Unit 07-06 - Sample Quiz: Central Limit Theorem

Multiple Choice
Identify the choice that best completes the statement or answers the question.

_____   1.

The graph at the right show the frequency distribution of a population with a population mean of 4 and a population standard deviation of 2.5.

If samples of size 25 ($n = 25$) were taken from the population what would be the **<u>mean</u> of the sample means** $\left(\mu_{\bar{x}} \right)$?

Population Distribution

$\sigma = 2.5$

$\mu = 4$

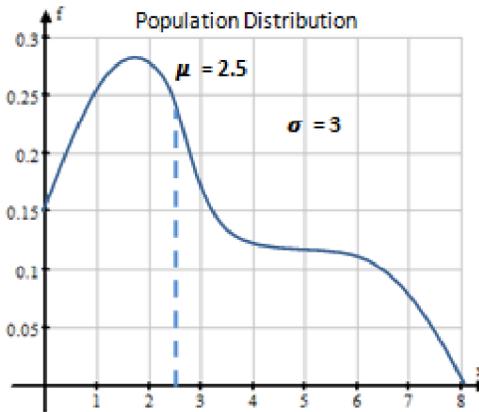a.   0.8   c.   4
b.   1.5   d.   6.5
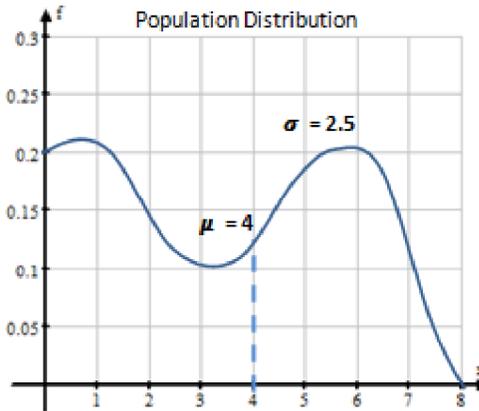
_____   2.

The graph at the right show the frequency distribution of a population with a population mean of **2.5** and a population standard deviation of **3**.

If samples of size 36 ($n = 36$) were taken from the population what would be the **<u>standard deviation</u> of the sample means** $\left(\sigma_{\bar{x}} \right)$?

Population Distribution

$\mu = 2.5$

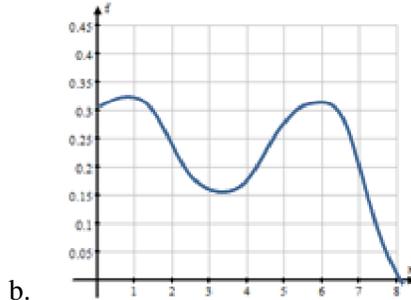$\sigma = 3$
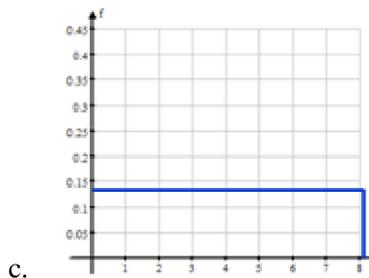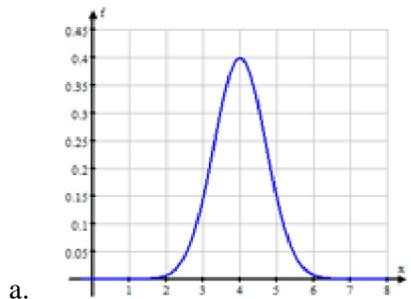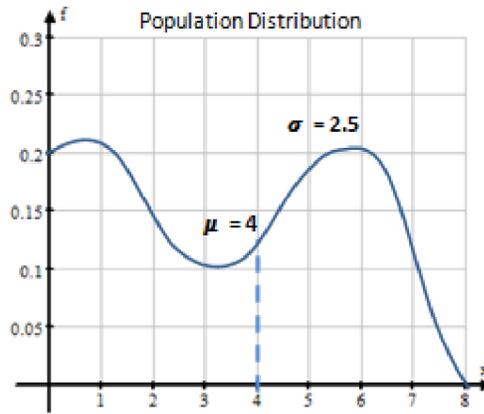
a. $0.08\overline{3}$ c.   1.200
b.   0.500   d.   3.000

____ 3.

The graph at the right show the frequency distribution of a population with a population mean of 2.5 and a population standard deviation of 3.

