($n = 64$) of classes, each with sleep times following an *exponential* distribution with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours (same as in Q1).

a) If you were to plot a histogram of the sample means student's sleep times, describe the distribution you would expect to see:

Shape: Approx Normal

Mean: 8 hours

Standard error: $\frac{1.5}{\sqrt{64}} = \frac{1.5}{8}$



$$SE = \frac{\sigma}{\sqrt{n}} = \frac{1.5}{\sqrt{64}} = \frac{1.5}{8}$$

b) According to the Central Limit Theorem, which statement is correct?

- The sample mean will equal the population mean when n is large enough
- The individual data points in a sample will follow a normal distribution
- The distribution of sample means will approach a normal distribution
- The population distribution must be normal for the theorem to apply

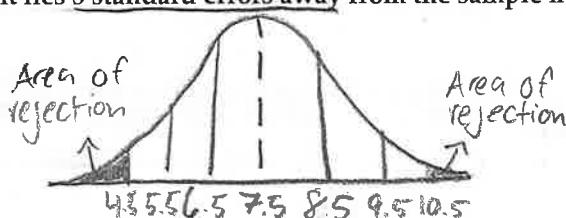
Q3. You are interested in whether students sleep on average 8 hours per night. You take one sample of 100 students ($n = 100$) with an average sleep time (\bar{x}) of 7.5 hours and standard deviation (S) of 1. You have decided in advance to reject the null hypothesis if it lies 3 standard errors away from the sample mean.

a) Describe the sampling distribution.

Shape: Approx. Normal

Mean: 7.5

Standard error: $\frac{1}{\sqrt{100}} = \frac{1}{10}$



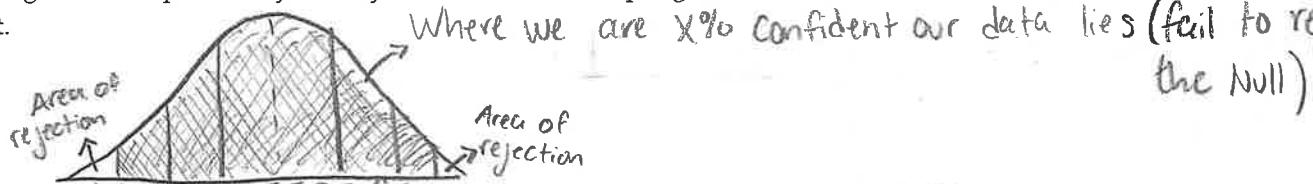
$$SE = \frac{1}{\sqrt{100}} = \frac{1}{10}$$

b) Construct the confidence interval for your test.

Lower Bound: 4.5 hours of Sleep

Upper Bound: 10.5 hours of Sleep

c) Use a figure of the probability density function of the sampling distribution to show the confidence interval for your test.



d) Using this confidence interval, are you able to reject the null hypothesis?

YES NO

Q4. A researcher conducts a test of whether students sleep on average 7.8 hours per night with a p-value of 0.12. Describe in one sentence what this p-value means.

The P-value describes the probability of getting your results. If Students didn't get 7.8 hours of sleep per night, we'd observe a difference of 3 Standard errors away 12% of the time

Name: Allison Yeddy

Student ID: 4751143

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Q1. A class's average sleep time follows an *exponential* distribution with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours.

a) If you sample one student ($n = 1$), what is the sampling distribution of the sample mean?

Shape: exponential

Mean: 8

Standard error: 1.5



b) If you sample 36 students ($n = 36$), what is the sampling distribution of the sample mean?

Shape: approx. normal

Mean: 8

Standard error: 1.5/6



c) If you sample ~~one student~~ ($n = 100$), what is the sampling distribution of the sample mean?

Shape: approx. normal

Mean: 8

Standard error: 1.5/10



Q2. You take 1000 samples ($n = 64$) of classes, each with sleep times following an *exponential* distribution with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours (*same as in Q1*).

a) If you were to plot a histogram of the sample means student's sleep times, describe the distribution you would expect to see:

Shape: approx normal

Mean: 8

$$\frac{1.5}{\sqrt{64}} = \frac{1.5}{8}$$

Standard error: $1.5/\sqrt{64}$

b) According to the Central Limit Theorem, which statement is correct?

- The sample mean will equal the population mean when n is large enough
- The individual data points in a sample will follow a normal distribution
- The distribution of sample means will approach a normal distribution
- The population distribution must be normal for the theorem to apply

Q3. You are interested in whether students sleep on average 8 hours per night. You take one sample of 100 students ($n = 100$) with an average sleep time (\bar{x}) of 7.5 hours and standard deviation (S) of 1. You have decided in advance to reject the null hypothesis if it lies 3 standard errors away from the sample mean.

a) Describe the sampling distribution.

Shape: approx. normal

Mean: 7.5

$$\frac{1}{\sqrt{100}}$$

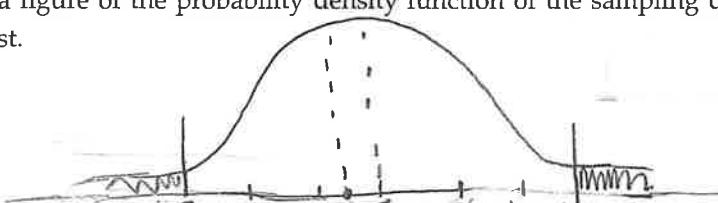
Standard error: $1/\sqrt{100}$

b) Construct the confidence interval for your test.

Lower Bound: 5.5

Upper Bound: 11

c) Use a figure of the probability density function of the sampling distribution to show the confidence interval for your test.



d) Using this confidence interval, are you able to reject the null hypothesis? YES / NO

Q4. A researcher conducts a test of whether students sleep on average 7.8 hours per night with a p-value of 0.12. Describe in one sentence what this p-value means.

A p-value of 0.12 means if students sleep on average of 7.8 hours, the extremes happen 12% of the time.

Name: Alex Samis

Student ID: 4621267

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Q1. A class's average sleep time follows an *exponential* distribution with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours.

a) If you sample one student ($n = 1$), what is the sampling distribution of the sample mean?

Shape: exponential distribution $1.5/\sqrt{1}$

Mean: 8

Standard error: 1.5

b) If you sample 36 students ($n = 36$), what is the sampling distribution of the sample mean?

Shape: approx normal $1.5/\sqrt{36}$

Mean: 8

Standard error: 1.5/6

c) If you sample one student ($n = 100$), what is the sampling distribution of the sample mean?

Shape: approx normal

Mean: 8

Standard error: 1.5/10

Q2. You take 1000 samples ($n = 64$) of classes, each with sleep times following an *exponential distribution* with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours (same as in Q1).

a) If you were to plot a histogram of the sample means student's sleep times, describe the distribution you would expect to see:

Shape: approx normal

Mean: 8

Standard error: 1.5 / 8

b) According to the Central Limit Theorem, which statement is correct?

no The sample mean will equal the population mean when n is large enough

no The individual data points in a sample will follow a normal distribution

yes ✓ The distribution of sample means will approach a normal distribution

no The population distribution must be normal for the theorem to apply

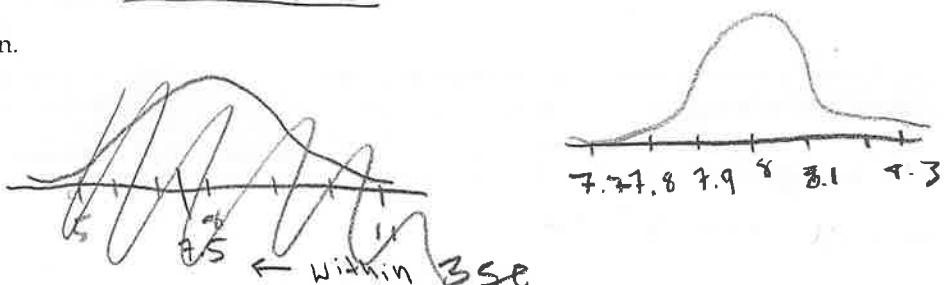
Q3. You are interested in whether students sleep on average 8 hours per night. You take one sample of 100 students ($n = 100$) with an average sleep time (\bar{x}) of 7.5 hours and standard deviation (S) of 1. You have decided in advance to reject the null hypothesis if it lies 3 standard errors away from the sample mean.

a) Describe the sampling distribution.

Shape: approx normal

Mean: 8

Standard error: 1 / 10

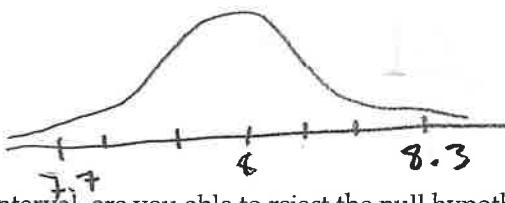


b) Construct the confidence interval for your test.

Lower Bound: 7.7 hours

Upper Bound: 8.3 hours

c) Use a figure of the probability density function of the sampling distribution to show the confidence interval for your test.



d) Using this confidence interval, are you able to reject the null hypothesis? YES / NO

Q4. A researcher conducts a test of whether students sleep on average 7.8 hours per night with a p-value of 0.12. Describe in one sentence what this p-value means.

IF the researcher's hypothesis is correct, students sleep 7.8 hours per night 12% of the time. Extreme values would be less common in the sample. The results would be approx. normal due to the central limit theorem.

Name: Bailey Michalak

Student ID: 4614927

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Q1. A class's average sleep time follows an *exponential distribution* with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours.

$$SE = \frac{SD}{\sqrt{n}}$$

a) If you sample one student ($n = 1$), what is the sampling distribution of the sample mean?

Shape: Uniform

Mean: 8 $= \frac{1.5}{\sqrt{1}} = 1.5$

Standard error: 1.5

b) If you sample 36 students ($n = 36$), what is the sampling distribution of the sample mean?

Shape: Normal

Mean: 8 $= \frac{1.5}{\sqrt{36}} = \frac{1.5}{6} = \frac{1}{4}$

Standard error: 0.25

c) If you sample one student ($n = 100$), what is the sampling distribution of the sample mean?

Shape: Normal

Mean: 8 $= \frac{1.5}{\sqrt{100}} = \frac{1.5}{10} = \frac{1}{6}$

Standard error: 0.15

Q2. You take 1000 samples ($n = 64$) of classes, each with sleep times following an *exponential* distribution with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours (same as in Q1).

a) If you were to plot a histogram of the sample means student's sleep times, describe the distribution you would expect to see:

Shape: Approximately Normal

Mean: 8

$$\text{Standard error: } \frac{1.5}{\sqrt{64}} = \frac{1.5}{8}$$

b) According to the Central Limit Theorem, which statement is correct?

- The sample mean will equal the population mean when n is large enough
- The individual data points in a sample will follow a normal distribution
- The distribution of sample means will approach a normal distribution
- The population distribution must be normal for the theorem to apply

Q3. You are interested in whether students sleep on average 8 hours per night. You take one sample of 100 students ($n = 100$) with an average sleep time (\bar{x}) of 7.5 hours and standard deviation (S) of 1. You have decided in advance to reject the null hypothesis if it lies 3 standard errors away from the sample mean.

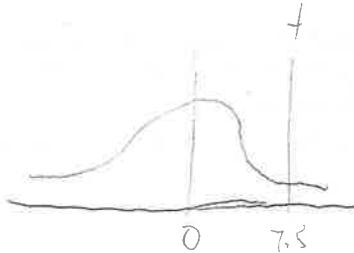
a) Describe the sampling distribution.

