

Assignment 1

AI1110: Probability and Random Variables
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10.15.2.4: Question. 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 Information		
Definition	Variable	Given values
No of Black Balls	x	
Total no of balls	n	20
Initial Probability that ball is Black	p	$\frac{x}{20}$
Probability that ball is Black after adding 6 black balls	q	$\frac{x+6}{20}$

Given, the probability after adding 6 black balls to the box is double the initial probability.

From the table:

$$q = 2 \times p$$

$$\frac{x+6}{18} = 2 \times \frac{x}{12} \quad (1)$$

$$\Rightarrow x + 6 = 3 \times x \quad (2)$$

$$\Rightarrow 2 \times x = 6 \quad (3)$$

$$\Rightarrow x = 3 \quad (4)$$

Therefore: The value of x is 3.