EXERCISES CHAPTER 4

CONFIDENCE INTERVAL

1. A study was carried out to estimate the average life of a large shipment of light bulbs. Previous studies indicated that the standard deviation is known to be 100 hours. A random sample of 50 light bulbs was selected and indicated that the sample average life was 350 hours. Construct a 95% confident interval estimate of the true average life for light bulbs in this shipment.

2. An experiment was conducted with two types of engines, A and B. Gas mileages in miles per gallon were measured. Fifty experiments were conducted using engine Type A and 75 experiments were done for Engine Type B. The gasoline used and other conditions were held constant. The average gas mileage for Engine A was 42 miles per gallon and that for Engine B was 36 miles per gallon. Find a 96% confidence interval for the difference between the gas mileages for the two types of engines. Assume that population standard deviations of gas mileages are 6 and 8 for engines A and B.

3. A survey was conducted to estimate the proportion of the households with a personal computer. From the 300 households surveyed, 75 had a personal computer. Find a 95% confidence interval for the proportion in the population who has a personal computer.

4. Does the M&M corporation use the same proportion of red candies in its plain and peanut varieties? A random sample of 56 plain M&Ms contained 12 red candies, and another random sample of 32 peanut M&Ms contained 8 red candies. Using 95% confidence interval, can you conclude that there is a difference in the proportions of red candies for the plain and peanut varieties? Explain.
HYPOTHESIS TESTING

1. A lecturer claims that the medical students put in more hours studying compared to other students. The mean number of hours spent studying per week for other students is 23 hours with a standard deviation of 3 hours per week. A sample of 25 medical students was selected at random and the mean number of hours spent studying per week was found to be 25 hours.

2. An experiment is done to test strength of two types of glasses. A sample of 12 pieces of glasses has a mean strength of 40 kg and a standard deviation of 2 kg. A sample of 13 pieces of glasses has a mean strength of 38 kg and a standard deviation of 2.5 kg. Test at 5% significance level that the mean strength of the two types of glasses is the same. Assume the two population variances are equal.

3. A manufacturer claimed that at least 95% of the machine equipment he supplied to a factory conformed to specifications. An examination of a sample of 200 pieces of equipment revealed that 18 were faulty. Test his claim at a significance level of 0.01.

4. Two separate surveys were carried out to investigate whether or not the user of Plus highway were in favor of raising the speed limit on highways. From the 250 car drivers interviewed, 220 were in favor of raising the speed limit while from the 200 motorist interviewed, 180 were in favor.

   i) Find a 95% confident interval for the difference in proportion between the car drivers and motorist who are in favor of raising the speed limit.

   ii) Test hypothesis for the difference between car drivers and motorist who were in favor of raising the speed limit on highways at 1% significance level.