Shape: Approximately normal

Mean: 7.5

Standard error: 0.1

$$\frac{1}{\sqrt{100}} = \frac{1}{10} = 0.1$$

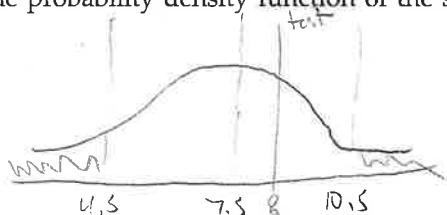


b) Construct the confidence interval for your test.

Lower Bound: 4.5

Upper Bound: 10.5

c) Use a figure of the probability density function of the sampling distribution to show the confidence interval for your test.



d) Using this confidence interval, are you able to reject the null hypothesis?

YES NO

Q4. A researcher conducts a test of whether students sleep on average 7.8 hours per night with a p-value of 0.12. Describe in one sentence what this p-value means.

There is approximately a 12% chance that the test will show no effect.

Name: Amer Banawan

Student ID: 4640677

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Q1. A class's average sleep time follows an *exponential* distribution with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours.

a) If you sample one student ($n = 1$), what is the sampling distribution of the sample mean?

Shape: exponential

Mean: 8

$$SE = \frac{1.5}{\sqrt{1}}$$

Standard error: 1.5

b) If you sample 36 students ($n = 36$), what is the sampling distribution of the sample mean?

Shape: approx. normal

Mean: 8

$$SE = \frac{1.5}{\sqrt{36}} = \frac{1.5}{6}$$

Standard error: .25

c) If you sample one student ($n = 100$), what is the sampling distribution of the sample mean?

Shape: Uniform

Mean: 8

$$SE = \frac{1.5}{\sqrt{100}} = \frac{1.5}{10} = 0.15$$

Q2. You take 1000 samples ($n = 64$) of classes, each with sleep times following an exponential distribution with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours (same as in Q1).

a) If you were to plot a histogram of the sample means student's sleep times, describe the distribution you would expect to see:

Shape: Exponential

$$SE = \frac{\sigma}{\sqrt{n}}$$

Mean: 8

Standard error: $\frac{1.5}{8}$

$$SE = \frac{1.5}{\sqrt{64}}$$

b) According to the Central Limit Theorem, which statement is correct?

- The sample mean will equal the population mean when n is large enough
- The individual data points in a sample will follow a normal distribution
- The distribution of sample means will approach a normal distribution
- The population distribution must be normal for the theorem to apply

Q3. You are interested in whether students sleep on average 8 hours per night. You take one sample of 100 students ($n = 100$) with an average sleep time (\bar{x}) of 7.5 hours and standard deviation (S) of 1. You have decided in advance to reject the null hypothesis if it lies 3 standard errors away from the sample mean.

a) Describe the sampling distribution.

Shape: Approx. Normal

Mean: 7.5

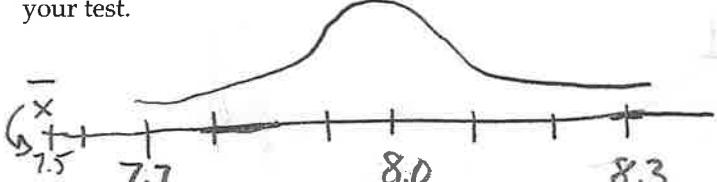
Standard error: 0.1 $SE = \frac{S}{\sqrt{n}} = \frac{1}{10}$

b) Construct the confidence interval for your test.

Lower Bound: 7.7

Upper Bound: 8.3

c) Use a figure of the probability density function of the sampling distribution to show the confidence interval for your test.



d) Using this confidence interval, are you able to reject the null hypothesis? YES NO

Q4. A researcher conducts a test of whether students sleep on average 7.8 hours per night with a p-value of 0.12. Describe in one sentence what this p-value means.

Since the p-value > 0.05, we do not reject the null hypothesis, as we are confident that students sleep, on average, 7.8 hours per night.

Name: Charlie Voss

Student ID: 4716256

ECON 0150 | MiniExam 3 | Fall 2025

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Q1. A class's average sleep time follows an exponential distribution with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours.

a) If you sample one student ($n = 1$), what is the sampling distribution of the sample mean?

Shape: exponential

Mean: 8

$$\frac{1.5}{\sqrt{1}} = 1.5$$

Standard error: 1.5

b) If you sample 36 students ($n = 36$), what is the sampling distribution of the sample mean?

Shape: Appx normal

Mean: 8

Standard error: .25

$$\frac{1.5}{\sqrt{36}} = \frac{1.5}{6} = \frac{1}{4}$$

c) If you sample one student ($n = 100$), what is the sampling distribution of the sample mean?

Shape: Appx Normal

Mean: 8

Standard error: .15

$$\frac{1.5}{\sqrt{100}} = \frac{1.5}{10} = \frac{1.5}{100} = .15$$

Q2. You take 1000 samples ($n = 64$) of classes, each with sleep times following an *exponential* distribution with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours (same as in Q1).

a) If you were to plot a histogram of the sample means student's sleep times, describe the distribution you would expect to see:

Shape: Appx Normal

Mean: 8

Standard error: $\frac{1.5}{\sqrt{64}}$

$$\frac{1.5}{\sqrt{64}}$$

b) According to the Central Limit Theorem, which statement is correct?

The sample mean will equal the population mean when n is large enough

The individual data points in a sample will follow a normal distribution

The distribution of sample means will approach a normal distribution

The population distribution must be normal for the theorem to apply

Q3. You are interested in whether students sleep on average 8 hours per night. You take one sample of 100 students ($n = 100$) with an average sleep time (\bar{x}) of 7.5 hours and standard deviation (S) of 1. You have decided in advance to reject the null hypothesis if it lies 3 standard errors away from the sample mean.

a) Describe the sampling distribution.

Shape: Appx normal

Mean: 7.5

Standard error: $\frac{1}{\sqrt{100}}$ or 0.1

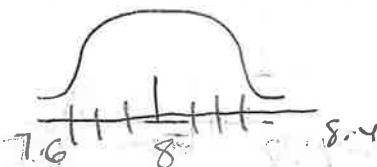
$$\frac{1}{\sqrt{100}}$$

b) Construct the confidence interval for your test.

Lower Bound: 7.6

Upper Bound: 8.4

c) Use a figure of the probability density function of the sampling distribution to show the confidence interval for your test.



d) Using this confidence interval, are you able to reject the null hypothesis? YES / NO

Q4. A researcher conducts a test of whether students sleep on average 7.8 hours per night with a p-value of 0.12. Describe in one sentence what this p-value means.

If students don't sleep 7.8 hours, we'd observe 7.5 or more hours of sleep 12% of the time.

Name: Ethan Sthe

Student ID: 4710889

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Q1. A class's average sleep time follows an *exponential* distribution with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours.

a) If you sample one student ($n = 1$), what is the sampling distribution of the sample mean?

Shape: Uniform

$$SE = \frac{\sigma}{\sqrt{n}}$$

Mean: 8

Standard error: 1.5

b) If you sample 36 students ($n = 36$), what is the sampling distribution of the sample mean?

Shape: Exponential 

$$\frac{1.5}{\sqrt{36}} = .15$$

Mean: 8

Standard error: .15

c) If you sample one student ($n = 100$), what is the sampling distribution of the sample mean?

Shape: Exponential

$$\frac{1.5}{\sqrt{100}} = .15$$

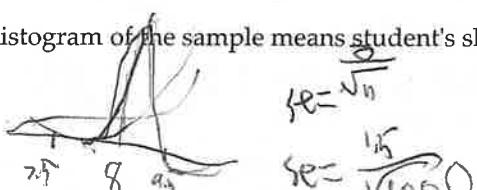
Mean: 8

Standard error: .15

Q2. You take 1000 samples ($n = 64$) of classes, each with sleep times following an *exponential* distribution with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours (same as in Q1).

a) If you were to plot a histogram of the sample means student's sleep times, describe the distribution you would expect to see:

Shape: Exponential



Mean: 8

Standard error: $1.5/\sqrt{100}$

b) According to the Central Limit Theorem, which statement is correct?

- The sample mean will equal the population mean when n is large enough
- The individual data points in a sample will follow a normal distribution
- The distribution of sample means will approach a normal distribution
- The population distribution must be normal for the theorem to apply

Q3. You are interested in whether students sleep on average 8 hours per night. You take one sample of 100 students ($n = 100$) with an average sleep time (\bar{x}) of 7.5 hours and standard deviation (S) of 1. You have decided in advance to reject the null hypothesis if it lies 3 standard errors away from the sample mean.

a) Describe the sampling distribution.

Shape: Avg. distribution

Mean: 7.5

$$SE = \frac{1}{\sqrt{100}}$$

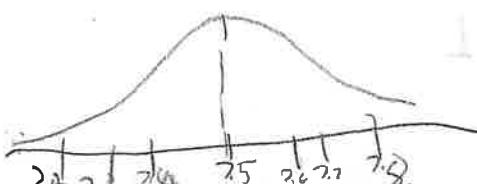
Standard error: $\frac{1}{10}$

b) Construct the confidence interval for your test.

Lower Bound: 7.2

Upper Bound: 7.8

c) Use a figure of the probability density function of the sampling distribution to show the confidence interval for your test.



$7+3S \in$

$7.7 < 8$

YES / NO

d) Using this confidence interval, are you able to reject the null hypothesis?

Q4. A researcher conducts a test of whether students sleep on average 7.8 hours per night with a p-value of 0.12. Describe in one sentence what this p-value means.

This means there is a 12% confidence interval, meaning 12% each

way from 7.8 (7.8 ± 0.3), and an 8% chance

Name: Jack Bachkoris

Student ID: 4631980

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$$\text{Standard error} = \frac{\sigma}{\sqrt{n}}$$

Q1. A class's average sleep time follows an *exponential* distribution with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours.

a) If you sample one student ($n = 1$), what is the sampling distribution of the sample mean?

Shape: Exponential

Mean: 8

$$\frac{1.5}{\sqrt{1}}$$

Standard error: 1.5

b) If you sample 36 students ($n = 36$), what is the sampling distribution of the sample mean?

Shape: Approx. normal

Mean: 8

$$\frac{1.5}{\sqrt{36}}$$

Standard error: 1.5/6

c) If you sample one student ($n = 100$), what is the sampling distribution of the sample mean?

Shape: Approx. normal

Mean: 8

$$\frac{1.5}{\sqrt{100}}$$

Standard error: 1.5/10

Q2. You take 1000 samples ($n = 64$) of classes, each with sleep times following an *exponential* distribution with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours (same as in Q1).

a) If you were to plot a histogram of the sample means student's sleep times, describe the distribution you would expect to see:

Shape: approx normal

Mean: 8

Standard error: $15/8$

b) According to the Central Limit Theorem, which statement is correct?

- The sample mean will equal the population mean when n is large enough
- The individual data points in a sample will follow a normal distribution
- The distribution of sample means will approach a normal distribution
- The population distribution must be normal for the theorem to apply

Q3. You are interested in whether students sleep on average 8 hours per night. You take one sample of 100 students ($n = 100$) with an average sleep time (\bar{x}) of 7.5 hours and standard deviation (S) of 1. You have decided in advance to reject the null hypothesis if it lies 3 standard errors away from the sample mean.

a) Describe the sampling distribution.

