1. An IT competency test, used for staff recruitment, is devised so as to give a normal distribution of scores with a mean of 100. A random sample of 49 experienced IT users who are given the test achieve a mean score of 121 with a standard deviation of 14.

   - Perform a hypothesis test to assess whether this group of IT Users is unusual (i.e. have a different mean from the general population).
   - Compute a 95% confidence interval for the group.

2. A sample of 50 households in one community shows that 10 of them are watching a TV special on the national economy. In a second community, 15 of a random sample of 50 households are watching the TV special. We test the hypothesis that the overall proportion of viewers in the two communities does not differ, using the 1 percent level of significance, as follows:

3. The mean height of adult males is 69 inches and the standard deviation is 2.5 inches. The mean height of adult females is 65 inches and the standard deviation is 2.5 inches. Let population 1 be the population of male heights, and population 2 the population of female heights. Suppose samples of 50 each are selected from both populations.

4. The quality control manager at the Telektronic Company considers the production of telephone answering machines to be out of control when the overall rate of defects exceeds 4%. Testing of a random sample of 150 machines revealed that 9 are defective. The production manager claims that production is not out of control and no corrective action is necessary. Use a 0.05 significance level to test the production managersclaim.

5. In a study of company salaries, salaries paid by 2 different IT companies were randomly selected.

   - For 40 Deltatech employees the mean is 23,870 and the standard deviation is 2960.
   - For 35 Echelon employees , the mean is 22,025 and the standard deviation is 3065.

   At the 0.05 level of significance, test the claim that Deltatech employees earn the same as their Echelon counterparts.

6. A bank is concerned about the amount of debt being accrued by customers using its credit cards. The board of directors voted to institute an expensive monitoring system if the mean for all the banks customers is greater than 2000.

   - The bank randomly selected 50 credit-card holders and determined the amounts they charged.
   - For this sample group, the mean is 2177and the standard deviation is 1257.

   Using a 0.05 level of significance, test the claim that the mean amount charged is greater than 2000. Will the monitoring system be implemented?

7. A random sample of 100 resistors revealed that 5 were outside specification. You are requested to construct a 95% confidence interval for the proportion of resistors that are defective (outside specification).

   If the company wished to estimate the defective rate to within + or - 2% with 99% confidence, how big a sample would need to be undertaken to provide the relevant information?

8. A study was carried out in which researchers collected crime data. Of those convicted of arson, 50 were drinkers and 43 abstained. Of those convicted of fraud, 63 were drinkers and 144 abstained. Use a 0.01 level of significance to test the claim that the proportion of drinkers among convicted arsonists is greater than the proportion of drinkers convicted of fraud.

9. A survey, carried out at a major flower and gardening show, was concerned with the association between the intention to return to the show next year and the purchase of goods at this year's show.

   - There were 220 people interviewed and of these 101 had made a purchase; 69 of these people said they intended to return next year.

   - Of the 119 who had not made a purchase, 68 said they intended to return next year.

   By testing the difference between the proportions of purchasers and non-purchasers who intend to return next year, examine whether there is sufficient evidence to justify concluding that the intention to return depends on whether or not a purchase was made.

10. Does it pay to take preparatory courses for standardised tests such as the Comptia Exams?

    Using the sample data in the following table, compute the case-wise differences, the mean of the case-wise differences and the standard deviation of the case wise differences for the following data set.

Student	A	B	C	D	E	F	G	H	I	J
Score Before	700	840	830	860	840	690	830	1180	930	1070
Score After	720	840	820	900	870	700	800	1200	950	1080