STA2023 Module 8 Test

Name_____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Provide an appropriate response.

1) Which of the following is not synonymous with the sampling distribution of the sample mean?

A) Distribution of a variable in a sample of a given size for a given $\bar{x}$

B) Distribution of $\bar{x}$

C) Distribution of all possible sample means from samples of a given size

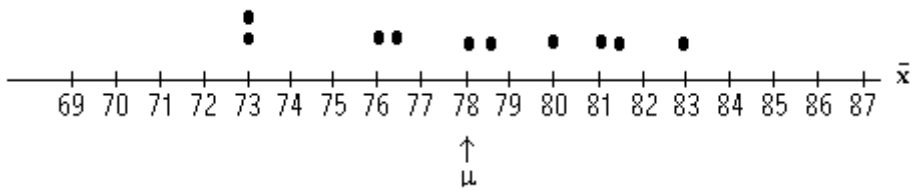
D) Distribution of the variable $\bar{x}$

Answer: A

Objective: (7.1) Know Concepts: Sampling Error

Find the requested probability.

2) The test scores of 5 students are under consideration. The following is the dotplot for the sampling distribution of the sample mean for samples of size 2.



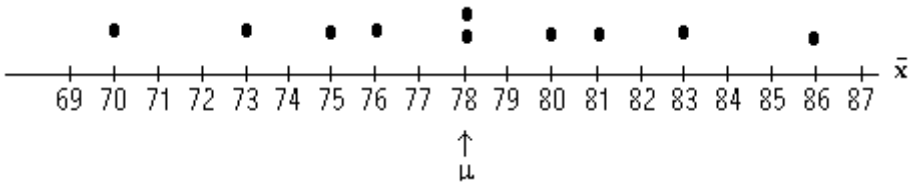
Find the probability, expressed as a percent, that the sample mean will be within 2 points of the population mean.

A) 30% B) 40% C) 60% D) 50%

Answer: D

Objective: (7.1) Find Probability of Specified Sampling Error

3) The test scores of 5 students are under consideration. The following is the dotplot for the sampling distribution of the sample mean for samples of size 2.



Find the probability, expressed as a percent, that the sample mean will be equal to the population mean.

A) 10% B) 30% C) 20% D) 5%

Answer: C

Objective: (7.1) Find Probability of Specified Sampling Error

4) The table reports the distribution of pocket money, in bills, of the 6 students in a statistics seminar.

Student	Hannah	Ming	Keshaun	Tameeka	Jose	Vaishali
Amount, in dollars	2	4	4	5	5	7

For a random sample of size two, find the probability, expressed as a percent rounded to the nearest tenth, that the sample mean will be within $1 of the population mean.

A) 78.6% B) 80.0% C) 73.3% D) 66.7%

Answer: C

Objective: (7.1) Find Probability of Specified Sampling Error

Provide an appropriate response.

5) As a general rule, you cannot expect to exactly determine the sampling distribution of a statistic. Why?

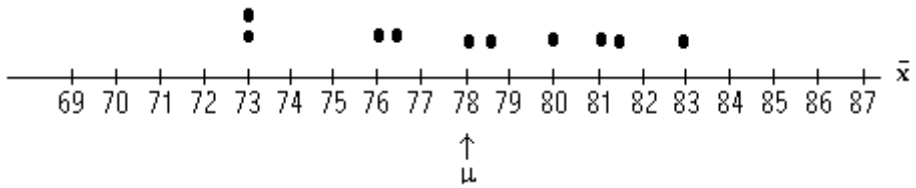
A) Many populations are not normal.
B) Many populations are too large.
C) Many populations are not uniform.
D) Many populations are too small.

Answer: B

Objective: (7.1) Know Concepts: Sampling Error

Find the requested probability.

6) The test scores of 5 students are under consideration. The following is the dotplot for the sampling distribution of the sample mean for samples of size 2.



Find the probability, expressed as a percent, that the sample mean will be within 5 points of the population mean.

