

# AI1110 Assignment 4

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 CBSE 12th Probability

I. Ex 13.2 Q13

## Question:

Two balls are drawn at random with replacement from a box containing 10 black and 8 red balls. Find the probability that

- (i) both balls are red.
- (ii) first ball is black and second is red.
- (iii) one of them is black and other is red.

## Solution:

Let  $X$  = outcome of 1st draw and  $Y$  = outcome of 2nd draw.

$X, Y$  are elements of set  $\{B, R\}$  where  $B$  stands for black ball and  $R$  stands for red ball.

$$(i) P(X = R \cap Y = R) = \frac{8}{18} \times \frac{8}{18} = \frac{16}{81} \quad (1)$$

$$(ii) P(X = B \cap Y = R) = \frac{10}{18} \times \frac{8}{18} = \frac{20}{81} \quad (2)$$

$$\begin{aligned} (iii) P(X = R \cap Y = B) + P(X = B \cap Y = R) \\ = \frac{8}{18} \times \frac{10}{18} + \frac{10}{18} \times \frac{8}{18} \\ = \frac{40}{81} \end{aligned} \quad (3)$$

The python code `codes/Q13.py` produces a theoretical probability distribution.