

(12 marks)

(i) Fill in the boxes below to form a 95% confidence interval for the population proportion of successes, p .

(1 mark)

5

(1 mark)

(1 mark)

- The mathematician uses a population that is known to have a population proportion of 0.35. They take 50 independent, randomly generated samples of size 100 and calculate 50 independent 95% confidence intervals.

The population proportion of 0.35 is represented as a horizontal dashed line.



PLEASE TURN OVER

(c) Let X be the number of 95% confidence intervals that *will not* contain the population proportion out of 100 independent 95% confidence intervals to be calculated.

- $$X \sim B\left(\begin{array}{|c|} \hline \\ \hline \end{array}, \begin{array}{|c|} \hline \\ \hline \end{array}\right)$$

(1) exactly five 95% confidence intervals that *will not* contain the population proportion.

(2) at least one 95% confidence interval that *will not* contain the population proportion.

(d) Determine the minimum number of independent 95% confidence intervals that would need to be calculated to have a greater than 0.5 probability of having at least one 95% confidence interval that *will not* contain the population proportion.

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