

Take your time and make sure you follow all instructions. Where necessary, work must be shown in order to receive partial credit. Include input into the calculator in order to receive partial credit.

1. Determine ONLY the H_O and H_A for the following claims. [4 pts each]
 - a) An area transportation department spokesman claims the average weight of vehicles in the area is different than the national average of 3125 pounds.

 - b) An urban doctor claims that the city she practices in has a flu rate in area patients that is below the national rate of 12.5%.

2. Decide if the following will be True or False under the assumption that everything else remains the same. [2 pts each]
 - a) If the margin of error is decreased the confidence level is increased.

 - b) If the confidence level is decreased the sample size is decreased.

 - c) Multiplying the sample size by a third will cause the margin of error to be increased by a factor of 9.

3. Nationally 21.8% of families have incomes over \$100,000. A magazine publisher would like to know the proportion of subscribers who have annual incomes over \$100,000. They will survey a simple random sample of subscribers. What size sample would need to be selected to find a 98% confidence interval for the proportion within 2.5 percentage points. [12 pts]
4. An entomologist samples a field for egg masses of a harmful insect by placing a yard-square frame at random locations and carefully examining the ground within the frame. A simple random sample of 75 locations selected from a county's pasture land found egg masses in 13 locations. (a) Give a 95% confidence interval for the proportion of all possible locations that are infested. Construct the interval by hand, but your calculator can be used to check your results. Make sure the appropriate conditions are met. (b) Would the entomologist be justified in saying that 20% of all locations are infested with the insect? Why or Why not? [13 pts]

- 5 An randomized comparative experiment on the effect of dietary calcium on blood pressure is performed. One group received calcium the other placebo. The 27 members in the group that received the placebo had a mean seated systolic blood pressure of 114.9 with a standard deviation of 9.3. (a) Determine the 99% confidence interval for the mean. Construct the interval by hand, but your calculator can be used to check your results. Make sure the appropriate conditions are met. (b) What does the 99% confidence interval mean? [13 pts]

6. A certain breed of dog has adult weights that are normally distributed with a mean of 52 pounds and a standard deviation of 6 pounds. If a random sample of 16 is selected what is the probability the mean is less than 50 pounds. Be sure to check the necessary conditions. [13 pts]

7. A university's athletic department claims that the women's team does not make free throws at the same national rate of 61.4%. During the season the team was observed to make 100 free throws out of a random sample of 150 shots. Perform a 5% test using the given hypothesis. Make sure the appropriate conditions are met, show the work for calculating the test statistics, show the p -value, and write a conclusion. [20 pts]

$$H_O : p = 0.614$$

$$H_A : p \neq 0.614$$

8. A bank wonders if deleting an annual credit card fee for customers will cause customers to charge more than the bank's average of \$2400 in a year. A random sample of 95 customers is given the special promotion. After the first year the sample charged an average of \$2510 with a standard deviation of \$450. Perform a 5% test using the given hypothesis. Make sure the appropriate conditions are met, show the work for calculating the test statistics, show the p -value, and write a conclusion. [20 pts]

$$H_0 : \mu = \$2400$$

$$H_A : \mu > \$2400$$