Shape: approx normal

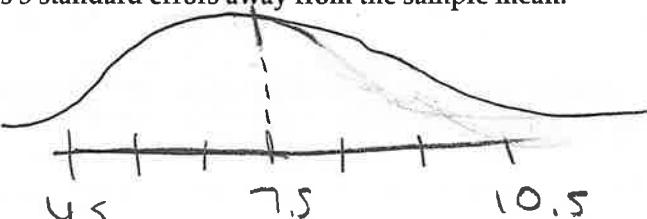
Mean: 7.5

Standard error: $1/\sqrt{100}$

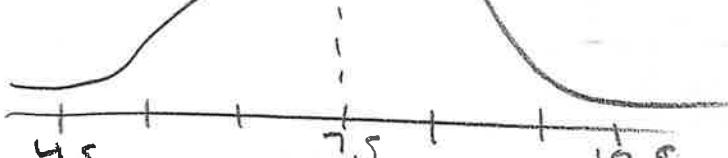
b) Construct the confidence interval for your test.

Lower Bound: 4.5

Upper Bound: 10.5



c) Use a figure of the probability density function of the sampling distribution to show the confidence interval for your test.



d) Using this confidence interval, are you able to reject the null hypothesis? YES / NO

Q4. A researcher conducts a test of whether students sleep on average 7.8 hours per night with a p-value of 0.12.

Describe in one sentence what this p-value means.

We'd observe average of 7.8 hours per night 12% of the time.

Name: Ryan Oliver

Student ID: 4785721

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Q1. A class's average sleep time follows an *exponential* distribution with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours.

a) If you sample one student ($n = 1$), what is the sampling distribution of the sample mean?

Shape: uniform

Mean: 8

$$\frac{1.5}{\sqrt{n}}$$

Standard error: 1.5

b) If you sample 36 students ($n = 36$), what is the sampling distribution of the sample mean?

Shape: normal dist

Mean: 8

$$\frac{1.5}{\sqrt{36}} \quad \frac{1.5}{6}$$

Standard error: .25

c) If you sample one student ($n = 100$), what is the sampling distribution of the sample mean?

Shape: normal dist

Mean: 8

$$\frac{1.5}{\sqrt{100}} \quad \frac{1.5}{10}$$

Standard error: .15

Q2. You take 1000 samples ($n = 64$) of classes, each with sleep times following an *exponential* distribution with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours (same as in Q1).

a) If you were to plot a histogram of the sample means student's sleep times, describe the distribution you would expect to see:

Shape: normal dist.

$$\frac{1.5}{\sqrt{64}} \quad \frac{1.5}{8} \quad \frac{1.5}{\sqrt{64}}$$

Mean: 8

Standard error: $\frac{1.5}{\sqrt{64}} \approx .1875$

b) According to the Central Limit Theorem, which statement is correct?

- The sample mean will equal the population mean when n is large enough
- The individual data points in a sample will follow a normal distribution
- The distribution of sample means will approach a normal distribution
- The population distribution must be normal for the theorem to apply

Q3. You are interested in whether students sleep on average 8 hours per night. You take one sample of 100 students ($n = 100$) with an average sleep time (\bar{x}) of 7.5 hours and standard deviation (S) of 1. You have decided in advance to reject the null hypothesis if it lies 3 standard errors away from the sample mean.

a) Describe the sampling distribution.

Shape: Normal distribution

$$\frac{1}{\sqrt{100}} \quad \frac{1}{10}$$

Mean: 7.5

Standard error: .10

b) Construct the confidence interval for your test.

Lower Bound: 5

Upper Bound: 11

c) Use a figure of the probability density function of the sampling distribution to show the confidence interval for your test.



d) Using this confidence interval, are you able to reject the null hypothesis? YES / NO

Q4. A researcher conducts a test of whether students sleep on average 7.8 hours per night with a p-value of 0.12. Describe in one sentence what this p-value means.

You reject null hypothesis, so you accept students sleep on avg 7.8 hours

Name: Ella Shroff

Student ID: 4151899

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Q1. A class's average sleep time follows an *exponential* distribution with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours.

a) If you sample one student ($n = 1$), what is the sampling distribution of the sample mean?

Shape: Exponential

Mean: 8

Standard error: 1.5

b) If you sample 36 students ($n = 36$), what is the sampling distribution of the sample mean?

Shape: Approx. Normal

Mean: 8

Standard error: $\frac{1.5}{6}$

c) If you sample one student ($n = 100$), what is the sampling distribution of the sample mean?

Shape: Approx. Normal

Mean: 8

Standard error: $\frac{1.5}{10}$

Q2. You take 1000 samples ($n = 64$) of classes, each with sleep times following an *exponential* distribution with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours (*same as in Q1*).

a) If you were to plot a histogram of the sample means student's sleep times, describe the distribution you would expect to see:

Shape: APPROX. NORMAL

Mean: 8

Standard error: $\frac{1.5}{8}$

b) According to the Central Limit Theorem, which statement is correct?

- The sample mean ~~X~~ will equal the population mean when n is large enough
- The individual ~~data~~ points in a sample will follow a normal distribution
- The distribution of sample means will approach a normal distribution
- The population ~~distribution~~ must be normal for the theorem to apply

Q3. You are interested in whether students sleep on average 8 hours per night. You take one sample of 100 students ($n = 100$) with an average sleep time (\bar{x}) of 7.5 hours and standard deviation (S) of 1. You have decided in advance to reject the null hypothesis if it lies 3 standard errors away from the sample mean.

a) Describe the sampling distribution.

Shape: APPROX. NORMAL

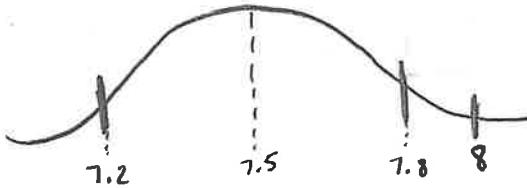
Mean: 7.5

Standard error: $\frac{1}{10}$

b) Construct the confidence interval for your test.

$$\text{Lower Bound: } 7.5 - \frac{3}{10} = \frac{72}{10} = 7.2 \quad \text{Upper Bound: } 7.5 + \frac{3}{10} = \frac{78}{10} = 7.8$$

c) Use a figure of the probability density function of the sampling distribution to show the confidence interval for your test.



d) Using this confidence interval, are you able to reject the null hypothesis? YES NO

Q4. A researcher conducts a test of whether students sleep on average 7.8 hours per night with a p-value of 0.12. Describe in one sentence what this p-value means.

The probability of observing a test statistic at least as extreme as ours is 0.12% if the null hypothesis is true.

Name: giana torri

Student ID: 4636747

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Q1. A class's average sleep time follows an *exponential distribution* with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours.

a) If you sample one student ($n = 1$), what is the sampling distribution of the sample mean?

Shape: exponential

Mean: 8

Standard error: 1.5 $\frac{\sigma}{\sqrt{n}} = \frac{1.5}{\sqrt{1}} = 1.5$

b) If you sample 36 students ($n = 36$), what is the sampling distribution of the sample mean?

Shape: normal approx.

Mean: 8

Standard error: 1.5/6 or $\frac{1.5}{\sqrt{36}} = 1.5/6 = 3/2 \div 6 = 3/2 \cdot \frac{1}{6} = 1/4$

c) If you sample one student ($n = 100$), what is the sampling distribution of the sample mean?

sample size = n = 100

Shape: normal approx.

Mean: 8

Standard error: $\frac{1.5}{\sqrt{100}} = 1.5/10 = 3/2 \div 10 = 3/2 \cdot \frac{1}{10} = 3/20$

Q2. You take 1000 samples ($n = 64$) of classes, each with sleep times following an *exponential* distribution with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours (same as in Q1).

a) If you were to plot a histogram of the sample means student's sleep times, describe the distribution you would expect to see:

Shape: normal approx.

Mean: 8

$$\text{Standard error: } \frac{\sigma}{\sqrt{n}} = \frac{1.5}{\sqrt{64}} = 1.5/8$$

b) According to the Central Limit Theorem, which statement is correct?

The sample mean will equal the population mean when n is large enough

The individual data points in a sample will follow a normal distribution

The distribution of sample means will approach a normal distribution

The population distribution must be normal for the theorem to apply

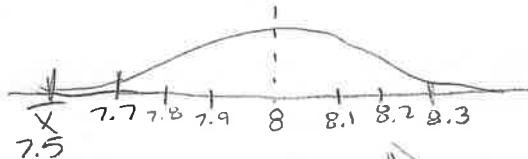
Q3. You are interested in whether students sleep on average 8 hours per night. You take one sample of 100 students ($n = 100$) with an average sleep time (\bar{x}) of 7.5 hours and standard deviation (S) of 1. You have decided in advance to reject the null hypothesis if it lies 3 standard errors away from the sample mean.

a) Describe the sampling distribution.

Shape: normal approx.

Mean: 7.5

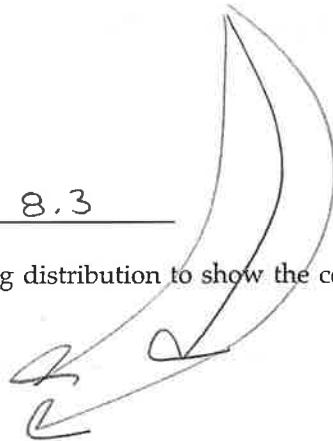
$$\text{Standard error: } \frac{1}{\sqrt{n}} = \frac{1}{\sqrt{100}} = \frac{1}{10}$$



b) Construct the confidence interval for your test.

Lower Bound: 7.7

Upper Bound: 8.3



d) Using this confidence interval, are you able to reject the null hypothesis? YES / NO

Q4. A researcher conducts a test of whether students sleep on average 7.8 hours per night with a p-value of 0.12. Describe in one sentence what this p-value means.

If the kids do not sleep 7.8 hrs/night, we would see a dif. of 7.5 or more extreme 12% of the time

Name: Myriam Randiga

Student ID: 4545505

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Q1. A class's average sleep time follows an *exponential* distribution with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours.

a) If you sample one student ($n = 1$), what is the sampling distribution of the sample mean?

Shape: UNIFORM

$$\bar{M} = 8$$

Mean: 8

$$S = 1.5$$

Standard error: 1.5

b) If you sample 36 students ($n = 36$), what is the sampling distribution of the sample mean?

Shape: approx. normal

$$1.5 / \sqrt{36}$$

Mean: 8

Standard error: 0.25

c) If you sample one student ($n = 100$), what is the sampling distribution of the sample mean?

Shape: normal, very tight

Mean: 8

Standard error: 0.15

Q2. You take 1000 samples ($n = 64$) of classes, each with sleep times following an *exponential* distribution with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours (*same as in Q1*).

a) If you were to plot a histogram of the sample means student's sleep times, describe the distribution you would expect to see:

Shape: approx. normal distribution

$$\begin{aligned} M &= 8 \\ \sigma &= 1.5 \end{aligned}$$

Mean: 8

Standard error: 0.187

b) According to the Central Limit Theorem, which statement is correct?

- The sample mean will equal the population mean when n is large enough
- The individual data points in a sample will follow a normal distribution
- The distribution of sample means will approach a normal distribution

The population distribution must be normal for the theorem to apply

Q3. You are interested in whether students sleep on average 8 hours per night. You take one sample of 100 students ($n = 100$) with an average sleep time (\bar{x}) of 7.5 hours and standard deviation (S) of 1. You have decided in advance to reject the null hypothesis if it lies 3 standard errors away from the sample mean.

a) Describe the sampling distribution.

Shape: approx normal

$$n=100$$

Mean: 7.5

$$\bar{x}=7.5 \quad S=1$$

Standard error: 1

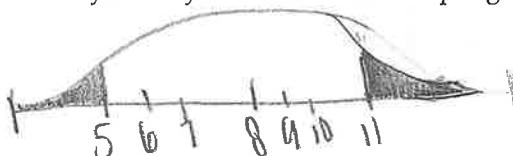
$$3 - 8 + 3$$

b) Construct the confidence interval for your test.

