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2014 11b The probability that it rains on any particular day during the 30 days of November is 0.1. Write an expression for the probability that it rains on fewer than 3 days in November. **2**

Let $p = P(\text{not rains}) = 0.9$, $q = P(\text{rains}) = 0.1$.

$$\begin{aligned} P(\text{rains on 0, 1 or 2 days}) &= \binom{30}{0} p^{30} + \binom{30}{1} p^{29} q + \binom{30}{2} p^{28} q^2 \\ &= 0.9^{30} + \binom{30}{1} 0.9^{29} 0.1 + \binom{30}{2} 0.9^{28} 0.1^2 \end{aligned}$$

State Mean:
1.22

* These solutions have been provided by [projectmaths](#) and are not supplied or endorsed by BOSTES.

Board of Studies: Notes from the Marking Centre

Candidates who recognised and correctly used the binomial expansion gained full marks.

Common problems were:

- not understanding what was meant by 'fewer than 3 days'
- not including the probability of rain on 'no days'.

Source: http://www.boardofstudies.nsw.edu.au/hsc_exams/2014/pdf_doc/2014-maths-ext-1.pdf