

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

$$\Pr(X = 0) = \frac{\text{no of white colored balls}}{\text{Total no of balls}} \quad (1)$$

$$= \frac{2}{2 + 3 + 4} \quad (2)$$

$$= \frac{2}{9} \quad (3)$$

- (ii) The probability that the ball drawn is blue

$$\Pr(X = 1) = \frac{\text{no of blue colored balls}}{\text{Total no of balls}} \quad (4)$$

$$= \frac{3}{2 + 3 + 4} \quad (5)$$

$$= \frac{3}{9} \quad (6)$$

$$= \frac{1}{3} \quad (7)$$

- (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.

$$\Pr(X = 0) + \Pr(X = 1) + \Pr(X = 2) = 1 \quad (8)$$

So we can find $\Pr(X = 2)$ from equation (8),

$$\Pr(X = 2) = 1 - \Pr(X = 0) - \Pr(X = 1) \quad (9)$$

$$= 1 - \frac{2}{9} - \frac{3}{9} \quad (10)$$

$$= \frac{4}{9} \quad (11)$$