

L11QUE: Quantitative Economics
L11QUM: Quantitative Methods
L11MES: Mathematical and Economic Statistics

Tutorial 4

1. A random sample of 16 bags of a chemical were tested to estimate the mean impurity content. It is known that the impurity content is distributed normally. The sample mean impurity content was 20.4 grams, and the sample standard deviation was 6.4 grams. Find the 95% confidence interval for the population mean.
2. An auditor takes a random sample of 400 invoices relating to the activities of a company in a particular year. The sample mean of the invoices is £250 and the sample standard deviation is £64. Find a 95% confidence interval for the population mean of the company invoices in the same year.
3. A production process produces bottles of shampoo. If the process is operating correctly, the contents weight of these bottles will have a mean of 20 ounces. A random sample of four bottles was drawn. The sample mean contents weight was 19.54 ounces, and the sample standard deviation was 0.52 ounces. It is known that the weight of the bottles follows a normal distribution. Test at the 5% significant level, against a two-sided alternative, the null hypothesis that the population mean is 20 ounces.
4. A telemarketing group claim that, after training, employees will earn an average of £1,500 in their first month of work. A random sample of 150 employees is drawn. Sample mean earnings for the first month of work were £1,262 and the sample standard deviation was £432. Test at the 5% significance level the null hypothesis that the population mean is £1,500, against the alternative that it is less than £1,500.
5. Explain what the following hypothesis testing terms mean:
 - (a) Type I and Type II errors
 - (b) Test Power (L11QUE/MES students only)