

AI1110 Assignment 6

Dondapati Chandrahas Reddy
AI21BTECH11010
 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.