L7 HW

- Due Feb 7 at 11:59pm
- Points 14
- Questions 14
- Time Limit None
- Allowed Attempts 3

Instructions

ENGINEERING STATISTICS MATH 330

You get two attempts on all homework quizzes.

In all quizzes and homeworks in this course, round your answers to THREE DECIMAL places unless otherwise indicated.

Take the Quiz Again

Attempt History

	Attempt	Time	Score
KEPT	**Attempt 2**	less than 1 minute	14 out of 14
LATEST	**Attempt 2**	less than 1 minute	14 out of 14
	Attempt 1	8 minutes	12 out of 14

(!) Answers will be shown after your last attempt

Score for this attempt: 14 out of 14
Submitted Feb 6 at 12:49pm
This attempt took less than 1 minute.

⋮⋮

Given that we have a normal distribution with parameters

$\mu = 52 \, and \, \sigma^2 = 16$.

If we collect a random sample of size n = 36 from this distribution, answer the following parts.

Question 1

1 / 1 pts

Part 1: What is the distribution of the sample mean? Select the name of the distribution then put the parameters in the next two parts.

○ Left Skewed.

○ Right Skewed.

◉ Normal.

○ There is no way to tell based on the given information.

Question 2

1 / 1 pts

Part 2: If the distribution of the sample mean had parameters A and B, where A is the mean and B is the variance, then

A =

> 52

Question 3

1 / 1 pts

Part 3: If the distribution of the sample mean had parameters A and B, where A is the mean and B is the variance, then

B =

> 0.444

Question 4

1 / 1 pts

If we collect a random sample of size n = 144 from a distribution that is right skewed and has a mean of 21 and a standard deviation of 5, which of the following statements is true:

○ The distribution of the sample mean will be for sure right skewed.

○ The distribution of the sample mean will be approximately normal by the law of large numbers.

◉ The distribution of the sample mean will be approximately normal by the central limit theorem.

○ The distribution of the sample mean could be right skewed or left skewed, we don't know.

Question 5

1 / 1 pts

If we collect a random sample of size n = 144 from a distribution that is right skewed and has a mean of 21 and a standard deviation of 5, which of the following statements is true?

○ The standard deviation of the distribution of the sample mean will be 5.

○ The standard deviation of the distribution of the sample mean will be 25.

○ The standard deviation of the distribution of the sample mean will be $\frac{5}{144}$.

○ The standard deviation for the distribution of the sample mean will be $\frac{25}{144}$.

◉ The standard deviation of the distribution of the sample mean will be $\frac{5}{12}$.

○ The standard deviation of the distribution of the sample mean will be $\frac{52}{12}$.

⸬

A battery manufacturer claims that the lifetime of a certain type of battery has a mean of 40 hours and a standard deviation of 5. The distribution is known to be normal. Let $\bar{X}$ represent the mean lifetime of the batteries in a simple random sample of size 100. Use this information for all the parts.

⸬

Question 6

1 / 1 pts

Part 1: Find $E(\bar{X})$

| 40 |

⸬

Question 7

1 / 1 pts

Part 2: Find $Var(\bar{X})$

| 0.25 |

⸬

Question 8

1 / 1 pts

Part 3: Find the probability that the sample mean is more than 40.5 hours.

| 0.159 |

⸬

Question 9

1 / 1 pts

Part 4: Find the probability that one of the batteries would last more than 42 hours.

| 0.345 |

⋮⋮

Question 10

1 / 1 pts

Part 5: What is the distribution of the sample mean?

○ Left skewed because the population is left skewed.

○ Right skewed

○ Approximately normal by the law of large numbers.

◉ Approximately Normal by the Central Limit Theorem.

⋮⋮

Question 11

1 / 1 pts

Part 6: If we take the lifetimes of the 100 batteries sampled at random and graph a histogram for them, what would likely be the shape of the histogram?

○ Left skewed

○ Right skewed

◉ Bell shaped

○ There is no way to know what the distribution would be.

⋮⋮

Let $X_1, X_2, \ldots, X_{35}$ be a random sample (all X's are independent and they have the same distribution) from a distribution that is Exponential(8). Use this information for all the parts.

⋮⋮

Question 12

1 / 1 pts

Part 1: What is the value of the expected value of the mean of the X's? That is, find $E(\bar{X})$

0.125

⋮⋮

Question 13

1 / 1 pts

Part 2: What is the distribution of $\bar{X}$?

○ Exactly Exponential.

○ Approximately Exponential.

○ Exactly Normal.

◉ Approximately Normal.

⋮⋮

Question 14

1 / 1 pts

Part 3: What is the probability that exactly ONE of the X's is greater than 1? (Hint start by finding the probability that X_1 is greater than 1)

0.012

Quiz Score: 14 out of 14