



Term 2 W9 Revision: Hypothesis Testing

Questions

1 DHS JC2 Mid-Year CT 9758/2018/02/Q1

The government of a particular country reported that the mean monthly water consumption of households is 17.9 m^3 . This is followed by a nationwide water conservation campaign to encourage households to reduce their water consumption. Subsequently after the campaign, the water consumption $x \text{ m}^3$ of a random sample of 50 households is recorded and their data are summarised as follows.

$$\sum (x - 15) = 103, \quad \sum (x - 15)^2 = 599.$$

- (i) Find unbiased estimates of the population mean and variance. [2]
- (ii) Test at the 5% significance level whether the campaign is effective.

State, giving a reason, whether any assumption about the distribution of the monthly water consumption of households is needed in order for the test to be valid. [4]

- (iii) Explain the meaning of '5% significance level' in the context of the question. [1]

2 RI Prelim 9758/2020/02/Q7

In a factory, machines pack sugar into bags of 1 kg each on average, with variance $\sigma^2 \text{ kg}^2$. The manufacturer is concerned that the machines are putting too much sugar into the bags and decides to carry out a hypothesis test. A random sample of 8 bags are selected and their total mass is 8.4 kg.

- (i) Stating a necessary assumption, carry out a test of the manufacturer's concern at the 5% significance level if $\sigma = 0.08$. [5]
- (ii) Use an algebraic method to calculate the range of values of σ^2 for which the null hypothesis would not be rejected at the 5% significance level. [3]

3 ACJC Prelim 9758/2019/02/Q7 modified

A concert promoter claims that the mean price of a ticket to a pop concert is \$200. A media company took a large random sample of n tickets, and found that the average ticket price for the sample is \$206. If the standard deviation of ticket price is known to be \$32.25, find the minimum value of n such that there is sufficient evidence at the 4% level of significance to reject the concert promoter's claim. [4]