

**Lab 6**

- 1) Each of the following is a confidence interval for  $\mu$  = true average resonance frequency (Hz) for all tennis rackets of a certain type:  
 (114.4, 115.6) and (114.1, 115.9)
  - a) What is the value of the sample mean resonance frequency?
  - b) Both intervals were calculated from the same sample data. The confidence level for one of these intervals is 90% and for the other is 99%. Which of the intervals has the 90% confidence level and why?
- 2) In a random sample of 400 adults and 600 teenagers who watched a certain TV program, 100 adults and 300 teenagers indicated that they liked it.
  - a) Construct a 99% confidence intervals for the difference in proportions of all adults and all teenagers who watched the program and liked it.
  - b) Is there a difference between the proportion of adults and teenagers who liked the program? Justify your answer.
- 3) An experiment produces the following data:  
 2480, 1510, 1690, 1740, 1900, 2000, 2030, 2100, 2190, 2200, 2290, 2390  
 Find a 95% CI for  $\sigma$ .
- 4) Given  $n_1 = 8$ ,  $\bar{x}_1 = 546$ ,  $s_1 = 31$  and  $n_2 = 4$ ,  $\bar{x}_2 = 492$ ,  $s_2 = 26$ 
  - a) Find a 98% confidence interval for  $\frac{\sigma_1^2}{\sigma_2^2}$ .
  - b) Are the population variances different? Justify your answer.
- 5) The management of a supermarket wanted to investigate whether the male customers spend less than female customers. A sample of 20 female customer showed that they spend an average of \$96 with a standard deviation of \$14.40. Another sample of 25 male customer showed that they spend an average of \$80 with a standard deviation of \$17.50. Assume the amounts spent by all male and female customers are normally distributed with equal but unknown population variance.
  - a) Construct a 99% confidence interval for the difference between the mean amount spent by all female and male customers at this supermarket.
  - b) Are male customers spent less on average? Justify your answer.
- 6) By referring to the dataset pulse.csv given in lab 4, answer the following questions.
  - a) Find a 90% confidence interval for the ratio between the population variances of male and female resting pulse rate.
  - b) Is the population variance equal or unequal? Justify your answer.
  - c) Find a 90% confidence interval for the difference between the population means of male and female resting pulse rate.
  - d) On average, is there a difference in the population means of male and female resting pulse rate? If yes, which gender has a faster resting pulse rate on average? Justify your answer.