Assignment 4

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Question: (CBSE CLASS 11 - Example 11)
A bag contains 9 discs of which 4 are red, 3 are blue and 2 are yellow. The discs are similar in shape and size. A disc is drawn at random from the bag. Calculate the probability that it will be:

(i) red
(ii) yellow
(iii) blue
(iv) not blue
(v) either red or blue

Solution:

Color	**No. of Discs**
Red	4
Yellow	2
Blue	3
Total	9

TABLE I

Let a random variable X denote the outcome of the experiment such that:-

Event	**Description**
$X = 0$	Drawn ball is Red
$X = 1$	Drawn ball is Yellow
$X = 2$	Drawn ball is Blue

TABLE II

(i) $X = 0$ denotes the disc is red.

$$\Pr(X = 0) = \frac{4}{9} \tag{1}$$
$$= \boxed{0.444} \tag{2}$$

(ii) $X = 1$ denotes the disc is yellow.

$$\Pr(X = 1) = \frac{2}{9} \tag{3}$$
$$= \boxed{0.222} \tag{4}$$

(iii) $X = 2$ denotes the disc is blue.

$$\Pr(X = 2) = \frac{3}{9} \tag{5}$$
$$= \frac{1}{3} \tag{6}$$
$$= \boxed{0.333} \tag{7}$$

(iv) $X \neq 2$ denotes the disc is not blue, that is, $X \in \{0, 1\}$. Thus, the disc is either yellow or red.

$$\Pr(X \neq 2) = \Pr(X \in \{0, 1\}) \tag{8}$$
$$= \Pr(X = 0) + \Pr(X = 1) \tag{9}$$
$$= \frac{4 + 2}{9} \tag{10}$$
$$= \frac{2}{3} \tag{11}$$
$$= \boxed{0.667} \tag{12}$$

(v) $X \in \{0, 2\}$ denotes the disc is either red or blue.

$$\Pr(X \in \{0, 2\}) = \Pr(X = 0) + \Pr(X = 2) \tag{13}$$
$$= \frac{4 + 3}{9} \tag{14}$$
$$= \frac{7}{9} \tag{15}$$
$$= \boxed{0.778} \tag{16}$$

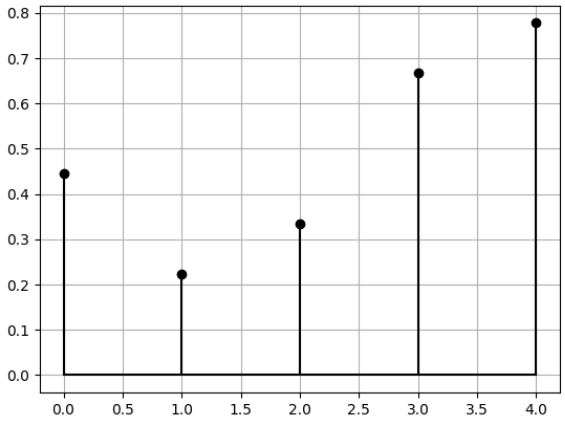

Fig. 1: Plot of PMF using above data