Maths IB_2

Test 3

3 december 2025

subjets : *Probability I*

Tot :[/ 15 marks]

Name: _____

Problem 1 *[/ 7 marks]*

A bag contains n marbles, two of which are blue. Hayley plays a game in which she randomly draws marbles out of the bag, one after another, without replacement. The game ends when Hayley draws a blue marble.

(a) Find the probability, in terms of n, that the game will end on her

(i) first draw;

(ii) second draw. [4]

(b) Let $n = 5$. Find the probability that the game will end on her

(i) third draw;

(ii) fourth draw. [4]

Problem 2 *[/ 9 marks]*

Box 1 contains 5 red balls and 2 white balls.
Box 2 contains 4 red balls and 3 white balls.

(a) A box is chosen at random and a ball is drawn. Find the probability that the ball is red. [3]

Let A be the event that "box 1 is chosen" and let R be the event that "a red ball is drawn".

(b) Determine whether events A and R are independent. [2]

Question 3

The following table shows the probability distribution of a discrete random variable where $a, k \in \mathbb{R}^+$.

x	1	2	3	4
$\mathrm{P}(X = x)$	k	k^2	a	k^3

Given that $\mathrm{E}(X) = 2.3$, find the value of a.