Population Distribution

$\sigma = 2.5$

$\mu = 4$

If samples of size 25 ($n = 25$) were taken from the population which graph would most likely be a good representation of the distribution of the sample means?

a.

c.

b.

d.
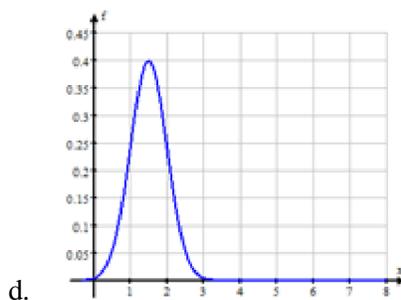
____ 4.

A high school student spends an average of 6 hours ($\mu = 6$) on their phone a day with a standard deviation of 2.5 hours ($\sigma = 2.5$).

If samples of size 16 ($n = 16$) were taken from the population what would be the **mean of the sample means** $\left(\mu_{\bar{x}} \right)$?

a. 1.5   c. 4
b. 2.5   d. 6

_____ 5.

Use the central limit theorem if possible. For a sample of n = 36, find the probability of a sample mean being **greater than 43** given $\mu = 42$ and $\sigma = 12$. The population is also normally distributed.

34.1%   34.1%

13.6%   13.6%

2.3%   2.3%

(Hint: First determine $\mu_{\bar{x}}$ and $\sigma_{\bar{x}}$ and use those values to find $z_{\bar{x}}$)
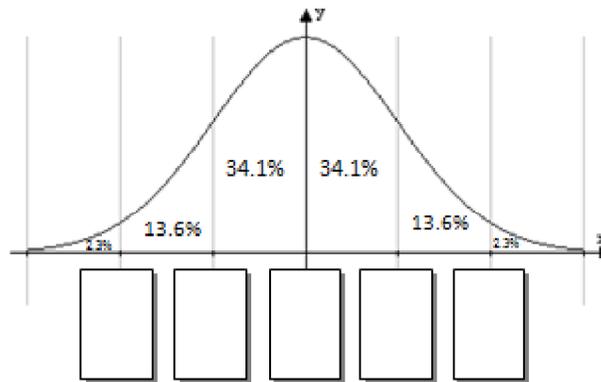
a.   0.3085   c.   0.5332
b.   0.4668   d.   0.6915

_____ 6.

Use the central limit theorem if possible. For a sample of n = 9, find the probability of a sample mean being **less than 7** given $\mu = 8$ and $\sigma = 3$. The population is **not** normally distributed.

34.1%   34.1%

13.6%   13.6%

2.3%   2.3%
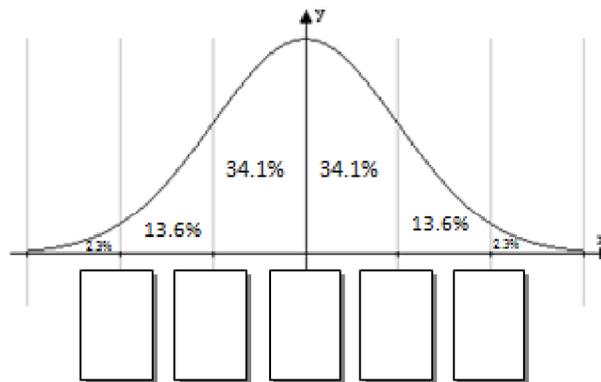
a.   0.1587   c.   0.8413
b.   0.3694   d.   Cannot be determined because the sample
                                                        size is too small.

_____ 7.

At a restaurant near the high school, the restaurant manager has determined that each customer on average spends $9.10 ($\mu = 9.10$) with a standard deviation of $3.00 ($\sigma = 3.00$). The customer data was normally distributed.

A group of 4 friends (*n = 4*) went to the restaurant together and one of the friends bought lunch for entire group. What is the probability that the total bill will be more than $40?
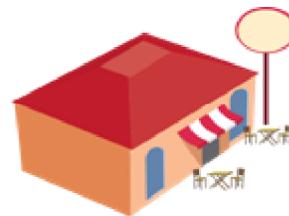
(Hint: This suggests finding the probability that the sample mean would be greater than $10.00.)

a.   12.8%   c.   38.2%
b.   27.4%   d.   42.1%

____ 8.

The length of pregnancies are normally distributed with a mean of 268 days ($\mu = 268$) and a standard deviation of 15 days ($\sigma = 15$).

A group of 36 pregnant women ($n = 36$) were in a parenting class together. What is the probability that the average pregnancy for the women lasted longer than 270 days?

a. 21.2%	c. 55.2%
b. 28.8%	d. 78.8%