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:

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

$$\Pr\left(\textbf{black ball}\right) = \frac{x}{12} \tag{1}$$

(ii) 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:

$$\Pr\left(\textbf{black ball}\right) = \frac{x+6}{18} \tag{2}$$

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

$$\text{(i)} = 2 \times \text{(ii)}$$

$$\frac{x+6}{18} = 2 \times \frac{x}{12} \tag{3}$$

Solving the equation, we get:

$$x + 6 = 3x \tag{4}$$

$$2x = 6 \tag{5}$$

$$x = 3 \tag{6}$$

$\therefore$ The value of x = 3.