1. A researcher repeats, independently, 100 trials of a task.

The number of successes is X and the probability of success on each trial is 0.05

(a) Find $P(X = 2)$

(2)

(b) Use a suitable Poisson approximation to estimate $P(X = 2)$

(2)

(c) Calculate the percentage error in this approximation.

(2)

(d) State the conditions under which the Poisson distribution may be used as an approximation to the binomial distribution.

(1)

The random variable Y has a Poisson distribution with mean λ such that

$$P(Y = 6) = 0.1601 \text{ and } P(Y = 7) = 0.1418$$

(e) By forming and solving 2 equations, find the value of λ to 2 significant figures. Show your working clearly.

(4)

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Question 1 continued

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Question 1 continued

(Total for Question 1 is 11 marks)