6. The random variable X has a binomial distribution $X \sim \mathrm{B}(n, p)$

Given that

$$\text{variance of } X = \frac{9}{10} \times \text{mean of } X$$

(a) find the value of p

(2)

The distribution of X is approximated by Y with a Poisson distribution with mean λ

Given that $Y \sim \mathrm{Po}(\lambda)$ and $\mathrm{P}(Y = 19) = \mathrm{P}(Y = 20)$

(b) find the value of n

(5)

(c) State whether or not the Poisson approximation is reasonable in this case.
Give a reason for your answer.

(1)

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(Total for Question 6 is 8 marks)