I.

a. The maximum error of estimate is a function of three factors: the level of confidence, sample size and standard deviation. T-F, and why or why not?

b. Explain the difference between a point estimate and an interval estimate.

II.

1. Consider a population with µ 63.7 and σ = 4.31.

(A) Calculate the z-score for x = 62.8 from a sample of size 47.  
(B) Could this z-score be used in calculating probabilities using Table 3 in Appendix B of the text?  Why or why not?

**2.** Given a level of confidence of 99% and a population standard deviation of 8, answer the following:  
(A) What other information is necessary to find the sample size (n)?  
(B) Find the Maximum Error of Estimate (E) if n = 98.  Show all work.

**3.** A sample of 102 golfers showed that their average score on a particular golf course was 88.55 with a standard deviation of 4.27.    
Answer each of the following (***show all work***  
and state the final answer to ***at least two decimal places***.):  
(A) Find the 95% confidence interval of the mean score for all 102 golfers.  
(B) Find the 95% confidence interval of the mean score for all golfers if this is a sample of 135 golfers instead of a sample of 102.  
(C) Which confidence interval is smaller and why?

**4.** Assume that the population of heights of male college students is approximately normally distributed with mean ** of 68.14 inches and standard deviation ** of 5.38 inches. A random sample of 66 heights is obtained.  Show all work.

(A)  Find the mean and standard error of the x distribution   
(B)  Find P(x > 67.25)

**5.** The diameters of grapefruits in a certain orchard are normally distributed with a mean of 5.72 inches and a standard deviation of 0.57 inches.  Show all work.   
(A)  What percentage of the grapefruits in this orchard is larger than 5.66 inches?   
(B)  A random sample of 100 grapefruits is gathered and the mean diameter is calculated. What is the probability that the sample mean is greater than 5.66 inches?

**6.** A researcher is interested in estimating the noise levels in decibels at area urban hospitals. She wants to be 99% confident that her estimate is correct.  If the standard deviation is 4.92, how large a sample is needed to get the desired information to be accurate within 0.71 decibels?  Show all work.

III.

**1.** Consider a normal population with µ = 25 and σ = 8.0.  
(A)    Calculate the standard score for a value x of 22.  
(B)    Calculate the standard score for a randomly selected sample of 30 with x = 22.  
(C)    Explain why the standard scores of 22 are different between A and B above.

**2.** Assume that a sample is drawn and z(α/2) = 1.65 and σ = 25.  Answer the following questions:  
   
(A)If the Maximum Error of Estimate is 0.05 for this sample, what would be the sample size?  
   
(B)Given that the sample Size is 400 with this same z(α/2) and σ, what would be the Maximum Error of Estimate?  
   
(C)What happens to the Maximum Error of Estimate as the sample size gets larger?  
   
(D)What effect does the answer to C above have to the size of the confidence interval?

**3.** Assume that the mean score on a certain aptitude test across the nation is 100, and that the standard deviation is 20 points.  Find the probability that the mean aptitude test score for a randomly selected group of 150 8th graders is between 101.5 and 98.5.

**4.** By measuring the amount of time it takes a component of a product to move from one workstation to the next, an engineer has estimated that the standard deviation is 3.63 seconds.   
Answer each of the following (show all work):  
(A) How many measurements should be made in order to be 95% certain that the maximum error of estimation will not exceed 2.0 seconds?   
   
(B) What sample size is required for a maximum error of 0.5 seconds?

**5.** A 95% confidence interval estimate for a population mean was computed to be (36.2, 48.8). Determine the mean of the sample, which was used to determine the interval estimate (show all work).

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| **6.** A study was conducted to estimate the mean amount spent on birthday gifts for a typical family having two children. A sample of 180 was taken, and the mean amount spent was $219.76. Assuming a standard deviation equal to $41.77, find the 99% confidence interval for m, the mean for all such families (show all work). |

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| **7.** A confidence interval estimate for the population mean is given to be (35.85, 44.80).  If the standard deviation is 12.298 and the sample size is 41, answer each of the following (show all work):    (A) Determine the maximum error of the estimate, E.    (B) Determine the confidence level used for the given confidence interval. |

IV.

1. What is the relationship between α and Type I Error?
2. What decision is reached when the *p*-value is greater than α?