3. During Monday afternoons, customers are known to enter a certain shop at a mean rate of 7 customers every 10 minutes.

(a) Suggest a suitable distribution to model the number of customers that enter this shop in a 10-minute interval on Monday afternoons.

(1)

(b) State **two** assumptions necessary for this distribution to be a suitable model of this situation.

(2)

A new shop manager wants to find out if the rate of customers has changed since they took over.

(c) Write down suitable null and alternative hypotheses that the shop manager should use.

(1)

The shop manager decides to monitor the number of customers entering the shop in a random 10-minute interval next Monday afternoon.

(d) Using a 3% level of significance, find the critical region to test whether the rate of customers has changed.

(3)

(e) Find the actual significance level of this test based on your critical region from part (d)

(2)

During the random 10-minute interval that Monday afternoon, 12 customers entered the shop.

(f) Comment on this finding, using the critical region in part (d)

(2)

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 3 continued

Question 3 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 3 continued

(Total for Question 3 is 11 marks)