ASSIGNMENT 3

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Question: A box contains 3 blue, 2 white and 4 red marbles.If a marble is drawn at random from the box, what is the probability that it will be

(i) white?
(ii) blue?
(iii) red?

Solution: Given there are 2 white, 3 blue and 4 red marbles.

Event	Description
W	white marble is drawn
B	blue marble is drawn
R	red marble is drawn

TABLE I: Random variable and Event distribution

(i) The probability that a marble is drawn at random from the box is white

$$\Pr(W) = \frac{\text{Number of white marbles}}{\text{Total number of marbles}} \tag{1}$$
$$= \frac{2}{9} \tag{2}$$
$$= 0.222 \tag{3}$$

(ii) The probability that a marble is drawn at random from the box is blue

$$\Pr(B) = \frac{\text{Number of blue marbles}}{\text{Total number of marbles}} \tag{4}$$
$$= \frac{3}{9} \tag{5}$$
$$= \frac{1}{3} \tag{6}$$
$$= 0.333 \tag{7}$$

(iii) The probability that a marble is drawn at random from the box is red

$$\Pr(R) = \frac{\text{Number of red marbles}}{\text{Total number of marbles}} \tag{8}$$
$$= \frac{4}{9} \tag{9}$$
$$= 0.444 \tag{10}$$

Note: Since the events are mutually exclusive and exhaustive, the probability that the ball drawn is red can also be calculated as

$$\Pr(W) + \Pr(B) + \Pr(R) = 1 \tag{11}$$
$$\Pr(R) = 1 - \Pr(W) - \Pr(B) \tag{12}$$
$$= 1 - \frac{2}{9} - \frac{1}{3} \tag{13}$$
$$= \frac{4}{9} \tag{14}$$
$$= 0.444 \tag{15}$$