

4.

total balls = 12
no. of black balls = x

$$P(\text{black ball}) = \frac{x}{12}$$

no. of black balls added = 6

$$\begin{aligned} \text{total balls} &= 12 + 6 \\ &= 18 \end{aligned}$$

no. of black balls = $x + 6$

$$P(\text{black ball}) = \frac{x+6}{18}$$

according to condition

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

$$\Rightarrow 3x = x + 6$$

$$\Rightarrow 3x - x = 6$$

$$\Rightarrow 2x = 6$$

$$\Rightarrow x = 3$$