05	**5d**	A total of 300 tickets are sold in a raffle which has three prizes. There are 100 red, 100 green and 100 blue tickets. At the drawing of the raffle, winning tickets are NOT replaced before the next draw. (i) What is the probability that each of the three winning tickets is red? (ii) What is the probability that at least one of the winning tickets is not red? (iii) What is the probability that there is one winning ticket of each colour?	 **2** **1** **2**

i. P(3 red tickets) $= \frac{100}{300} \times \frac{99}{299} \times \frac{98}{298}$

$= \frac{1617}{44551}$

$= 0.036295$

ii. P(at least one not red) = 1 – P(3 red tickets)

$= 1 - \frac{1617}{44551}$

$= \frac{42934}{44551}$

$= 0.963705$

iii. P(one of each colour) = P(RGB) + P(RBG) + P(GRB) + P(GBR) + P(BRG) + P(BGR)

$= 6 \times \frac{100}{300} \times \frac{100}{299} \times \frac{100}{298}$

$= \frac{10000}{44551}$

$= 0.224462$

* 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

Performance on this question was very strong. Most candidates (wisely) opted to deal with probabilities directly, without resorting to an expansive tree diagram. The issue of selection without replacement resulted in some confusion; however most candidates worked logically through the production of the various probabilities. Due to the large number of tickets, incorrect answers tended to agree with correct answers to several decimal places, so it proved crucial that candidates show all their working.

Source: http://www.boardofstudies.nsw.edu.au/hsc_exams/