Lower Bound: 5

Upper Bound: 11

c) Use a figure of the probability density function of the sampling distribution to show the confidence interval for your test.



d) Using this confidence interval, are you able to reject the null hypothesis?

YES / NO

Q4. A researcher conducts a test of whether students sleep on average 7.8 hours per night with a p-value of 0.12. Describe in one sentence what this p-value means.

If students sleep an avg. of 8 hours, we observe a difference of

7.5 or more extreme 12% of the time

Name: Aidan Burkhardt

Student ID: 4653239

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AB I will not communicate directly or indirectly with others during the MiniExam.

Q1. A class's average sleep time follows an exponential distribution with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours.

a) If you sample one student ($n = 1$), what is the sampling distribution of the sample mean?

Shape: exponential

$$\frac{\sigma}{\sqrt{n}} = 1.5$$

Mean: 8

Standard error: 1.5

b) If you sample 36 students ($n = 36$), what is the sampling distribution of the sample mean?

Shape: normal

7.50

Mean: 8

Standard error: 1.5/6



$$se = \frac{\sigma}{\sqrt{n}}$$

~~1.5~~ $\frac{1.5}{\sqrt{36}}$

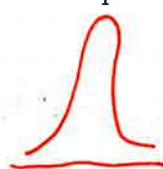
c) If you sample one student ($n = 100$), what is the sampling distribution of the sample mean?

Shape: normal (tighter)

Mean: 8

Standard error: 1.5/10

$$se = \frac{1.5}{\sqrt{100}}$$



Q2. You take 1000 samples ($n = 64$) of classes, each with sleep times following an *exponential* distribution with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours (same as in Q1).

a) If you were to plot a histogram of the sample means student's sleep times, describe the distribution you would expect to see:

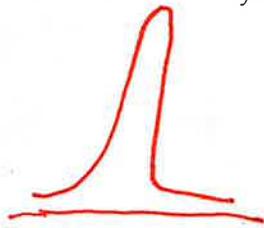
Shape: $\sim \text{normal}$

Mean: 8

Standard error: $\frac{1.5}{\sqrt{64}} = \frac{1.5}{8}$

$n > 30$
 $\sim \text{normal}$

$$\frac{1.5}{\sqrt{64}} = \frac{1.5}{8}$$



b) According to the Central Limit Theorem, which statement is correct?

- The sample mean will equal ~~the~~ population mean when n is large enough
- The individual ~~data~~ points in a sample will follow a normal distribution
- The distribution of sample means will approach a normal distribution
- The population distribution ~~X~~ must be normal for the theorem to apply

Q3. You are interested in whether students sleep on average 8 hours per night. You take one sample of 100 students ($n = 100$) with an average sleep time (\bar{x}) of 7.5 hours and standard deviation (S) of 1. You have decided in advance to reject the null hypothesis if it lies 3 standard errors away from the sample mean.

a) Describe the sampling distribution.

Shape: $\sim \text{normal}$

Mean: 7.5

Standard error: $\frac{\sigma}{\sqrt{n}} = \frac{1}{\sqrt{100}} = \frac{1}{10}$

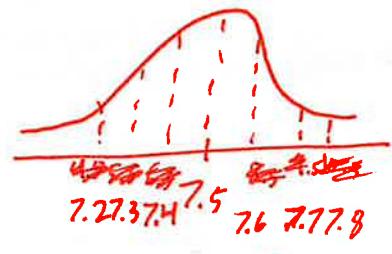
$$\sigma = S$$

$$n = 100$$

$$\bar{x} = 7.5$$

$$SD = 1$$

$$3SD = H_0 \text{ True}$$



b) Construct the confidence interval for your test.

Lower Bound: 7.2

Upper Bound: 7.8

c) Use a figure of the probability density function of the sampling distribution to show the confidence interval for your test.

d) Using this confidence interval, are you able to reject the null hypothesis? YES / NO

very confident that avg. sleep is not 8 hrs per night.

Q4. A researcher conducts a test of whether students sleep on average 7.8 hours per night with a p-value of 0.12. Describe in one sentence what this p-value means. (assuming S is the same as Q3)

12% of the time, we'd observe a difference of extreme events occurring ~~extremely~~ at / over ± 0.3 of 7.8 hrs per night.

Name: Ryan Berry

Student ID: 4757443

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Q1. A class's average sleep time follows an *exponential* distribution with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours.

a) If you sample one student ($n = 1$), what is the sampling distribution of the sample mean?

Shape: Uniform

Mean: 8

Standard error: 1.5

b) If you sample 36 students ($n = 36$), what is the sampling distribution of the sample mean?

Shape: Approximately exponential

Mean: 8

Standard error: 0.25

100

c) If you sample 100 students ($n = 100$), what is the sampling distribution of the sample mean?

Shape: Approximately exponential

Mean: 8

Standard error: 0.15

Q2. You take 1000 samples ($n = 64$) of classes, each with sleep times following an *exponential* distribution with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours (same as in Q1).

a) If you were to plot a histogram of the sample means student's sleep times, describe the distribution you would expect to see:

Shape: Approximately normal

Mean: 8

Standard error: $1.5/\sqrt{1000}$

b) According to the Central Limit Theorem, which statement is correct?

- The sample mean will equal the population mean when n is large enough
- The individual data points in a sample will follow a normal distribution
- The distribution of sample means will approach a normal distribution
- The population distribution must be normal for the theorem to apply

Q3. You are interested in whether students sleep on average 8 hours per night. You take one sample of 100 students ($n = 100$) with an average sleep time (\bar{x}) of 7.5 hours and standard deviation (S) of 1. You have decided in advance to reject the null hypothesis if it lies 3 standard errors away from the sample mean.

a) Describe the sampling distribution.

Shape: Approximately normal

Mean: 7.5

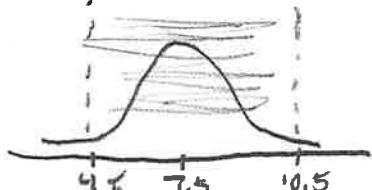
Standard error: 1

b) Construct the confidence interval for your test.

Lower Bound: 4.5

Upper Bound: 10.5

c) Use a figure of the probability density function of the sampling distribution to show the confidence interval for your test.



d) Using this confidence interval, are you able to reject the null hypothesis? YES NO

Q4. A researcher conducts a test of whether students sleep on average 7.8 hours per night with a p-value of 0.12. Describe in one sentence what this p-value means.

If the null hypothesis is true that students sleep on average 7.8 hours per night, the probability of getting the results you got or more extreme is 12%.

Name: Jhanvi Sharma

Student ID: 4614120

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Q1. A class's average sleep time follows an *exponential* distribution with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours.

a) If you sample one student ($n = 1$), what is the sampling distribution of the sample mean?

Shape: uniform 

Mean: 8

Standard error: $\frac{1.5}{\sqrt{1}} = 1.5$

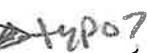
b) If you sample 36 students ($n = 36$), what is the sampling distribution of the sample mean?

Shape: approx normal

Mean: 8

Standard error: $\frac{1.5}{\sqrt{36}} = .25$ $\frac{\theta}{\sqrt{n}}$

c) If you sample one student ($n = 100$), what is the sampling distribution of the sample mean?

Shape: approx normal  typo?

Mean: 8

Standard error: $\frac{1.5}{\sqrt{100}} = .15$

Q2. You take 1000 samples ($n = 64$) of classes, each with sleep times following an *exponential* distribution with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours (same as in Q1).

a) If you were to plot a histogram of the sample means student's sleep times, describe the distribution you would expect to see:

Shape: approx normal

Mean: follows normal distribution according to CLT

Standard error: _____ $\frac{1.5}{\sqrt{64}} = .1875$

b) According to the Central Limit Theorem, which statement is correct?

- The sample mean will equal the population mean when n is large enough
- The individual data points in a sample will follow a normal distribution
- The distribution of sample means will approach a normal distribution
- The population distribution must be normal for the theorem to apply

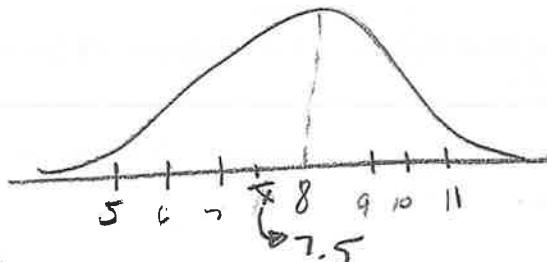
Q3. You are interested in whether students sleep on average 8 hours per night. You take one sample of 100 students ($n = 100$) with an average sleep time (\bar{x}) of 7.5 hours and standard deviation (S) of 1. You have decided in advance to reject the null hypothesis if it lies 3 standard errors away from the sample mean.

a) Describe the sampling distribution.

Shape: approx normal

Mean: 7.5

Standard error: 1



b) Construct the confidence interval for your test.

Lower Bound: 5

Upper Bound: 11

c) Use a figure of the probability density function of the sampling distribution to show the confidence interval for your test.

[5, 11]

7.5 is within the confidence interval

fail to reject

d) Using this confidence interval, are you able to reject the null hypothesis?

YES / NO

Q4. A researcher conducts a test of whether students sleep on average 7.8 hours per night with a p-value of 0.12. Describe in one sentence what this p-value means. (True)

If students sleep for 7.8 hr, we observe a difference of 7.8 or more only 12 percent of the time.

If this is the true mean of 7.8, we'll get this result only 12 percent of the time

Name: Emily Nguyen

Student ID: 4589082

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Q1. A class's average sleep time follows an *exponential* distribution with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours.

a) If you sample one student ($n = 1$), what is the sampling distribution of the sample mean?

Shape: exponential

Mean: 8

Standard error: 1.5 $SE = \frac{\sigma}{\sqrt{n}} = 1.5$

b) If you sample 36 students ($n = 36$), what is the sampling distribution of the sample mean?

Shape: Approx. Normal

Mean: 8

Standard error: 0.25 $SE = \frac{1.5}{\sqrt{36}} = \frac{1.5}{6}$

c) If you sample ¹⁰⁰one student ($n = 100$), what is the sampling distribution of the sample mean?

Shape: Normal

Mean: 8

Standard error: 0.15 $SE = \frac{1.5}{\sqrt{100}} = \frac{1.5}{10}$

Q2. You take 1000 samples ($n = 64$) of classes, each with sleep times following an *exponential* distribution with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours (same as in Q1).

a) If you were to plot a histogram of the sample means student's sleep times, describe the distribution you would expect to see:

Shape: Approx. Normal

Mean: 8

$$\text{Standard error: } SE = \frac{\sigma}{\sqrt{n}} = \frac{1.5}{\sqrt{64}} = \frac{1.5}{8}$$

b) According to the Central Limit Theorem, which statement is correct?

- The sample mean will equal the population mean when n is large enough
- The individual data points in a sample will follow a normal distribution
- The distribution of sample means will approach a normal distribution
- The population distribution must be normal for the theorem to apply \times

Q3. You are interested in whether students sleep on average 8 hours per night. You take one sample of 100 students ($n = 100$) with an average sleep time (\bar{x}) of 7.5 hours and standard deviation (S) of 1. You have decided in advance to reject the null hypothesis if it lies 3 standard errors away from the sample mean.

a) Describe the sampling distribution.

$$H_0: \mu = 8$$

Shape: t-distribution (no pop. std)

Mean: 7.5

$$\text{Standard error: } SE = \frac{\sigma}{\sqrt{n}} = \frac{1}{\sqrt{100}} = \frac{1}{10} = \frac{1}{10}$$

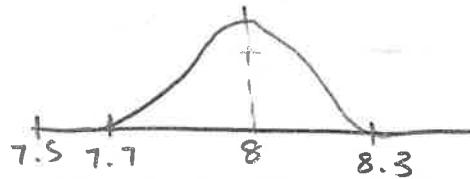
$$t = \frac{\bar{x} - \mu_0}{SE} = \frac{7.5 - 8}{1/\sqrt{100}} = \frac{-0.5}{0.1} = -5$$

b) Construct the confidence interval for your test.

