

AP Statistics
Ch. 9 Sampling Distributions
Multiple Choice Problems
Mr. Dooley

NAME _____

1.) A random sample of size 16 is to be taken from a normal population having mean of 100 and variance 4. What is the 90th percentile of the distribution of \bar{x} ?

- A 97.44
- B 100.08
- C 100.32
- D 100.64
- E 102.56

2.) A random sample of size 25 is to be selected from a normal population having a mean of 81 and a variance of 9. What is the 95th percentile of the sampling distribution of the mean?

- A 80.01
- B 81.99
- C 82.13
- D 82.18
- E 83.96

3.) A sampling distribution of the means of all possible samples of size 100 is formed. The parent population has a mean $\mu = 5$ and a standard deviation $\sigma = 1.4$. What is the value of $\mu_{\bar{x}}$?

- A 0.05
- B 0.14
- C 0.5
- D 1.4
- E 5

4.) The Central Limit Theorem states which of the following for a sample size n ($n > 1$),

- A the shape of the sampling distribution of sample means is always normal.
- B the mean of the set of sample means is always less than the mean of the population
- C the standard deviation of the set of samples means is equal to the standard deviation of the population
- D the mean of the set of sample means is equal to the mean of the population when n is large
- E the standard deviation of the set of sample means is greater than the standard deviation of the population.

5.) A measurable characteristic about an entire population is

- A an experiment
- B a parameter
- C a population
- D a sample
- E a statistic

6.)

Which of the following are true?

- I. The larger the sample, the smaller the spread in the sampling distribution.
- II. Provided that the population size is significantly greater than the sample size, the spread of a sampling distribution is about the same no matter what the sample size.
- III. Sampling distributions from non-normal populations are approximately normal provided n is large.

- (A) II only
- (B) III only
- (C) I and II only
- (D) I and III only
- (E) I, II, and III

7.)

A population has a normal distribution with a mean of 50 and a standard deviation of 10. If a random sample of size 9 is taken from the population, then what is the probability that this sample mean will be between 48 and 54?

- (A) 0.060
- (B) 0.228
- (C) 0.385
- (D) 0.399
- (E) 0.611

8.)

Which of the following is NOT true concerning sampling distributions?

- (A) If the sample size n is large, the sampling distribution of \bar{x} , drawn from a normal population, is approximately normal.
- (B) The mean of the sampling distribution of \hat{p} is equal to the population proportion p .
- (C) The mean of the sampling distribution of the difference of two means $(\bar{x}_1 - \bar{x}_2)$ is equal to the difference of the population means $(\mu_1 - \mu_2)$.
- (D) The standard deviation of the sampling distribution of \bar{x} is σ/\sqrt{n} , where σ is the population standard deviation.
- (E) The standard deviation of the sampling distribution of the differences of two means $\sigma_{\bar{x}_1 - \bar{x}_2}$ is equal to the sum of the respective population standard deviations.

9.)

Which of the following statements is a consequence of the Central Limit Theorem?

- I. If the original population is uniformly distributed, then the sampling distribution of \bar{x} will be uniform for large samples.
- II. The sampling distribution of \bar{x} will be approximately normal for large samples.
- III. The mean of the sampling distribution of \bar{x} will be close to μ for large samples.

- (A) I only
- (B) II only
- (C) III only
- (D) II and III only
- (E) I, II, and III

10.)

If you chose an SRS of size n from a population with a given proportion p , and compute the proportion \hat{p} of the sample then the

- (A) sampling distribution of \hat{p} is approximately normal provided $n\hat{p}$ and $n(1 - \hat{p})$ are > 10
- (B) mean of the sampling distribution of \hat{p} is equal to $\frac{p}{\sqrt{n}}$
- (C) standard deviation of the sampling distribution is $\sqrt{np(1 - p)}$
- (D) sampling distribution of \hat{p} is closer to a normal distribution when n is very small
- (E) sampling distribution of \hat{p} is left skewed for values of $\hat{p} < 0.5$ and $n\hat{p} > 10$ and $n(1 - \hat{p}) > 10$

11.)

. The average number of pushups a United States Marine does daily is 300, with a standard deviation of 50. A random sample of 36 Marines is selected. What is the probability that the sample mean is at most 320 push-ups?

- (A) 0.0082
- (B) 0.3446
- (C) 0.6554
- (D) 0.8767
- (E) 0.9918

12.)

A consequence of the Central Limit Theorem is that for n sufficiently large ($n \geq 30$), if all samples of size n are taken, the mean of the sample means $\mu_{\bar{x}}$ is equal to the population mean μ . Since the mean of the sampling distribution is equal to the population mean, \bar{x} is referred to as

- (A) a biased estimator
- (B) an unbiased estimator
- (C) a random estimator
- (D) a controlled variable
- (E) a parameter

Answers : 1-d, 2-b, 3-e, 4-d, 5-b, 6-d, 7-e, 8-e, 9-d, 10-a, 11-e, 12-b