A) 80% B) 90% C) 100% D) 95%

Answer: C

Objective: (7.1) Find Probability of Specified Sampling Error

Provide an appropriate response.

7) What generally happens to the sampling error as the sample size is decreased?

A) It gets larger.
B) It gets more predictable.
C) It gets less predictable.
D) It gets smaller.

Answer: A

Objective: (7.1) Know Concepts: Sampling Error

8) How many different samples of size 3 can be obtained from a population of size 5?

A) 1 B) 5 C) 3 D) 10

Answer: D

Objective: (7.1) Know Concepts: Sampling Error

For samples of the specified size from the population described, find the mean and standard deviation of the sample mean $\bar{x}$.

9) The National Weather Service keeps records of rainfall in valleys. Records indicate that in a certain valley, the annual rainfall has a mean of 74 inches and a standard deviation of 16 inches. Suppose the rainfalls are sampled during randomly picked years and $\bar{x}$ is the mean amount of rain in these years. For samples of size 64, determine the mean and standard deviation of $\bar{x}$.

A) $\mu_{\bar{x}} = 74$; $\sigma_{\bar{x}} = 16$
B) $\mu_{\bar{x}} = 2$; $\sigma_{\bar{x}} = 74$
C) $\mu_{\bar{x}} = 74$; $\sigma_{\bar{x}} = 2$
D) $\mu_{\bar{x}} = 16$; $\sigma_{\bar{x}} = 74$

Answer: C
Objective: (7.2) Find Mean/Standard Deviation of Sample Mean

10) The mean and the standard deviation of the sampled population are, respectively, 46.1 and 8.8.
$n = 441$

A) $\mu_{\bar{x}} = 46.1$; $\sigma_{\bar{x}} = 0.4$
B) $\mu_{\bar{x}} = 0.4$; $\sigma_{\bar{x}} = 46.1$
C) $\mu_{\bar{x}} = 27.0$; $\sigma_{\bar{x}} = 4.0$
D) $\mu_{\bar{x}} = 8.8$; $\sigma_{\bar{x}} = 0.4$

Answer: A
Objective: (7.2) Find Mean/Standard Deviation of Sample Mean

Provide an appropriate response.

11) The mean height for a population is 65 inches. Let $\bar{x}$ denote the mean height for a sample of people picked randomly from the population. True or false, the standard deviation of $\bar{x}$ for samples of size 30 is smaller than the standard deviation, σ, of the population?

A) True
B) False

Answer: A
Objective: (7.2) *Know Concepts: Mean/Standard Deviation of Sample Mean

For samples of the specified size from the population described, find the mean and standard deviation of the sample mean $\bar{x}$.

12) One truck from Lakeland Trucking, Inc. can carry a load of 2851.2 lb. Records show that the weights of boxes that it carries have a mean of 75 lb and a standard deviation of 12 lb. For samples of size 36, find the mean and standard deviation of $\bar{x}$.

A) $\mu_{\bar{x}} = 75$; $\sigma_{\bar{x}} = 12$
B) $\mu_{\bar{x}} = 2$; $\sigma_{\bar{x}} = 75$
C) $\mu_{\bar{x}} = 12$; $\sigma_{\bar{x}} = 75$
D) $\mu_{\bar{x}} = 75$; $\sigma_{\bar{x}} = 2$

Answer: D
Objective: (7.2) Find Mean/Standard Deviation of Sample Mean

Provide an appropriate response.

13) The mean height for a population is 65 inches and the standard deviation is 3 inches. Let A and B denote the events described below.

Event A: The height of a randomly selected person is within 3 inches of the population mean.
Event B: The mean height in a random sample of 16 people is within 3 inches of the population mean.

True or false, the probability of event A is greater than the probability of event B?

A) True
B) False

Answer: B
Objective: (7.2) *Know Concepts: Mean/Standard Deviation of Sample Mean

For samples of the specified size from the population described, find the mean and standard deviation of the sample mean $\bar{x}$.