Lower Bound: 7.7

Upper Bound: 8.3

c) Use a figure of the probability density function of the sampling distribution to show the confidence interval for your test.



d) Using this confidence interval, are you able to reject the null hypothesis?

YES / NO

Q4. A researcher conducts a test of whether students sleep on average 7.8 hours per night with a p-value of 0.12. Describe in one sentence what this p-value means.

If H_0 ($\mu = 7.8$) were true, we'd see results this extreme or more extreme only about 12% of the time.

Name: Chase Arthur

Student ID: 4628108

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Q1. A class's average sleep time follows an *exponential* distribution with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours.

a) If you sample one student ($n = 1$), what is the sampling distribution of the sample mean?

Shape: Exponential

Mean: 8 $SE = \frac{\sigma}{\sqrt{n}} = \frac{1.5 \text{ hours}}{\sqrt{1}} = 1.5$
Standard error: 1.5

b) If you sample 36 students ($n = 36$), what is the sampling distribution of the sample mean?

Shape: Approx. Normal

Mean: 8 $SE = \frac{1.5}{\sqrt{36}} = \frac{1.5}{6}$
Standard error: $\frac{1.5}{6}$

c) If you sample one student ($n = 100$), what is the sampling distribution of the sample mean?

Shape: Approx. normal

Mean: 8 $\frac{1.5}{\sqrt{100}} = \frac{1.5}{10}$
Standard error: $\frac{1.5}{10}$

Q2. You take 1000 samples ($n = 64$) of classes, each with sleep times following an *exponential* distribution with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours (same as in Q1).

a) If you were to plot a histogram of the sample means student's sleep times, describe the distribution you would expect to see:

Shape: APPROX NORMAL

Mean: 8

Standard error: $\frac{1.5}{\sqrt{64}}$

$$\frac{\sigma}{\sqrt{n}} = \frac{1.5}{\sqrt{64}} = \frac{1.5}{8}$$

b) According to the Central Limit Theorem, which statement is correct?

- The sample mean will equal the population mean when n is large enough
- The individual data points in a sample will follow a normal distribution
- The distribution of sample means will approach a normal distribution
- The population distribution must be normal for the theorem to apply

Q3. You are interested in whether students sleep on average 8 hours per night. You take one sample of 100 students ($n = 100$) with an average sleep time (\bar{x}) of 7.5 hours and standard deviation (S) of 1. You have decided in advance to reject the null hypothesis if it lies 3 standard errors away from the sample mean.

a) Describe the sampling distribution.

Shape: APPROX NORMAL

Mean: 7.5

Standard error: $\frac{1}{\sqrt{100}}$

$$\begin{aligned} 7 - \frac{1}{10} &= 7 \frac{9}{10} \\ &7.9 \\ &7.8 \\ &7.7 \\ &7.6 \end{aligned}$$

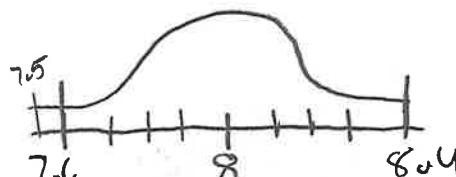
b) Construct the confidence interval for your test.

Lower Bound: 7.4

Upper Bound: 8.4

or we can
 7.5 ± 0.10
 $7.4, 7.6$

c) Use a figure of the probability density function of the sampling distribution to show the confidence interval for your test.



d) Using this confidence interval, are you able to reject the null hypothesis? YES / NO

Q4. A researcher conducts a test of whether students sleep on average 7.8 hours per night with a p-value of 0.12. Describe in one sentence what this p-value means.

When looking at the p-value we know that 12% of the time the sleep time is more than 3 SD away, or 12% of the time we have an extreme value.

Name: Christian Ketels

Student ID: 4704976

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Q1. A class's average sleep time follows an *exponential* distribution with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours.

a) If you sample one student ($n = 1$), what is the sampling distribution of the sample mean?

Shape: uniform

$$SE = \frac{6}{\sqrt{1}} = 6$$

Mean: 8

Standard error: 1.5

b) If you sample 36 students ($n = 36$), what is the sampling distribution of the sample mean?

Shape: normal

Mean: 8

Standard error: $\frac{1.5}{\sqrt{36}} = \frac{1.5}{6} = 0.25$

$$SE = \frac{1.5}{\sqrt{36}} = \frac{1.5}{6} = 0.25$$

A hand-drawn normal distribution curve is shown with a mean of 8 and a standard error of 0.25.

c) If you sample 100 students ($n = 100$), what is the sampling distribution of the sample mean?

Shape: normal

Mean: 8

Standard error: $\frac{1.5}{\sqrt{100}} = \frac{1.5}{10} = 0.15$

$$SE = \frac{1.5}{\sqrt{100}} = \frac{1.5}{10} = 0.15$$

Q2. You take 1000 samples ($n = 64$) of classes, each with sleep times following an *exponential* distribution with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours (same as in Q1).

a) If you were to plot a histogram of the sample means student's sleep times, describe the distribution you would expect to see:

Shape: normal

Mean: 8

Standard error: $\frac{1.5}{\sqrt{64}} = \frac{1.5}{8}$

$$SE = \frac{\sigma}{\sqrt{n}}$$

b) According to the Central Limit Theorem, which statement is correct?

- The sample mean will equal the population mean when n is large enough
- The individual data points in a sample will follow a normal distribution
- The distribution of sample means will approach a normal distribution
- The population distribution must be normal for the theorem to apply

Q3. You are interested in whether students sleep on average 8 hours per night. You take one sample of 100 students ($n = 100$) with an average sleep time (\bar{x}) of 7.5 hours and standard deviation (S) of 1. You have decided in advance to reject the null hypothesis if it lies 3 standard errors away from the sample mean.

a) Describe the sampling distribution.

Shape: normal

\bar{x}

Mean: 7.5

Standard error: $\frac{1}{\sqrt{100}} = \frac{1}{10}$

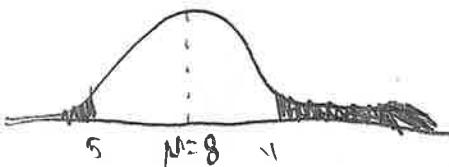
$$SE = \frac{\sigma}{\sqrt{n}}$$

b) Construct the confidence interval for your test.

Lower Bound: 5

Upper Bound: 11

c) Use a figure of the probability density function of the sampling distribution to show the confidence interval for your test.



d) Using this confidence interval, are you able to reject the null hypothesis? YES NO

Q4. A researcher conducts a test of whether students sleep on average 7.8 hours per night with a p-value of 0.12. Describe in one sentence what this p-value means.

Student's sleep times per night will be extreme for 12% of data.

Name: Christian Wiczenski

Student ID: 4624229

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Q1. A class's average sleep time follows an *exponential* distribution with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours.

a) If you sample one student ($n = 1$), what is the sampling distribution of the sample mean?

Shape: Approx normal



Mean: 8

Standard error: $1.5/\sqrt{n}$

$$\sigma/\sqrt{n} \Rightarrow 1.5/\sqrt{n}$$

b) If you sample 36 students ($n = 36$), what is the sampling distribution of the sample mean?

Shape: Approx normal

$$SE = \sigma \Rightarrow \frac{1.5}{\sqrt{36}} = 7 \cdot \frac{1.5}{6}$$

Mean: 8

Standard error: $1.5/6$

c) If you sample one student ($n = 100$), what is the sampling distribution of the sample mean?

Shape: Approx normal

Mean: 8

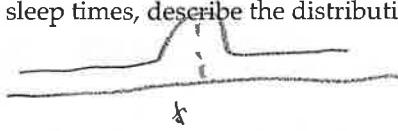
Standard error: $1.5/\sqrt{100}$

$$1.5/\sqrt{100} = 1.5/10$$

Q2. You take 1000 samples ($n = 64$) of classes, each with sleep times following an *exponential* distribution with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours (same as in Q1).

- a) If you were to plot a histogram of the sample means student's sleep times, describe the distribution you would expect to see:

Shape: approx normal



Mean: 8

$$\sigma/\sqrt{n} \Rightarrow 1.5/\sqrt{64} = 1.5/8$$

Standard error: $1.5/\sqrt{64}$

- b) According to the Central Limit Theorem, which statement is correct?

- The sample mean will equal the population mean when n is large enough
- The individual data points in a sample will follow a normal distribution
- The distribution of sample means will approach a normal distribution
- The population distribution must be normal for the theorem to apply

Q3. You are interested in whether students sleep on average 8 hours per night. You take one sample of 100 students ($n = 100$) with an average sleep time (\bar{x}) of 7.5 hours and standard deviation (S) of 1. You have decided in advance to reject the null hypothesis if it lies 3 standard errors away from the sample mean.

- a) Describe the sampling distribution.

Shape: approx normal

Mean: 7.5

Standard error: $1/\sqrt{100}$

$n = 100$

$$SE = \sigma/\sqrt{n} = 1 / \sqrt{100}$$

$$\bar{x} = 7.5$$

$$S = 1$$

$$7.5 + 3(1) = 7.5 + 3$$

$$= 7.8$$

- b) Construct the confidence interval for your test.

Lower Bound: 7.2

Upper Bound: 7.8

- c) Use a figure of the probability density function of the sampling distribution to show the confidence interval for your test.

reject if $\bar{x} \leq 7.2$ or $\bar{x} \geq 7.8$
 confidence interval, around same sample mean, we would shade density under $\bar{x} \pm 3SE$

- d) Using this confidence interval, are you able to reject the null hypothesis? YES NO

Q4. A researcher conducts a test of whether students sleep on average 7.8 hours per night with a p-value of 0.12. Describe in one sentence what this p-value means.

if students did not sleep 7.8 hours on average per night we would expect to see that 12% of the time

Name: Max Irish

Student ID: 4618211

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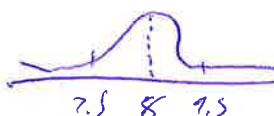
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MI I will not communicate directly or indirectly with others during the MiniExam.

Q1. A class's average sleep time follows an *exponential distribution* with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours.

a) If you sample one student ($n = 1$), what is the sampling distribution of the sample mean?

Shape: Approx. Normal (CLT)



Mean: 8

Standard error: ~~1.5~~

$$\frac{1.5}{\sqrt{1}}$$

$$SE = \theta / \sqrt{n} \Rightarrow 1.5 / \sqrt{1}$$

b) If you sample 36 students ($n = 36$), what is the sampling distribution of the sample mean?

Shape: Approx. Normal

Mean: 8

Standard error: ~~1.5~~

$$\frac{1.5}{\sqrt{36}}$$

$$SE = \theta / \sqrt{n} \Rightarrow \frac{1.5}{\sqrt{36}} = \frac{1.5}{6}$$

c) If you sample one student ($n = 100$), what is the sampling distribution of the sample mean?

Shape: Approx. Normal

Mean: 8

Standard error: ~~1.5~~

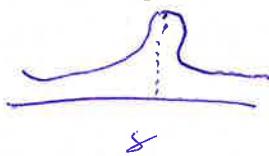
$$\frac{1.5}{\sqrt{100}}$$

$$\Rightarrow \frac{1.5}{\sqrt{100}} = \frac{1.5}{10}$$

Q2. You take 1000 samples ($n = 64$) of classes, each with sleep times following an *exponential* distribution with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours (same as in Q1).

a) If you were to plot a histogram of the sample means student's sleep times, describe the distribution you would expect to see:

Shape: Approx Normal (CLT)



Mean: 8

Standard error: $3/8$

$$SE = \sigma / \sqrt{n} \Rightarrow 3 / \sqrt{64} = 3/8$$

b) According to the Central Limit Theorem, which statement is correct?

