Leave blank

6. Sarah makes clay pots in batches of size n. The clay pots need to be fired in a kiln. Sarah finds that 30% of the clay pots crack when they are fired. The remainder do not crack.

(a) Explain what assumptions need to be made to model with a binomial distribution the number of clay pots in a batch that crack when fired.

(2)

Sarah makes and fires a batch of 8 clay pots.

(b) Write down the expected number of clay pots that crack.

(1)

(c) Find the probability that exactly 2 clay pots crack.

(2)

The probability that at least k clay pots crack is 0.0113

(d) Find the value of k.

(2)

Sarah attends a course to improve her pottery skills. She claims that the course will reduce the proportion of clay pots that crack when fired.

After completing the course Sarah makes a batch of 20 clay pots to assess her claim.

(e) Stating your hypotheses clearly, determine the critical region for the hypothesis test she must use to assess her claim using a 5% significance level.

(3)

(f) Write down the actual significance level of this test.

(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

Leave blank

Question 6 continued

Leave blank

Question 6 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

Leave blank

Question 6 continued

(Total 11 marks)

Q6