# 4.5 Probability concept\_expected numbers\_P\_1

**1a.** *[4 marks]*

A box contains four red balls and two white balls. Darren and Marty play a game by each taking it in turn to take a ball from the box, without replacement. The first player to take a white ball is the winner.

Darren plays first, find the probability that he wins.

**1b.** *[3 marks]*

The game is now changed so that the ball chosen is replaced after each turn.

Darren still plays first.

Show that the probability of Darren winning has not changed.

**2a.** *[6 marks]*

Mobile phone batteries are produced by two machines. Machine A produces 60% of the daily output and machine B produces 40%. It is found by testing that on average 2% of batteries produced by machine A are faulty and 1% of batteries produced by machine B are faulty.

(i)     Draw a tree diagram clearly showing the respective probabilities.

(ii)     A battery is selected at random. Find the probability that it is faulty.

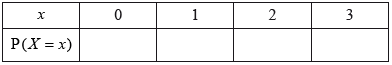
(iii)     A battery is selected at random and found to be faulty. Find the probability that it was produced by machine A.

**2b.** *[6 marks]*

In a pack of seven transistors, three are found to be defective. Three transistors are selected from the pack at random without replacement. The discrete random variable *X* represents the number of defective transistors selected.

(i)     Find .

(ii)     **Copy** and complete the following table:



(iii)     Determine .

Printed for SANSKAR SCHOOL

© International Baccalaureate Organization 2019

International Baccalaureate® - Baccalauréat International® - Bachillerato Internacional®