

Name _____

Date: _____

AP Statistics - Mr. Bannon

Period _____

Unit 11 - Review

Part I - Multiple choice

1) Which of the following best describes what we mean when say that t -procedures are *robust*?

- a. The t -procedures work well with almost any distribution.
- b. The numerical value of t is not affected by outliers.
- c. The t -procedures will still work reasonably well even if the assumption of normality is violated.
- d. t -procedures can be used as long as the sample size is at least 40.
- e. t -procedures are as accurate as z -procedures.

2) Using a sample size of 25, what is the critical t -value for a 95% confidence interval?

- A. 1.708
- B. 1.711
- C. 2.060
- D. 2.064
- E. 2.172

3) When a sample size of 12 is used to perform a two-sided test for the mean, a t -value of 2.1 is significant to what level?

- A. Between 0.5% and 1%
- B. Between 1% and 2.5%
- C. Between 2.5% and 5%
- D. Between 5% and 10%
- E. Between 10% and 15%

4) It has been calculated that a 99% confidence interval for the difference between two population means is (12.4, 19.3). Which of the following are true?

- I. The probability that the real difference is between 12.4 and 19.3 is 0.99.
- II. There is a 1% chance that the real difference is less than 12.4 and a 1% chance that the real difference is greater than 19.3.
- III. We are 99% confident that the real difference in population means is between 12.4 and 19.3.

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

5) Which of the following are true statements?

- I. The shape of the t -distributions changes as the sample size decreases.
- II. The t -distributions are mound-shaped and symmetric.
- III. The t -distributions may be used wherever the z -distribution is appropriate.

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

6) A gasoline additive is being tested to determine the amount of improvement that can be expected in gas mileage. Twelve cars are randomly selected to be included in the study. The results are given below. Construct a 95% confidence interval for the improvement in gas mileage.

Before Additive	17	22	23	19	18	19	24	23	19	22	21	20
After Additive	19	22	25	21	24	21	24	25	21	25	22	21

- A. 1.92 ± 0.80
- B. 1.92 ± 0.81
- C. 1.92 ± 0.88
- D. 1.92 ± 0.98
- E. 1.92 ± 0.99

For problems 7. The following data was collected from 30 college students as to the number of miles they drive, one way, to college.

7	9	6	18	24	9	17	16	32	24
17	34	18	18	45	24	29	30	16	19
6	26	9	17	30	17	2	19	24	4

7) What would be the margin of error for a 95% confidence interval?

- A. 3.00
- B. 3.44
- C. 3.57
- D. 3.72
- E. 4.70

8) Which of the following are true statements?

- I. The area under the curve of the t -distribution between ± 1 standard deviation is greater when $d.f. = 5$ than when $d.f. = 10$.
- II. There is less area in the tails, beyond ± 3 standard deviations, of the t -distribution when $d.f. = 5$ than when $d.f. = 10$.
- III. For a given α , the critical t -value increases as $d.f.$ decreases.

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

- 9) Two manufacturers sell boxes of cereal with a net weight listed as 28 ounces. A testing company wants to determine the difference in average weight in the two brands of cereal. The same number of boxes of each brand of cereal will be tested. A preliminary study has shown that the standard deviation in weight for each brand is 0.28 ounces. How many boxes of each cereal must be included in the study to be 95% sure of being within 0.1 ounces of the actual difference in average weight?
- A. 43
 - B. 61
 - C. 64
 - D. 74
 - E. 105

Part II - Free Response

- 1) A professor at a large state college has been teaching statistics for many years. She tells her classes that she thinks females generally score higher on statistics tests than do males. This caused such a debate among the faculty that they decided to conduct a study. Thirty-five female and 32 male students are randomly selected from the several hundred students who take statistics classes each year. A common test is administered to these students. The following chart summarizes the results of the study.

	\bar{x}	s	n
Females	71.2	3.9	35
Males	68.9	3.5	32

~~Construct individual 95% confidence intervals for the females and for the males. Comment on the confidence intervals. Construct a 95% confidence interval for the difference in the averages between the females and the males. Comment on how this compares to the individual confidence intervals.~~

2) A group of 175 married couples are enrolled in a study to see if women have a stronger reaction than men to videos that contain violent material. At the conclusion of the study, each couple is given a questionnaire designed to measure the intensity of their reaction. Higher values indicate a stronger reaction. The means and standard deviations for all men, all women, and the differences between husbands and wives are as follows:

	\bar{x}	s
Men	8.56	1.42
Women	8.97	1.84
Difference (Husband–Wife)	-0.38	1.77

Do the data give strong statistical evidence that wives have a stronger reaction to violence in videos than do their husbands?

3) An avid reader, Booker Worm, claims that he reads books that average more than 375 pages in length. A random sample of 13 books on his shelf had the following number of pages: 595, 353, 434, 382, 420, 225, 408, 422, 315, 502, 503, 384, 420. Do the data support Booker's claim? Test at the 0.05 level of significance.

4) The local farmers association in Cass County wants to estimate the mean number of bushels of corn produced per acre in the county. A random sample of 13 1-acre plots produced the following results (in number of bushels per acre): 98, 103, 95, 99, 92, 106, 101, 91, 99, 101, 97, 95, 98. Construct a 95% confidence interval for the mean number of bushels per acre in the entire county. The local association has been advertising that the mean yield per acre is 100 bushels. Do you think it is justified in this claim?

5) The statistics teacher, Dr. Tukey, gave a 50-point quiz to his class of 10 students and they didn't do very well, at least by Dr. Tukey's standards (which are quite high). Rather than continuing to the next chapter, he spent some time reviewing the material and then gave another quiz. The quizzes were comparable in length and difficulty. The results of the two quizzes were as follows.

Student	1	2	3	4	5	6	7	8	9	10
Quiz 1	42	38	34	37	36	26	44	32	38	31
Quiz 2	45	40	36	38	34	28	44	35	42	30

Do the data indicate that the review was successful, at the .05 level, at improving the performance of the students on this material? Give good statistical evidence for your conclusion.