

Sample of Material from MAT124 at Broome Community College

This material is for sample purposes only and is not to be considered as an official listing of topics.

1. Mark each of the questions as T (true) or F (false).

- a) _____ The following is a possible null hypothesis: $H_0 : \bar{x} = 0$
- b) _____ The median is a resistant measure.
- c) _____ Typically we know the value of a population parameter.
- d) _____ In a normal distribution with mean 2 and standard deviation 3, about 68% of the values will fall between -1 and 5 .
- e) _____ Using anecdotal evidence is typically a poor way to understand information about a population.
- f) _____ If the p-value is 0.05 , then the probability that the null hypothesis is correct is $.05$.
- g) _____ The following are statistics: σ and μ .
- h) _____ If a sample of 65 results in a 95% confidence interval for μ of $(7.8, 9.4)$, then there is a 95% chance that μ is between 7.8 and 9.4 .

2. What sample size should be chosen to find the mean number of absences per month by school children to within 0.2 at a 90% confidence level if it is known that the standard deviation is 1.1 ?

3. Construct a box plot using the data below. The mean is 72.6 and the standard deviation is 12.79 . Which better represents the data set, the box plot or the mean and standard deviation?

76 35 72 77 63 65 87 73 84 86 79 80 77 65 70

4. Which of the following sets of 4 numbers has the largest standard deviation?

- a) $7,8,9,10$
- b) $5,5,5,5$
- c) $0,0,10,10$
- d) $0,4,5,10$

5. A marketing research firm wishes to determine if the adult men in Laramie, Wyoming would be interested in a new upscale men's clothing store. From a list of all residential addresses in Laramie, the firm selects a simple random sample of 100 and mails a brief questionnaire to each. The population of interest is:

- a) All residential addresses in Laramie, Wyoming.
- b) All adult men in Laramie, Wyoming
- c) The 100 addresses that the survey was mailed to.
- d) The men that responded to the survey

6. The average number of daily emergency room admissions at a hospital is 85 with a standard deviation of 37 . (10 points)

- a) On any given day, what is the probability that the number of emergency admissions is between 75 and 95 ?
- b) In a random sample of 30 days, what is the probability that the mean number of daily emergency admissions is between 75 and 95 ?

7. Assume that scores on the Math SAT exam are normally distributed with a mean of 500 and a standard deviation of 100. What score would put a student in the 80th percentile?

8. An efficiency expert conducts a study to determine the effect of sleep on work production in an electronics assembly plant. She interviews 30 people who claim to sleep under 7 hours per night and 30 who claim to sleep over 7 hours per night. In each group she calculates the mean number of pieces assembled per day.

- a) Explain why this is an observational study and not an experiment.
- b) Give an example of a possible confounding variable with an explanation, in the context of this study.
- c) If the mean number of pieces assembled is statistically significantly greater for those who sleep over 7 hours per night, is it reasonable to encourage all employees to sleep over 7 hours per night?
- d) How could the efficiency expert design a related experiment to study the effect of sleep on work production?

9. The back to back stem plot below gives the average bowling scores of males and female participants in the finals of a national tournament. (4 points)

Males		Females	Leaf unit = 1.0
997632	28	6	
88421	27	25	
80	26	378	
3	25	0267	
1	24	028	
23	89		

Answer true or false for the following:

- a) _____ The same number of male and female bowlers participated.
- b) _____ The male scores are skewed, while the female scores are roughly symmetric.
- c) _____ The median and mean female scores are roughly equal
- d) _____ The median male score is greater than the mean male score.

10. In crash tests of 15 Honda minivans, collision repair costs are found to have a distribution that is roughly bell shaped, with a mean of \$1786 and a standard deviation of \$937. Construct a 95% confidence interval for the mean repair costs in all such vehicles. If someone who owns this minivan chooses not to have collision insurance, how much money would you recommend being saved in case of a repair from a collision?

11. The manufacturer of a new car claims that a typical car gets 26 mpg. An independent consumer group is skeptical of this claim and thinks that the mean gas mileage for this car is less than 26 mpg. To try to justify its contention, the consumer group conducts mileage tests on 30 randomly selected cars of this model and finds the mean gas mileage to be 25.23 mpg and the standard deviation to be 1.4 mpg. At the 1% significance level, does the data support the consumer group's conjecture?

N	Mean	StDev	SE Mean	Upper Bound	T	P
30	25.2300	1.4000	0.2556	25.6643	-3.01	0.003

12. On the GRE verbal test, sixty-eight women had a mean of 538.82 and a standard deviation of 114.16. Eighty-six men had a mean of 525.23 and a standard deviation of 97.23. Use a 0.05 level of significance to test the claim that the mean verbal score for women is greater than the mean verbal score for men.

Sample	N	Mean	StDev	SE Mean
1	68	539	114	14
2	86	525.2	97.2	10

Difference = mu (1) - mu (2)
 Estimate for difference: 13.5900
 95% lower bound for difference: -15.1781
 T-Test of difference = 0 (vs >): T-Value = 0.78 P-Value = 0.218 DF = 131