

Assignment 2

10.15.2.4

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Question: 2) 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:

Let the event black balls be denoted by **B**

- 1) Total number of black balls = x
Total number of balls = 12
The probability of getting a black ball is given by:

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

- 2) After adding 6 more black balls, the total number of balls becomes = 18
Now the total number of black balls becomes = $x + 6$.
The probability of getting a black ball now is given by:

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

It is given that the probability of drawing a black ball now is double of what it was before.
So we have:

$$((1)) = 2 \times ((2))$$

$$\frac{x + 6}{18} = 2 \times \frac{x}{12} \quad (3)$$

Solving the equation, we get:

$$x + 6 = 3x \quad (4)$$

$$2x = 6 \quad (5)$$

$$x = 3 \quad (6)$$

\therefore The value of $x = 3$.