

Name _____

Date _____

AP. Statistics - Mr. Bannon

Period _____

Unit 9 Review
Part I - Multiple Choice

- 1) Which of the following best describes the sampling distribution of a sample mean?
- (a) It is the distribution of all possible sample means of a given size.
 - (b) It is the particular distribution in which $\mu_{\bar{x}} = \mu$ and $\sigma_{\bar{x}} = \sigma$.
 - (c) It is a graphical representation of the means of all possible samples.
 - (d) It is the distribution of all possible sample means from a given population.
 - (e) It is the probability distribution for each possible sample size.
- 2) To use a normal approximation to the binomial, which of the following does *not* have to be true?
- (a) $np \geq 5$, $n(1-p) \geq 5$ (or: $np \geq 10$, $n(1-p) \geq 10$).
 - (b) The individual trials must be independent.
 - (c) The sample size in the problem must be too large to permit doing the problem on a calculator.
 - (d) For the binomial, the population size must be at least 10 times as large as the sample size.
 - (e) All of the above are true.
- 3) In a large population, 55% of the people get a physical examination at least once every two years. An SRS of 100 people are interviewed and the sample proportion is computed. The mean and standard deviation of the sampling distribution of the sample proportion are
- (a) 55, 4.97
 - (b) 0.55, 0.002
 - (c) 55, 2
 - (d) 0.55, 0.0497
 - (e) The standard deviation cannot be determined from the given information.

4) Thirty-one percent of motorists in the state drive domestic cars. In a random sample of 150 motorists, what is the probability that between 40 and 50 drive domestic cars?

- A. 0.36
- B. 0.41
- C. 0.57
- D. 0.68
- E. 0.74

5) Suppose that 75% of computer users have made a purchase online. In a random sample of 200 computer users, what is the probability that less than 65% have made a purchase online?

- A. 0.0005
- B. 0.3707
- C. 0.4602
- D. 0.6293
- E. 0.9995

6) Which of the following are true?

- I. If a population is not normally distributed, $\mu_{\bar{x}} = \mu$ and $\sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}}$.
- II. A sampling distribution consists of a set of all sized samples taken from a population.
- III. In all sampling distributions, $\mu_{\bar{x}} = \mu$, $\sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}}$, all samples making up the sampling distribution must be the same size.

- A. I only
- B. III only
- C. I and II
- D. I and III
- E. II and III

7) A sampling distribution is formed from samples of size 9 taken from a population with $\mu = 81$ and $\sigma = 36$. What is the mean and standard deviation of the sampling distribution?

- A. 9, 6
- B. 81, 4
- C. 9, 12
- D. 81, 12
- E. 9, 4

Unit 9 Review

Part II - Free Response

- 1) Which of the following is/are true of the central limit theorem? (More than one answer might be true.)
- I. $\mu_{\bar{x}} = \mu$.
 - II. $\sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}}$ (if $N \geq 10n$).
 - III. The sampling distribution of a sample mean will be approximately normally distributed for sufficiently large samples, regardless of the shape of the original population.
 - IV. The sampling distribution of a sample mean will be normally distributed if the population from which the samples are drawn is normal.
- 2) Crabs off the coast of Northern California have a mean weight of 2 lbs with a standard deviation of 5 oz. A large trap captures 35 crabs.
- (a) Describe the sampling distribution for the average weight of a random sample of 35 crabs taken from this population.
 - (b) What would the mean weight of a sample of 35 crabs have to be in order to be in the top 10% of all such samples?

3) A population is highly skewed to the left. Describe the shape of the sampling distribution of \bar{x} drawn from this population if the sample size is (a) 3 or (b) 30.

4) A certain type of light bulb is advertised to have an average life of 1200 hours. If, in fact, light bulbs of this type only average 1185 hours with a standard deviation of 80 hours, what is the probability that a sample of 100 bulbs will have an average life of at least 1200 hours?

5) Approximately 10% of the population of the United States is known to have blood type B. If this is correct, what is the probability that between 11% and 15%, inclusive, of a random sample of 500 adults will have type B blood?