MA4603/MA4505 Tutorial for Week 7 : Confidence intervals

Question 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.

Compute a 95% confidence interval for the group.

Question 2

A well-known polling company estimates that 57% of Irish voters support a new constitutional amendment. 800 people were randomly surveyed and asked about their voting preferences. 482 of the 800 people responded positively to the amendment. You are required to:

i. (1 Mark) Obtain a point estimate of the proportion of people supporting the constitutional amendment.

ii. (2 Marks) Construct a 95% confidence interval for the proportion of people in favour of the constitutional amendment.

Question 3 (Old mid-term exam paper)

Q2. Paired t-Test (11 Marks)

The typing speeds for one group of eight IT students were recorded both at the beginning of year 1 of their studies and at the end of year 4. The results (in words per minute) are given below:

Subject	A	B	C	D	E	F	G	H
Year 1	173	183	176	191	184	177	175	177
Year 4	172	184	180	190	191	187	181	183

A study was carried out to determine whether students improve in terms of typing speed over the four years of their university studies. A significance level of 5% is used.
There are 11 questions listed below, with 1 mark awarded for each correct answer.

i. Briefly explain the difference between paired samples and independent samples.

ii. Compute the case-wise differences.

ii. Compute the mean of the case-wise differences.

iv. Compute the standard deviation of the case-wise differences.

v. Formally state the null hypothesis.

vi. Formally state the alternative hypothesis.

vii. Compute the standard error for mean of case-wise differences.

Question 4

An insurance company wants to estimate the percentage of drivers who talk on their mobile phones while driving.

A random sample of 850 drivers results in 544 who talk on their mobile phones while driving.

(a) Find the point estimate of the percentage of all drivers who talk on their cell phones while driving.

(b) Find a 95% interval estimate of the percentage of all drivers who talk on their cell phones while driving.

Question 5

A manufacturer of computer monitors has, for many years, used a process giving a mean working life of 4700 hours for components.

A new process is tried to see if it will increase the life significantly. A sample of 100 monitors gave a mean life of 5000 hours, with a standard deviation of 1400 hours.

i. Compute a 95% confidence interval for the mean life of components built using the new process.