The sample mean will equal the population mean when n is large enough

The individual data points in a sample will follow a normal distribution

The distribution of sample means will approach a normal distribution

The population distribution must be normal for the theorem to apply

Q3. You are interested in whether students sleep on average 8 hours per night. You take one sample of 100 students ($n = 100$) with an average sleep time (\bar{x}) of 7.5 hours and standard deviation (S) of 1. You have decided in advance to reject the null hypothesis if it lies 3 standard errors away from the sample mean.

a) Describe the sampling distribution.

Shape: Approx. Normal

Mean: 7.5

Standard error: $1/10$

$$n = 100$$

$$\bar{x} = 7.5$$

$$SD = 1$$

$$SE = \sigma / \sqrt{n} = 1 / \sqrt{100}$$

$$\Rightarrow 1/10$$

b) Construct the confidence interval for your test.

Lower Bound: 7.2

Upper Bound: 7.8

$$= 7.8 - 7.2$$

c) Use a figure of the probability density function of the sampling distribution to show the confidence interval for your test.

Reject if $\geq 3SE$ corresponds to a $3-SE$ confidence band around the sample mean, we would shade density under $\bar{x} \pm 3SE$.

d) Using this confidence interval, are you able to reject the null hypothesis? YES NO

Q4. A researcher conducts a test of whether students sleep on average 7.8 hours per night with a p-value of 0.12. Describe in one sentence what this p-value means.

If students did not sleep 7.8 hours on average per night we would expect to see that 12% of the time.

Name: Connor Richards

Student ID: 4579086

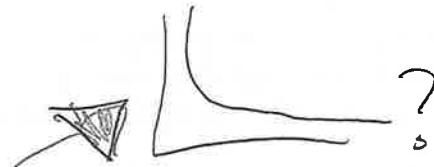
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Q1. A class's average sleep time follows an *exponential* distribution with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours.

a) If you sample one student ($n = 1$), what is the sampling distribution of the sample mean?

Shape: Uniform

Mean: 8 hours

Standard error: 1.5

$$SE = \frac{1.5}{\sqrt{1}} = 1.5$$

b) If you sample 36 students ($n = 36$), what is the sampling distribution of the sample mean?

Shape: approx. normal

Mean: 8

Standard error: 0.25

$$SE = \frac{1.5}{\sqrt{36}} = \frac{1.5}{6}$$

c) If you sample one student ($n = 100$), what is the sampling distribution of the sample mean?

Shape: Exponential

Mean: 8

Standard error: 0.15

$$SE = \frac{1.5}{\sqrt{100}} = \frac{1.5}{10}$$

Q2. You take 1000 samples ($n = 64$) of classes, each with sleep times following an *exponential* distribution with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours (same as in Q1).

a) If you were to plot a histogram of the sample means student's sleep times, describe the distribution you would expect to see:

Shape: exponential

Mean: 8 hrs

Standard error: .1875

$$\frac{1.5}{\sqrt{64}} = \frac{1.5}{8} = 0.1875$$

b) According to the Central Limit Theorem, which statement is correct?

- The sample mean will equal the population mean when n is large enough
- The individual data points in a sample will follow a normal distribution

The distribution of sample means will approach a normal distribution

- The population distribution must be normal for the theorem to apply

Q3. You are interested in whether students sleep on average 8 hours per night. You take one sample of 100 students ($n = 100$) with an average sleep time (\bar{x}) of 7.5 hours and standard deviation (S) of 1. You have decided in advance to reject the null hypothesis if it lies 3 standard errors away from the sample mean.

a) Describe the sampling distribution.

Shape: Normal

Mean: 7.5

Standard error: 0.10

$$\frac{\sigma}{\sqrt{n}} = \frac{1}{\sqrt{100}}$$

b) Construct the confidence interval for your test.

Lower Bound: 4.5

Upper Bound: 10.5

c) Use a figure of the probability density function of the sampling distribution to show the confidence interval for your test.

$$P(4.5 < \bar{x} < 10.5) = 0.88$$

d) Using this confidence interval, are you able to reject the null hypothesis?

YES NO

Q4. A researcher conducts a test of whether students sleep on average 7.8 hours per night with a p-value of 0.12. Describe in one sentence what this p-value means.

There is an 88% probability that we can observe a t-stat within our range explaining if students sleep 7.8 hrs/night.

Name: Grace Burge

Student ID: 4647455

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Q1. A class's average sleep time follows an *exponential* distribution with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours.

a) If you sample one student ($n = 1$), what is the sampling distribution of the sample mean?

Shape: exponential

$$se = \frac{\sigma}{\sqrt{n}}$$

Mean: 8

Standard error: 1.5

$$se = \frac{1.5}{\sqrt{1}} = 1.5$$

b) If you sample 36 students ($n = 36$), what is the sampling distribution of the sample mean?

Shape: exponential

Mean: 8

$$se = \frac{1.5}{\sqrt{36}} = \frac{1.5}{6} = 0.25$$

Standard error: 0.25

c) If you sample ~~100~~¹⁰⁰ students ($n = 100$), what is the sampling distribution of the sample mean?

Shape: approx. normal

Mean: 8

Standard error: 0.15

$$se = \frac{1.5}{\sqrt{100}} = \frac{1.5}{10} = 0.15$$

Q2. You take 1000 samples ($n = 64$) of classes, each with sleep times following an *exponential* distribution with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours (same as in Q1).

a) If you were to plot a histogram of the sample means student's sleep times, describe the distribution you would expect to see:

Shape: approx. normal

Mean: 8

Standard error: 3/16

$$SE = \frac{1.5}{\sqrt{64}} = \frac{1.5}{8} = \frac{3}{16}$$

b) According to the Central Limit Theorem, which statement is correct?

- The sample mean will equal the population mean when n is large enough
- The individual data points in a sample will follow a normal distribution
- The distribution of sample means will approach a normal distribution
- The population distribution must be normal for the theorem to apply

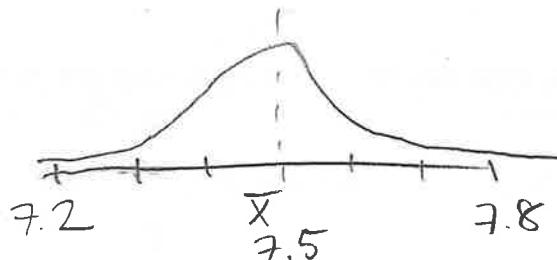
Q3. You are interested in whether students sleep on average 8 hours per night. You take one sample of 100 students ($n = 100$) with an average sleep time (\bar{x}) of 7.5 hours and standard deviation (S) of 1. You have decided in advance to reject the null hypothesis if it lies 3 standard errors away from the sample mean.

a) Describe the sampling distribution.

Shape: t-distribution

Mean: 7.5

Standard error: 0.1



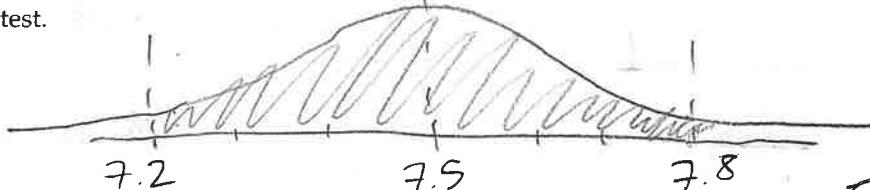
$$SE = \frac{1}{\sqrt{100}} = 0.1$$

b) Construct the confidence interval for your test.

Lower Bound: 7.2

Upper Bound: 7.8

c) Use a figure of the probability density function of the sampling distribution to show the confidence interval for your test.



d) Using this confidence interval, are you able to reject the null hypothesis?

YES / NO

Q4. A researcher conducts a test of whether students sleep on average 7.8 hours per night with a p-value of 0.12. Describe in one sentence what this p-value means.

If the average sleep of a student is 8 hours per night,

Name: Asliddin Nurboev

Student ID: 4571391

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Q1. A class's average sleep time follows an *exponential* distribution with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours.

a) If you sample one student ($n = 1$), what is the sampling distribution of the sample mean?

Shape: Exponential dist

Mean: 8

$$\frac{1.5}{1} = 1.5$$

Standard error: 1

b) If you sample 36 students ($n = 36$), what is the sampling distribution of the sample mean?

Shape: Approx. Normal

Mean: 8

$$\frac{1.5}{6} = 0.25$$

Standard error: 6

c) If you sample one student ($n = 100$), what is the sampling distribution of the sample mean?

Shape: Approx. Normal

Mean: 8

$$\frac{1.5}{10} = 0.15$$

Standard error: 10

6.8.20 - observe

Q2. You take 1000 samples ($n = 64$) of classes, each with sleep times following an *exponential* distribution with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours (same as in Q1).

a) If you were to plot a histogram of the sample means student's sleep times, describe the distribution you would expect to see:

Shape: Aprox. Normal

Mean: 8

Standard error: $\frac{1.5}{\sqrt{64}} = 0.1875$ *didn't use calculator might be wrong!*

b) According to the Central Limit Theorem, which statement is correct?

- The sample mean will equal the population mean when n is large enough
- The individual data points in a sample will follow a normal distribution
- The distribution of sample means will approach a normal distribution
- The population distribution must be normal for the theorem to apply

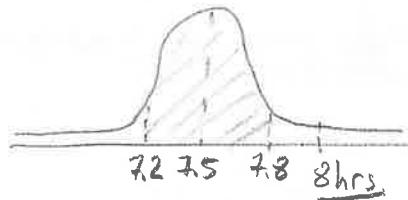
Q3. You are interested in whether students sleep on average 8 hours per night. You take one sample of 100 students ($n = 100$) with an average sleep time (\bar{x}) of 7.5 hours and standard deviation (S) of 1. You have decided in advance to reject the null hypothesis if it lies 3 standard errors away from the sample mean.

a) Describe the sampling distribution.

Shape: t-distribution

Mean: 7.5

Standard error: $\frac{1}{\sqrt{100}} = 0.1$

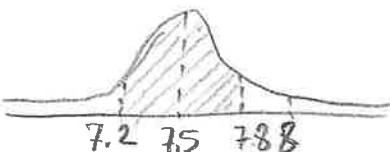


b) Construct the confidence interval for your test.

Lower Bound: 7.2

Upper Bound: 7.8

c) Use a figure of the probability density function of the sampling distribution to show the confidence interval for your test.



d) Using this confidence interval, are you able to reject the null hypothesis? YES NO

Q4. A researcher conducts a test of whether students sleep on average 7.8 hours per night with a p-value of 0.12. Describe in one sentence what this p-value means.

Observing students sleep on average 7.8 hours or extreme per night has a probability of 12 %.

Name: Megan Suess

Student ID: 4331770

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$$\mu = 8 \quad \sigma = 1.5$$

Q1. A class's average sleep time follows an *exponential* distribution with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours.

a) If you sample one student ($n = 1$), what is the sampling distribution of the sample mean?

Shape: exponential

Mean: 8

Standard error: 1.5

b) If you sample 36 students ($n = 36$), what is the sampling distribution of the sample mean?

Shape: approx. normal

Mean: 8 $\frac{\sigma}{\sqrt{n}} = \frac{1.5}{\sqrt{36}} = \frac{1.5}{6}$

Standard error: 1.5/6

c) If you sample ~~one~~ student ($n = 100$), what is the sampling distribution of the sample mean?

