Confidence intervals – A2 Further Mathematics Statistics

1. June/2022/Paper_7367/03S/No.5

The mass, X, in grams of a particular type of apple is modelled using a normal distribution.

A random sample of 12 apples is collected and the summarised results are

$$\sum x = 1038 \quad \text{and} \quad \sum x^2 = 90\,100$$

(a) A 99% confidence interval for the population mean of the masses of the apples is constructed using the random sample.

Show that the confidence interval is (81.7, 91.3) with values correct to three significant figures.

[4 marks]

(b) Padraig claims that the population mean mass of the apples is 85 grams.

He carries out a hypothesis test at the 1% level of significance using the random sample of 12 apples.

The hypotheses are

H_0: $\mu = 85$

H_1: $\mu \neq 85$

State, with a reason, whether the null hypothesis is accepted or rejected.

[1 mark]

(c) Interpret, in context, the conclusion to the hypothesis test in part **(b)**.

[1 mark]