

Department of Mathematics, Bennett University
EMAT203L (Probability and Statistics)
Tutorial sheet 5

1. Installation of a certain hardware takes a random amount of time with a standard deviation of 5 minutes. A computer technician installs this hardware on 64 different computers, with the average installation time of 42 minutes. Compute a 95% confidence interval for the mean installation time.
2. The equatorial radius of the planet Jupiter is measured 40 times independently by a process that is practically free of bias. These measurements give average of 71492 kilometers with a standard deviation of 28 kilometers. Find a 90% confidence interval for the equatorial radius of Jupiter.
3. Suppose that when a signal having value μ is transmitted from location A the value received at location B is normally distributed with mean μ and variance σ^2 . To reduce error, suppose the same value is sent 9 times. If the successive values received are 5, 8.5, 12, 15, 7, 9, 7.5, 6.5, 10.5, let us construct a 95 percent confidence interval for μ .
4. The number of concurrent users for some internet service provider has always averaged 5000 with a standard deviation of 800. After an equipment upgrade, the average number of users at 100 randomly selected moments of time is 5200. Does it indicate, at a 5% level of significance, that the mean number of concurrent users has increased? Assume that the standard deviation of the number of concurrent users has not changed.
5. The breaking strengths of cables produced by a manufacturer is normally distributed, and have a mean of 1800 pounds (lb) and a standard deviation of 100 lb. By a new technique in the manufacturing process, it is claimed that the breaking strength can be increased. To test this claim, a sample of 50 cables is tested and it is found that the mean breaking strength is 1850 lb. Can we support the claim at the 0.01 significance level?
6. A machinist is making engine parts with axle diameters of 0.7 inch. A random sample of 10 parts shows a mean diameter of 0.742 inch with a standard deviation of 0.040 inch. Test the hypothesis whether the work is meeting the specifications at 5% level of significance. Assume that axle diameters are normally distributed.
7. A group of 50 Internet users were asked how much they spent per year on the Internet. The collected data has mean \$304.6. It is desired to test that they spend \$325 per year versus it is different from \$325. Assume that the standard deviation of true expenditure is \$101.5. What is your conclusion for 5% level of significance?
8. The means of two large samples of 1000 and 2000 members are 675 inches and 680 inches, respectively. Can the samples be regarded as drawn from the same population of standard deviation 25 inches? Test at 5% level of significance.
9. In a certain factory there are two independent processes manufacturing the same item. The weight of the items produced by the two processes have same standard deviation of 13 pounds. The average weight in a sample of 250 items produced from one process is found to be 120 pounds, while the average weight in a sample of 400 items from the other process is 124 pounds. At 5% level of significance test the hypothesis that there is significant difference in the weights of items produced by two processes.
10. Samples of sizes 8 and 7 of two types of electric light bulbs were tested for their length of life, for which average means are found to be 1234 hrs and 1036 hrs, and standard deviations as 36 hrs. and 40 hrs., respectively. Assume that their true variances are same.
Is the difference in the sample means sufficient to warrant that type I is superior to type II regarding length of life? Test at 10% level of significance.