

Assignment 2

AI1110:Probability And Random Variables

Indian Institute of Technology, Hyderabad

RAJIV CHAUDHARY
AI22BTECH11021

10.15.2.4: A box contains 12 balls out of which x are black. If one ball is drawn at random from the box, what is the probability that it will be a black ball? If 6 more black balls are put in the box, the probability of drawing a black ball is now double of what it was before. Find x .

Solution: Given

Let A := Selected ball is a black ball before 6 more black balls added

Let B := Selected ball is a black ball after 6 more black balls added

Before 6 more black balls added

Total Balls = 12

Total Black Balls = x

$$\Pr(A) = \frac{x}{12} \quad (1)$$

After 6 more black balls added

Total Balls = 18

Total Black Balls = $x + 6$

$$\Pr(B) = \frac{x + 6}{18} \quad (2)$$

According to the Question,

$$\Pr(B) = 2(\Pr(A)) \quad (3)$$

$$\frac{x + 6}{18} = 2\left(\frac{x}{12}\right) \quad (4)$$

$$\frac{x + 6}{18} = \frac{x}{6} \quad (5)$$

$$6(x + 6) = 18x \quad (6)$$

$$6x + 36 = 18x \quad (7)$$

$$36 = 12x \quad (8)$$

$$x = 3 \quad (9)$$

∴ The value of x is 3.