

Review chapter 9 (2)

- 1) Various temperature measurements are recorded at different times for a particular city. The mean of 20°C is obtained for 40 temperatures on 40 different days. Assuming that $\sigma = 1.5^{\circ}\text{C}$. Test the claim that the population mean is 22°C , use a 0.05 significant level.
- 2) A simple random sample of 15-year-old boys from one city is obtained and their weights are listed below. Use a 0.01 significance level to test the claim that these sample weights come from a population with a mean smaller than 150. Assume that the standard deviation of the weights of all 15-year-old boys in the city is known to be 16.7 and population has normal distribution.
150 138 158 151 134 189 157 144 175 127 164
- 3) A machine dispenses a liquid drug into bottles in such a way that the standard deviation of the contents is 40 milliliters. A new machine is tested on a sample of 24 containers and the standard deviation for this sample group is found to be 72ml. At the 0.05 level of significance, test the claim that the amounts dispensed by the new machine have a greater standard deviation. 7
- 4) Tins of baked beans are packed in boxes of 24. Results from a random sample of 25 boxes delivered to supermarkets show that a total of 8 tins were damaged. Assess the claim that less than 2% of tins are damaged during delivery. Use $\alpha = 0.04$. 10
- 5)
- 6) Determine whether the hypothesis test involves a sampling distribution of means that is a normal distribution, Student t distribution, or neither.
Claim: $\mu = 959$, sample data: $n = 25$, sample mean = 951, sample standard deviation = 25. The sample data come from a normally distributed population.
A) Neither B) Normal C) Student
- 7) Test the claim that for the population of female college students, the mean weight is given by $\mu > 132$ lb. Sample data are summarized as $n = 20$, sample mean = 137, and $s = 14.2$ lb. Use a significance level of $\alpha = 0.1$. Assume that sample has been selected from a normally distributed population.
- 8) In tests of a computer component, it is found that the mean time between failures is 520 hours. A modification is made which is supposed to increase the time between failures. Test on a random sample of 10 modified components resulted in the following times (in hours) between failures: 518 548 561 523 536 499 538 557 528 563.
At the 0.05 significance level, test the claim that for the modified components, the mean time between failures is greater than 520 hours.
- 9) Find critical values based on the given information: $H_1: \sigma < 0.629$; $n = 19$; $\alpha = 0.025$.
- 10) A machine dispenses a liquid drug into bottles in such a way that the standard deviation of the contents is 40 milliliters. A new machine is tested on a sample of 24 containers and the standard deviation for this sample group is found to be 72ml. At the 0.05 level of significance, test the claim that the amounts dispensed by the new machine have a greater standard deviation.
- 11) A user of a certain gauge of steel wire suspects that the standard deviation of its breaking strength, in newton (N), is different from the value of 0.75 as specified by the manufacturer. Consequently the users test the breaking strength of each of a random sample of nine lengths of wire and obtains the following results: 72.1 74.5 72.8 75 73.4 75.4 76.1 73.5 74.1. Assume

that breaking strength to be normally distributed, test, at the 10% level of significance, the manufacturer's specification.

- 12) A machine which manufactures black polythene dustbin bags is known to produce 3% defective bags. Following a major breakdown of the machine, extensive repair work is carried out which may result in a change in the percentage of defective bags produced. To investigate this possibility, a random sample of 200 bags is taken from the machine's production and a count reveals 12 defective bags. What may be concluded? Use $\alpha = 0.03$.
- 13) Tins of baked beans are packed in boxes of 24. Results from a random sample of 25 boxes delivered to supermarkets show that a total of 8 tins were damaged. Assess the claim that less than 2% of tins are damaged during delivery. Use $\alpha = 0.04$.