14) The National Weather Service keeps records of snowfall in mountain ranges. Records indicate that in a certain range, the annual snowfall has a mean of 91 inches and a standard deviation of 12 inches. Suppose the snowfalls are sampled during randomly picked years. For samples of size 36, determine the mean and standard deviation of $\bar{x}$.

A) $\mu_{\bar{x}} = 2$; $\sigma_{\bar{x}} = 91$
B) $\mu_{\bar{x}} = 91$; $\sigma_{\bar{x}} = 2$
C) $\mu_{\bar{x}} = 91$; $\sigma_{\bar{x}} = 12$
D) $\mu_{\bar{x}} = 12$; $\sigma_{\bar{x}} = 91$

Answer: B
Objective: (7.2) Find Mean/Standard Deviation of Sample Mean

Provide an appropriate response.

15) Let x represent the number which shows up when a balanced die is rolled. Then x is a random variable with a uniform distribution. Let $\bar{x}$ denote the mean of the numbers obtained when the die is rolled 3 times. Which of the following statements concerning the sampling distribution of the mean, $\bar{x}$, is true?

A) $\bar{x}$ is normally distributed.
B) $\bar{x}$ has a uniform distribution.
C) $\bar{x}$ is approximately normally distributed.
D) None of the above statements is true.

Answer: D
Objective: (7.3) *Know Concepts: Sampling Distribution of Sample Mean

Find the indicated probability or percentage for the sampling error.

16) The amount of coffee that a filling machine puts into an 8–ounce jar is normally distributed with a mean of 8.2 ounces and a standard deviation of 0.18 ounce. What is the probability that the sampling error made in estimating the mean amount of coffee for all 8–ounce jars by the mean of a random sample of 100 jars will be at most 0.02 ounce?

A) 0.8665
B) 0.0938
C) 0.7330
D) 0.0876

Answer: C
Objective: (7.3) Find Probability for Sampling Error

17) The monthly expenditures on food by single adults in one city are normally distributed with a mean of \$410 and a standard deviation of \$70. What is the probability that the sampling error made in estimating the mean monthly expenditure of all single adults in that city by the mean of a random sample of 90 such adults will be at most \$10?

A) 0.8262 B) 0.9131 C) 0.1114 D) 0.9990

Answer: A

Objective: (7.3) Find Probability for Sampling Error

Provide an appropriate response.

18) Let x represent the number which shows up when a balanced die is rolled. Then x is a random variable with a uniform distribution. Let $\bar{x}$ denote the mean of the numbers obtained when the die is rolled 32 times. For samples of size 32, which of the following statements concerning the sampling distribution of the mean is true?

A) $\bar{x}$ is normally distributed.

B) $\bar{x}$ is approximately normally distributed.

C) The distribution of $\bar{x}$ is uniform.

D) None of the above statements is true.

Answer: B

Objective: (7.3) *Know Concepts: Sampling Distribution of Sample Mean

19) The heights of adult women in the U.S are normally distributed. Let $\bar{x}$ denote the mean height for a random sample of 4 women. For samples of size 4, which of the following statements concerning the sampling distribution of the mean is true?

A) $\bar{x}$ is approximately normally distributed.

B) $\bar{x}$ has a uniform distribution.

C) $\bar{x}$ is normally distributed.

D) None of the above statements is true.

Answer: C

Objective: (7.3) *Know Concepts: Sampling Distribution of Sample Mean

Identify the distribution of the sample mean. In particular, state whether the distribution of $\bar{x}$ is normal or approximately normal and give its mean and standard deviation.

20) Let x represent the number that shows up when a balanced die is rolled. Then x is a random variable with a mean of 3.5 and a standard deviation of 1.71. Let $\bar{x}$ denote the mean of the numbers obtained when the die is rolled 36 times. Determine the sampling distribution of $\bar{x}$.

A) Normal, mean = 3.5, standard deviation = 0.05

B) Approximately normal, mean = 3.5, standard deviation = 0.29

C) Normal, mean = 3.5, standard deviation = 0.29

D) Approximately normal, mean = 3.5, standard deviation = 1.71

Answer: B

Objective: (7.3) Find Sampling Distribution of Sample Mean