Shape: approx. normal

Mean: 8 $\frac{\sigma}{\sqrt{n}} = \frac{1.5}{\sqrt{100}} = \frac{1.5}{10}$

Q2. You take 1000 samples ($n = 64$) of classes, each with sleep times following an *exponential* distribution with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours (same as in Q1).

a) If you were to plot a histogram of the sample means student's sleep times, describe the distribution you would expect to see:

Shape: approx. normal

$$\frac{\sigma}{\sqrt{n}} = \frac{1.5}{\sqrt{64}} = \frac{1.5}{8}$$

Mean: 8

$$\frac{1.5}{8}$$

Standard error: $\frac{1.5}{8}$

b) According to the Central Limit Theorem, which statement is correct?

- The sample mean will equal the population mean when n is large enough
- The individual data points in a sample will follow a normal distribution
- The distribution of sample means will approach a normal distribution
- The population distribution must be normal for the theorem to apply

$$H_0: \mu = 8 \quad H_1: \mu \neq 8$$

Q3. You are interested in whether students sleep on average 8 hours per night. You take one sample of 100 students ($n = 100$) with an average sleep time (\bar{x}) of 7.5 hours and standard deviation (S) of 1. You have decided in advance to reject the null hypothesis if it lies 3 standard errors away from the sample mean.

$$n = 100 \quad \bar{x} = 7.5 \quad S = 1 \quad SE = \frac{S}{\sqrt{n}} = \frac{1}{\sqrt{100}} = \frac{1}{10}$$

a) Describe the sampling distribution.

Shape: exponential

Mean: 7.5

Standard error: $\frac{1}{10}$

$$\bar{x} \pm t \times SE \quad t = \frac{7.5 - 8}{\frac{1}{10}} = -5$$

$$7.5 \pm (-5 \times \frac{1}{10})$$

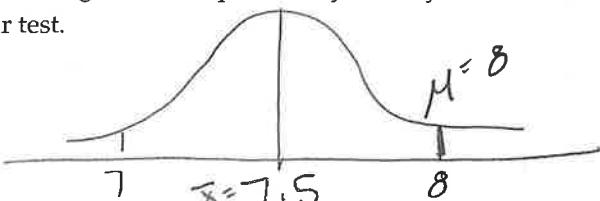
$$7.5 \pm \frac{1}{2}$$

b) Construct the confidence interval for your test.

Lower Bound: 7

Upper Bound: 8

c) Use a figure of the probability density function of the sampling distribution to show the confidence interval for your test.



d) Using this confidence interval, are you able to reject the null hypothesis? YES / (NO)

Q4. A researcher conducts a test of whether students sleep on average 7.8 hours per night with a p-value of 0.12. Describe in one sentence what this p-value means.

If the null hypothesis were true, we'd see results this extreme or more extreme about 12% of the time

Name: Jullius Ketcher

Student ID: 4886994

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Q1. A class's average sleep time follows an *exponential* distribution with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours.

a) If you sample one student ($n = 1$), what is the sampling distribution of the sample mean?

Shape: Exponential

Mean: 8

Standard error: 1.5

b) If you sample 36 students ($n = 36$), what is the sampling distribution of the sample mean?

Shape: Apx Normal $\sqrt{36} \approx 6$

Mean: 8

Standard error: 1.5

c) If you sample one student ($n = 100$), what is the sampling distribution of the sample mean?

Shape: Apx Normal $\sqrt{100} = 10$

Mean: 8

Standard error: 1.5

$$\sqrt{64} = 8$$

Q2. You take 1000 samples ($n = 64$) of classes, each with sleep times following an *exponential* distribution with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours (same as in Q1).

a) If you were to plot a histogram of the sample means student's sleep times, describe the distribution you would expect to see:

Shape: Apx Normal

Mean: 8

Standard error: 1.5 / 8

b) According to the Central Limit Theorem, which statement is correct?

The sample mean will equal the population mean when n is large enough

The individual data points in a sample will follow a normal distribution

The distribution of sample means will approach a normal distribution

The population distribution must be normal for the theorem to apply

Q3. You are interested in whether students sleep on average 8 hours per night. You take one sample of 100 students ($n = 100$) with an average sleep time (\bar{x}) of 7.5 hours and standard deviation (S) of 1. You have decided in advance to reject the null hypothesis if it lies 3 standard errors away from the sample mean.

a) Describe the sampling distribution.

Shape: t-dist, bell-shaped

Mean: 8

Standard error: $\frac{1}{\sqrt{100}} = .1$

b) Construct the confidence interval for your test.

Lower Bound: 7.2

Upper Bound: 7.8

I think this might be wrong, and
if it is, my answers for b), c)
would be wrong. :)

c) Use a figure of the probability density function of the sampling distribution to show the confidence interval for your test.



d) Using this confidence interval, are you able to reject the null hypothesis?

YES NO

Q4. A researcher conducts a test of whether students sleep on average 7.8 hours per night with a p-value of 0.12. Describe in one sentence what this p-value means.

If their null hypothesis is correct, the probability of getting a sample mean of, or more extreme than, 7.8 is .12 and will happen 12% of the time.

Name: Ethan Getgen

Student ID: 4543337

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Q1. A class's average sleep time follows an exponential distribution with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours.

a) If you sample one student ($n = 1$), what is the sampling distribution of the sample mean?

Shape: exponential

Mean: 8

Standard error: .5

$$SE = \frac{s}{\sqrt{n}} = \frac{s}{\sqrt{1}} = s$$

b) If you sample 36 students ($n = 36$), what is the sampling distribution of the sample mean?

Shape: approximately normal

Mean: 8

Standard error: .25

$$SE = \frac{1.5}{\sqrt{36}} = \frac{1.5}{6} = .25$$

c) If you sample one student ($n = 100$), what is the sampling distribution of the sample mean?

Shape: approximately normal | sample size = 100

Mean: 8

Standard error: .15

$$SE = \frac{1.5}{\sqrt{100}} = \frac{1.5}{10} = .15$$

Q2. You take 1000 samples ($n = 64$) of classes, each with sleep times following an exponential distribution with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours (same as in Q1).

a) If you were to plot a histogram of the sample means student's sleep times, describe the distribution you would expect to see:

Shape: approximately normal

Mean: 8

Standard error: .1875

$$SE = \frac{1.5}{\sqrt{64}} = \frac{1.5}{8} = .1875$$

*tighter spread as # of samples increase

b) According to the Central Limit Theorem, which statement is correct?

- The sample mean will equal the population mean when n is large enough
- The individual data points in a sample will follow a normal distribution
- The distribution of sample means will approach a normal distribution

The population distribution must be normal for the theorem to apply — applies regardless of pop dist.

Q3. You are interested in whether students sleep on average 8 hours per night. You take one sample of 100 students ($n = 100$) with an average sleep time (\bar{x}) of 7.5 hours and standard deviation (S) of 1. You have decided in advance to reject the null hypothesis if it lies 3 standard errors away from the sample mean.

a) Describe the sampling distribution.

Shape: approximately normal

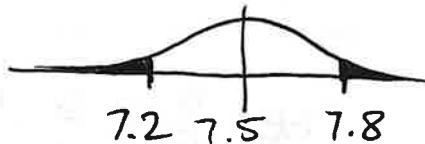
Mean: 7.5

Standard error: .1

$$S = 1$$

$$\bar{x} = 7.5$$

$$SE = \frac{S}{\sqrt{n}} = \frac{1}{\sqrt{100}} = \frac{1}{10}$$

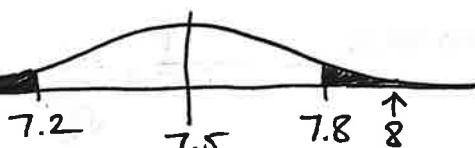
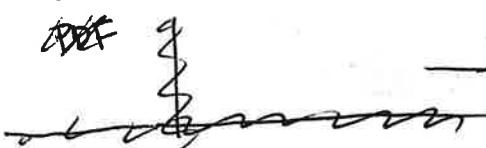


b) Construct the confidence interval for your test.

Lower Bound: 7.2

Upper Bound: 7.8

c) Use a figure of the probability density function of the sampling distribution to show the confidence interval for your test.



d) Using this confidence interval, are you able to reject the null hypothesis?

YES NO

final
YES is answer

Q4. A researcher conducts a test of whether students sleep on average 7.8 hours per night with a p-value of 0.12. Describe in one sentence what this p-value means.

There's a 12% chance that students will sleep at least 7.8 hours or more per night, if the null hypothesis is true.
, or 7.2 hours or less per night,

Name: Hamsa Bandi

Student ID: 4727075

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Q1. A class's average sleep time follows an *exponential* distribution with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours.

a) If you sample one student ($n = 1$), what is the sampling distribution of the sample mean?

Shape: exponential

Mean: 8 hours

$$SE = \frac{1.5}{\sqrt{1}} \quad 1.5$$

Standard error: 1.5 hours

b) If you sample 36 students ($n = 36$), what is the sampling distribution of the sample mean?

Shape: Approx. Normal

Mean: 8 hours

Standard error: 1/4 hours

$$SE = \frac{1.5}{\sqrt{36}} \quad \frac{1.5}{6} \quad \frac{1}{4}$$

c) If you sample one student ($n = 100$), what is the sampling distribution of the sample mean?

Shape: Approx. Normal

Mean: 8 hours

Standard error: .15 hours

$$SE = \frac{1.5}{\sqrt{100}} \quad \frac{1.5}{10}$$

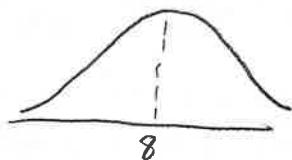
Q2. You take 1000 samples ($n = 64$) of classes, each with sleep times following an *exponential* distribution with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours (same as in Q1).

a) If you were to plot a histogram of the sample means student's sleep times, describe the distribution you would expect to see:

Shape: Approx. Normal

Mean: 8 hours

Standard error: $3/16$ hours



$$\text{SE} = \frac{1.5}{\sqrt{64}}$$

$$\text{SE} = \frac{1.5}{8}$$

$$\frac{3/2}{16/2} = \frac{6}{32} = \frac{3}{16}$$

b) According to the Central Limit Theorem, which statement is correct?

- The sample mean will equal the population mean when n is large enough
- The individual data points in a sample will follow a normal distribution
- The distribution of sample means will approach a normal distribution
- The population distribution must be normal for the theorem to apply

Q3. You are interested in whether students sleep on average 8 hours per night. You take one sample of 100 students ($n = 100$) with an average sleep time (\bar{x}) of 7.5 hours and standard deviation (S) of 1. You have decided in advance to reject the null hypothesis if it lies 3 standard errors away from the sample mean.

a) Describe the sampling distribution.

Shape: t-distribution

Mean: 7.5 hours

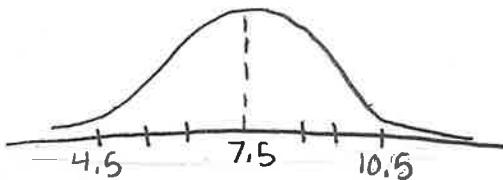
Standard error: 1 hour

b) Construct the confidence interval for your test.

Lower Bound: 4.5

Upper Bound: 10.5

c) Use a figure of the probability density function of the sampling distribution to show the confidence interval for your test.



d) Using this confidence interval, are you able to reject the null hypothesis? YES / NO

Q4. A researcher conducts a test of whether students sleep on average 7.8 hours per night with a p-value of 0.12. Describe in one sentence what this p-value means.

