MTH 150 Test 3
Fall 2017
Name _____

Elementary Statistics

Justify all answers by showing your work or by providing a coherent explanation. Please circle your answers

1. The mean birth weight for 1000 birth weights in the Boston City Hospital is 112.0 oz. with a standard deviation of 20.6 oz. What would be the margin of error in predicting the true mean of the Boston population birth weights ? (at a 98% confidence level)

a. 2.13 **b.** 1.52 **c**. 24 **d.** 1.0 **e.** 1.96

2. Six healthy three year old female sheep were injected with the antibiotic Gentamicin, at a dosage of 10 mg/kg body weight. Their blood serum concentrations (mg/ml) of Gentamicin after injection were 33, 26, 34, 31, 23, and 25. The summary statistics for these data are

n	$\bar{x}$	s
6	28.67	4.59

The 90% confidence interval for the population mean score on this test is:

a. (27.412, 30.145) **b.** (24.48, 29.10) **c**. **(**24.902, 32.438**)**
d. (32.48, 39.55) **e.** na

3. The average level of some enzyme for a sample of 10 individuals, was found to be 22. Assume that the population follows a normal distribution with variance of 45. Then the 99% confidence interval for the true average level would be

a. (26.58, 28.462) **b.** (15.3, 27. 95) **c**. (16.58, 27.46)
d. (14.96, 29.04) **e.** na

4. A researcher wants to estimate a population proportion with a margin of error of 0.05. What is the smallest sample size for which the sample proportion would be within 0.05 of the actual population proportion for 95% of all random samples?

a. 30 **b.** 100 **c**. 193 **d.** 385 **e.** 1000

5. To conduct a research project on whether college students purchase textbooks, the number of students to sample needs to be calculated. To estimate the population proportion, we decide to use a 95% level of confidence. The desired margin of error is plus or minus 0.10. There is no prior estimate of the population proportion. What sample size should be used?

a. 97 **b.** 5 **c**. 25 **d.** 68 **e.** 40

6. The variance in waiting times (in minutes) of 10 attendees at Bethel Woods, where attendees enter a single waiting line that feeds three checkpoint windows is 0.227 minutes. A 95% confidence interval for the population variance would be

a. (0.122, 0.510) **b.** (0.685, 0.811) **c**. (0.108, 0.757)
d. (1.960, 2.250) **e.** na

7. A 95% confidence interval for a population proportion calculated using data from a random sample of size $n = 500$ is (0.13, 0.73). Which of the following is the margin of error of this interval?

a. 0.60 **b.** 0.30 **c**. 0.15 **d.** 0.95 **e.** 0.45

8. We observed 28 successes in 70 Bernoulli trials. Compute a 95% confidence interval to estimate the population proportion of successes.

9. When 16 cigarettes of a particular brand were tested in a laboratory for the amount of tar content, it was found that the mean tar content was 18.3 mg with $s = 1.8$ mg. Set a 95% confidence interval for the mean tar content, μ, in the population of cigarettes of this brand.

10. The average heights of a random sample of 400 people from a city is 1.75 m. It is known that the heights of the population are random variables that follow a normal distribution with a variance of 0.16. For a confidence level of 90%, what would the minimum sample size need to be in order for the true mean of the heights to be less than 2 cm from the sample mean?

11. On day two of a study on body temperatures, 106 temperatures were taken. Suppose that we only have the first 10 temperatures to work with. The mean and standard deviation of these 10 scores were 98.44°F and 0.30°F , respectively. Construct a 95% confidence interval for the mean of all body temperatures.

12. Captopril is a drug designed to lower systolic blood pressure. When subjects were tested with this drug, their systolic blood pressure readings (in mm of mercury) were measured before and after the drug was taken, with the results given in the following table. (Assume a normal distribution of readings)

Construct a 95% confidence interval to estimate the true mean difference between the before and after readings.

BEFORE	***AFTER***	***difference***
200	191	-9
174	170	-4
198	177	-21
170	167	-3
179	159	-20
182	151	-31
193	176	-17
209	183	-26
185	159	-26
155	145	-10
169	146	-23
210	177	-33
	mean ->	-18.58
standard deviation ->		10.10