AQA – Inferences – one sample t – distributions – A2 Further Mathematics Statistics

1. June/2020/Paper_3/No.7

The rainfall per day in February in a particular town has been recorded as having a mean of 1.8 inches.

Sienna claims that rainfall in February has increased in the town. She records the rainfall in a random sample of 12 days.

Her sample mean is 2 inches and her sample standard deviation is 0.4 inches.

It is assumed that rainfall per day has a normal distribution.

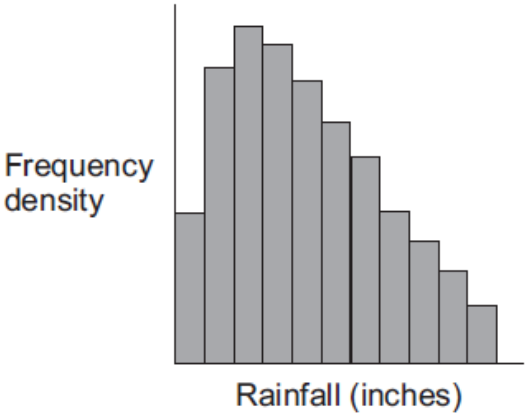
(a) Investigate Sienna's claim using the 5% level of significance.

[6 marks]

(b) For the test carried out in part **(a)**, state in context the meaning of a Type II error.

[1 mark]

(c) The distribution of rainfall per day in February in the town over 10 years is shown in the histogram.



Explain whether or not the assumption that rainfall per day in February has a normal distribution is appropriate.

[1 mark]

2. June/2019/Paper_3/No.7

A shopkeeper sells chocolate bars which are described by the manufacturer as having an average mass of 45 grams.

The shopkeeper claims that the mass of the chocolate bars, X grams, is getting smaller on average.

A random sample of 6 chocolate bars is taken and their masses in grams are measured. The results are

$$\sum x = 246 \quad \text{and} \quad \sum x^2 = 10\,198$$

Investigate the shopkeeper's claim using the 5% level of significance.

State any assumptions that you make.

[9 marks]