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:

1) Total number of black balls = x
2) Total number of balls = 12
   The probability of getting a black ball is given by:
$$\Pr\left(\textbf{black ball}\right) = \frac{x}{12} \quad \text{(i)}$$
3) After adding 6 more black balls, the total number of balls becomes = 18
4) Now the total number of black balls becomes = $x + 6$.
5) The probability of getting a black ball now is given by:
$$\Pr\left(\textbf{black ball}\right) = \frac{x+6}{18} \quad \text{(ii)}$$
6) It is given that the probability of drawing a black ball now is double of what it was before. So we have:
$$\text{(ii)} = 2 \times \text{(i)}$$
$$\frac{x+6}{18} = 2 \times \frac{x}{12}$$
   Solving the equation, we get:
$$x + 6 = 3x \quad (1)$$
$$2x = 6 \quad (2)$$
$$x = 3 \quad (3)$$
   $\therefore$ The value of x = 3.