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<b>09</b>	<b>9a</b>	Each week Van and Marie take part in a raffle at their respective workplaces. The probability that Van wins a prize in his raffle is $\frac{1}{9}$ . The probability that Marie wins a prize in her raffle is $\frac{1}{16}$ . What is the probability that, during the next three weeks, at least one of them wins a prize?	<b>2</b>
$P(\text{Van wins a prize}) = \frac{1}{9} \quad \therefore P(\text{Van does not win a prize}) = \frac{8}{9}$ $\therefore P(\text{Van does not win a prize in 3 weeks}) = \left(\frac{8}{9}\right)^3$ $P(\text{Marie wins a prize}) = \frac{1}{16} \quad \therefore P(\text{Marie does not win a prize}) = \frac{15}{16}$ $\therefore P(\text{Marie does not win a prize in 3 weeks}) = \left(\frac{15}{16}\right)^3$ $P(\text{neither wins a prize in 3 weeks}) = \left(\frac{8}{9}\right)^3 \times \left(\frac{15}{16}\right)^3$ $P(\text{at least one wins a prize}) = 1 - \left(\frac{8}{9}\right)^3 \times \left(\frac{15}{16}\right)^3$ $= \frac{91}{216}$			

\* These solutions have been provided by [projectmaths](#) and are not supplied or endorsed by the Board of Studies

**Board of Studies: Notes from the Marking Centre**

Common errors in this part included: not treating the two raffles as independent events; not combining the two independent events; or writing down decimals with no accompanying explanations.

**Source:** [http://www.boardofstudies.nsw.edu.au/hsc\\_exams/](http://www.boardofstudies.nsw.edu.au/hsc_exams/)