

# ASSIGNMENT 6 : CBSE PROBABILITY

## CLASS-12

AI21BTECH11016

### EXAMPLE - 25

(iii)

#### Question:

Find the probability distribution of number of doublets in three throws of a pair of dice.

#### Solution:

Let  $X = \{0, 1, 2, 3\}$  be a random variable representing the number of doublets.

Event	Description
$X = 0$	no dublet in three throws
$X = 1$	one dublet in three throws
$X = 2$	two doublets in three throws
$X = 3$	all three throws are doublets

TABLE I

For a single throw the possible doublets are :

(1,1) , (2,2), (3,3), (4,4), (5,5), (6,6)

$\Rightarrow$  Probability of getting a doublet =  $\frac{1}{6}$

From the binomial distribution :

(i)

$$\Pr \{X = 0\} = \binom{3}{0} \times \left[\frac{1}{6}\right]^0 \times \left[\frac{5}{6}\right]^3 \quad (1)$$

$$= \frac{125}{216} \quad (2)$$

(ii)

$$\Pr \{X = 1\} = \binom{3}{1} \times \left[\frac{1}{6}\right]^1 \times \left[\frac{5}{6}\right]^2 \quad (3)$$

$$= 3 \times \frac{25}{216} \quad (4)$$

$$= \frac{75}{216} \quad (5)$$

$$\Pr \{X = 2\} = \binom{3}{2} \times \left[\frac{1}{6}\right]^2 \times \left[\frac{5}{6}\right]^1 \quad (6)$$

$$= 3 \times \frac{5}{216} \quad (7)$$

$$= \frac{15}{216} \quad (8)$$

$$\Pr \{X = 3\} = \binom{3}{3} \times \left[\frac{1}{6}\right]^3 \times \left[\frac{5}{6}\right]^0 \quad (9)$$

$$= \frac{1}{216} \quad (10)$$

$\Rightarrow$  The Probability distribution of number of doublets in three throws of a pair of dice is :

X	0	1	2	3
P(X)	$\frac{125}{216}$	$\frac{75}{216}$	$\frac{15}{216}$	$\frac{1}{216}$

TABLE II