

Geometric Distribution Q2 [6 marks] (10/6/21)

Exam Boards

OCR : Statistics (Year 1)

MEI: Statistics a

AQA: -

Edx: Statistics 1 (Year 2)

Repeated independent trials of an experiment are carried out. On each trial the probability of success is $\frac{1}{5}$.

(i) Find the probability that the 1st success occurs after the 5th trial. [3 marks]

(ii) Find the probability that the 2nd success occurs on the 10th trial. [3 marks]

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Solution

(i) Probability = Probability that 1st 5 trials are failures [1 mark]

$$= \left(\frac{4}{5}\right)^5 = 0.32768 \text{ (5sf) or } 0.328 \text{ (3sf) [2 marks]}$$

(ii) Probability = Probability that there is exactly one success in the 1st 9 trials, and then a success on the 10th trial [1 mark]

$$= \binom{9}{1} \left(\frac{1}{5}\right)^1 \left(\frac{4}{5}\right)^8 \times \frac{1}{5} = 0.060398 \text{ (5sf) or } 0.0604 \text{ (3sf) [2 marks]}$$