AI1110 Assignment-4

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***Abstract*—This document contains the solution for Assignment 3 (NCERT Class 10 Probability example 8)**

Example 8 : A box contains 3 blue, 2 white and 4 red marbles. If a marble is drawn at random from the box, what is the probability that it will be

(i) white?
(ii) blue?
(iii) red?

Solution:

Denote the outcome of the experiment by a random variable X such that $X \in \{0, 1, 2\}$ where,

Event	Description
X=0	ball drawn is white
X=1	ball drawn is blue
X=2	ball drawn is red

TABLE I
EVENTS

(i) The probability that the ball drawn is white

$$\Pr(X=0) = \frac{\text{no of white colored balls}}{\text{Total no of balls}} \tag{1}$$
$$= \frac{2}{2+3+4} \tag{2}$$
$$= \frac{2}{9} \tag{3}$$

(ii) The probability that the ball drawn is blue

$$\Pr(X=1) = \frac{\text{no of blue colored balls}}{\text{Total no of balls}} \tag{4}$$
$$= \frac{3}{2+3+4} \tag{5}$$
$$= \frac{3}{9} \tag{6}$$
$$= \frac{1}{3} \tag{7}$$

(iii) The probability that the ball drawn is red
As we know that these events are mutually exclusive and exhaustive. Therefore sum of their probabilities is equal to 1.

$$\Pr(X=0) + \Pr(X=1) + \Pr(X=2) = 1 \tag{8}$$

so we can find $\Pr(X=2)$ from above equation

$$\Pr(X=2) = 1 - \Pr(X=0) - \Pr(X=1) \tag{9}$$
$$= 1 - \frac{2}{9} - \frac{3}{9} \tag{10}$$
$$= \frac{4}{9} \tag{11}$$