

<b>09</b>	<b>5b</b>	On each working day James parks his car in a parking station which has three levels. He parks his car on a randomly chosen level. He always forgets where he has parked so when he leaves work he chooses a level at random and searches for his car. If his car is not on that level, he chooses a different level and continues in this way until he finds his car. (i) What is the probability that his car is on the first level he searches? (ii) What is the probability that he must search all three levels before he finds his car? (iii) What is the probability that on every one of the five working days in a week, his car is not on the first level he searches?	<b>1</b> <b>1</b> <b>1</b>
		<p>(i) <math>P(\text{on first level searched}) = \frac{1}{3}</math></p> <p>(ii) <math>P(\text{not on first searched, not on second searched}) = \frac{2}{3} \times \frac{1}{2} \times 1</math>  <math>= \frac{1}{3}</math></p> <p>(iii) <math>P(\text{not on first level searched}) = 1 - P(\text{on first level searched})</math>  <math>= 1 - \frac{1}{3}</math>  <math>= \frac{2}{3}</math>  <math>P(\text{not on first level searched 5 days}) = \left(\frac{2}{3}\right)^5</math>  <math>= \frac{32}{243}</math></p>	<p>State Mean:</p> <p><b>0.94/1</b></p> <p><b>0.31/1</b></p> <p><b>0.39/1</b></p>

\* 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

- (i) Most candidates received full marks for this part.
- (ii) A significant number of candidates did not understand this part and incorrectly applied the product theorem. Many candidates drew a tree diagram but did not write the correct probabilities.
- (iii) Most candidates found this part challenging and did not apply the laws of probability. A common answer was  $\frac{2}{3} \times 5 = \frac{10}{3}$ . Candidates need to decide whether an answer is reasonable.

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