1 A garage sells tyres. The number of customers arriving at the garage to buy tyres in a 10-minute period is modelled by a Poisson distribution with mean 2

(a) Find the probability that

(i) fewer than 4 customers arrive to buy tyres in the next 10 minutes,

(ii) more than 5 customers arrive to buy tyres in the next 10 minutes.

(3)

The manager randomly selects 20 non-overlapping, 30-minute periods.

(b) Find the probability that there are between 4 and 7 (inclusive) customers arriving to buy tyres in exactly 15 of these 30-minute periods.

(4)

The manager believes that placing an advert in the local paper will lead to a significant increase in the number of customers arriving at the garage.
A week after the advert is placed, the manager randomly selects a 25-minute period and finds that 10 customers arrive at the garage to buy tyres.

(c) Test, at the 5% level of significance, whether or not there is evidence to support the manager's belief.
State your hypotheses clearly.

(5)

(d) Explain why the Poisson distribution is unlikely to be valid for the number of tyres sold during a 10-minute period.

(1)

DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

Question 1 continued

Question 1 continued

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA

Question 1 continued

(Total for Question 1 is 13 marks)