This means if this is true, we would observe a difference from 7.8 hours 12% of the time

Name: Maya Evans

Student ID: 4743118

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Q1. A class's average sleep time follows an *exponential* distribution with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours.

a) If you sample one student ($n = 1$), what is the sampling distribution of the sample mean?

Shape: Exponential

Mean: 8

Standard error: 1.5

$$\frac{1.5}{\sqrt{1}} = 1.5$$

b) If you sample 36 students ($n = 36$), what is the sampling distribution of the sample mean?

Shape: Approaching normal

Mean: 8

Standard error: $\frac{1.5}{\sqrt{36}}$ or $\frac{1.5}{6}$

$$\frac{1.5}{\sqrt{36}} \rightarrow \frac{1.5}{6} \rightarrow \frac{3}{12} \rightarrow \frac{1}{4}$$

c) If you sample ~~one~~ student ($n = 100$), what is the sampling distribution of the sample mean?

Shape: Approximately Normal

Mean: 8

Standard error: $\frac{1.5}{\sqrt{100}}$ or $\frac{1.5}{10}$

$$\frac{1.5}{\sqrt{100}} \rightarrow \frac{1.5}{10}$$

smaller standard error as $n \uparrow$

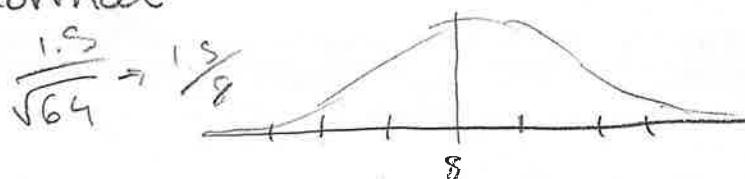
big enough to negate exponential?

Q2. You take 1000 samples ($n = 64$) of classes, each with sleep times following an *exponential* distribution with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours (same as in Q1).

a) If you were to plot a histogram of the sample means student's sleep times, describe the distribution you would expect to see:

Shape: Approximately normal

Mean: 8



Standard error: $\frac{1.5}{\sqrt{64}}$

b) According to the Central Limit Theorem, which statement is correct?

- The sample mean will equal the population mean when n is large enough
- The individual data points in a sample will follow a normal distribution

The distribution of sample means will approach a normal distribution

- The population distribution must be normal for the theorem to apply

Q3. You are interested in whether students sleep on average 8 hours per night. You take one sample of 100 students ($n = 100$) with an average sleep time (\bar{x}) of 7.5 hours and standard deviation (S) of 1. You have decided in advance to reject the null hypothesis if it lies 3 standard errors away from the sample mean.

a) Describe the sampling distribution.

Shape: Approximately normal

Mean: 7.5

$$\frac{1}{\sqrt{100}} = \frac{1}{10}$$

Standard error: $\frac{1}{\sqrt{100}}$

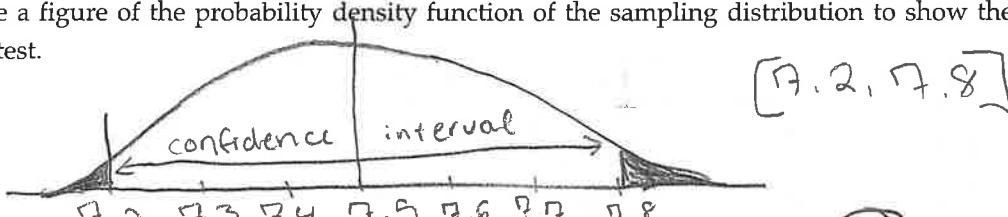


b) Construct the confidence interval for your test.

Lower Bound: 7.2

Upper Bound: 7.8

c) Use a figure of the probability density function of the sampling distribution to show the confidence interval for your test.



[7.2, 7.8]

d) Using this confidence interval, are you able to reject the null hypothesis? YES / NO

Q4. A researcher conducts a test of whether students sleep on average 7.8 hours per night with a p-value of 0.12. Describe in one sentence what this p-value means.

If students truly slept 7.8 (average) hours per night, we would observe this time or greater 12% of the time

Name: Sophia Chebli

Student ID: 4642360

ECON 0150 | MiniExam 3 | Fall 2025

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Academic Conduct Code

The following academic conduct code is designed to protect the integrity of your work. Print your name / initials beside the three academic honesty agreements. I pledge to my fellow students, the university, and the instructor, that:

SC. I will complete this MiniExam solely using my own work.

SC. I will not use any digital resources unless explicitly allowed by the instructor.

SC. I will not communicate directly or indirectly with others during the MiniExam.

Q1. A class's average sleep time follows an exponential distribution with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours.

a) If you sample one student ($n = 1$), what is the sampling distribution of the sample mean?

Shape: exponential

Mean: 8

Standard error: 1.5

$$SE = \frac{\sigma}{\sqrt{n}} = \frac{1.5}{\sqrt{1}} = 1.5$$

b) If you sample 36 students ($n = 36$), what is the sampling distribution of the sample mean?

Shape: exponential

Mean: 8

Standard error: 1.5/6

$$SE = \frac{\sigma}{\sqrt{n}} = \frac{1.5}{\sqrt{36}} = \frac{1.5}{6}$$

c) If you sample ^{one} student ($n = 100$), what is the sampling distribution of the sample mean?

Shape: exponential

Mean: 8

Standard error: 1.5/10

$$SE = \frac{1.5}{\sqrt{100}} = \frac{1.5}{10}$$

Q2. You take 1000 samples ($n = 64$) of classes, each with sleep times following an exponential distribution with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours (same as in Q1).

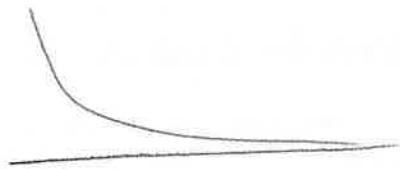
a) If you were to plot a histogram of the sample means student's sleep times, describe the distribution you would expect to see:

Shape: exponential

Mean: 8

Standard error: $\frac{1.5}{\sqrt{64}} = \frac{1.5}{8}$

$$SE = \frac{\sigma}{\sqrt{n}} = \frac{1.5}{\sqrt{64}} = \frac{1.5}{8}$$



b) According to the Central Limit Theorem, which statement is correct?

- The sample mean will equal the population mean when n is large enough
- The individual data points in a sample will follow a normal distribution
- The distribution of sample means will approach a normal distribution
- The population distribution must be normal for the theorem to apply

Q3. You are interested in whether students sleep on average 8 hours per night. You take one sample of 100 students ($n = 100$) with an average sleep time (\bar{x}) of 7.5 hours and standard deviation (S) of 1. You have decided in advance to reject the null hypothesis if it lies 3 standard errors away from the sample mean.

a) Describe the sampling distribution.

Shape: t-distribution

Mean: 7.5

Standard error: $\frac{1}{\sqrt{100}} = \frac{1}{10}$

$$SE = \frac{\sigma}{\sqrt{n}} = \frac{1}{\sqrt{100}} = \frac{1}{10}$$

$$H_0 = 8 \text{ hours}$$

$$n=100$$

$$\bar{x} = 7.5$$

$$S = 1$$

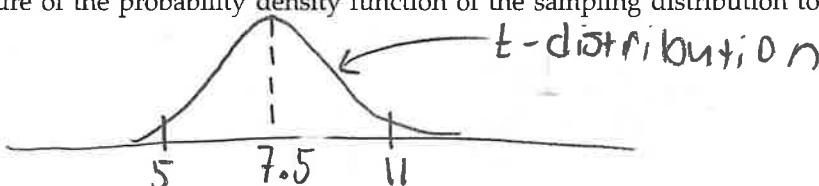
$$8$$

b) Construct the confidence interval for your test.

Lower Bound: 5 hours

Upper Bound: 11 hours

c) Use a figure of the probability density function of the sampling distribution to show the confidence interval for your test.



d) Using this confidence interval, are you able to reject the null hypothesis?

YES / NO

Q4. A researcher conducts a test of whether students sleep on average 7.8 hours per night with a p-value of 0.12. Describe in one sentence what this p-value means.

This p-value tells us that it would be 12% suspected, based on findings, Students Sleep 7.8 hours per night.

Name: Charley Wan

Student ID: 4616524

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Q1. A class's average sleep time follows an exponential distribution with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours.

a) If you sample one student ($n = 1$), what is the sampling distribution of the sample mean?

Shape: exponential

Mean: 8

Standard error: 1.5



b) If you sample 36 students ($n = 36$), what is the sampling distribution of the sample mean?

Shape: approximately normal

Mean: 8

Standard error: 0.25

$$se = \frac{\sigma}{\sqrt{n}} = \frac{1.5}{\sqrt{36}} = \frac{1.5}{6} = 0.25$$

c) If you sample 100 students ($n = 100$), what is the sampling distribution of the sample mean?

Shape: approximately normal

Mean: 8

Standard error: 0.15

$$se = \frac{\sigma}{\sqrt{n}} = \frac{1.5}{\sqrt{100}} = \frac{1.5}{10} = 0.15$$

Q2. You take 1000 samples ($n = 64$) of classes, each with sleep times following an *exponential* distribution with mean (μ) of 8 hours and standard deviation (σ) of 1.5 hours (*same as in Q1*).

a) If you were to plot a histogram of the sample means student's sleep times, describe the distribution you would expect to see:

Shape: approximately normal

Mean: 8 $SE = \frac{\sigma}{\sqrt{n}} = \frac{1.5}{\sqrt{64}} = \frac{1.5}{8} = 0.1875$
 Standard error: 0.1875

b) According to the Central Limit Theorem, which statement is correct?

- The sample mean will equal the population mean when n is large enough
- The individual data points in a sample will follow a normal distribution
- The distribution of sample means will approach a normal distribution
- The population distribution must be normal for the theorem to apply

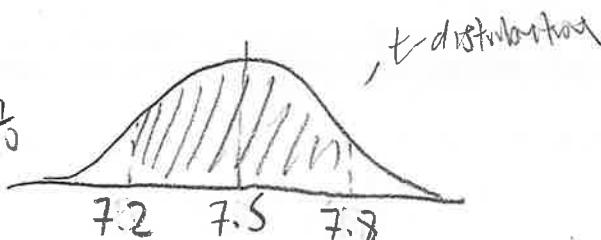
Q3. You are interested in whether students sleep on average 8 hours per night. You take one sample of 100 students ($n = 100$) with an average sleep time (\bar{x}) of 7.5 hours and standard deviation (S) of 1. You have decided in advance to reject the null hypothesis if it lies 3 standard errors away from the sample mean.

a) Describe the sampling distribution.

Shape: approximately normal

Mean: 7.5 $SE = \frac{\sigma}{\sqrt{n}} = \frac{1}{\sqrt{100}} = \frac{1}{10} = 0.1$

Standard error: 0.1

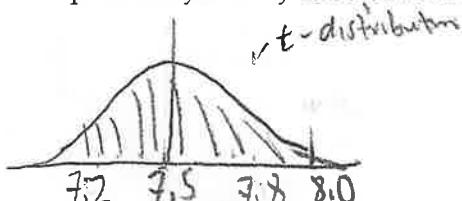


b) Construct the confidence interval for your test.

Lower Bound: 7.2

Upper Bound: 7.8

c) Use a figure of the probability density function of the sampling distribution to show the confidence interval for your test.



d) Using this confidence interval, are you able to reject the null hypothesis? YES / NO

Q4. A researcher conducts a test of whether students sleep on average 7.8 hours per night with a p-value of 0.12. Describe in one sentence what this p-value means.

There is a 12% chance of observing an average sleep time of 7.8 hours per night or more if the null hypothesis is true