Assignment 2
AI1110:Probability And Random Variables
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10.15.2.4: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

Let A:= Selected ball is a black ball before 6 more black balls added

Let B:= Selected ball is a black ball after 6 more black balls added

i) Before 6 more black balls added
Total Balls=12
Total Black Balls=x

$$\Pr(A) = \frac{x}{12} \tag{1}$$

ii) After 6 more black balls added
Total Balls=18
Total Black Balls=x+6

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

iii) According to the Question,

$$\Pr(B) = 2(\Pr(A)) \tag{3}$$
$$\frac{x+6}{18} = 2\left(\frac{x}{12}\right) \tag{4}$$
$$\frac{x+6}{18} = \frac{x}{6} \tag{5}$$
$$6(x+6) = 18x \tag{6}$$
$$6x + 36 = 18x \tag{7}$$
$$36 = 12x \tag{8}$$
$$x = 3 \tag{9}$$

$\therefore$ **The value of x is 3.**