

ASSIGNMENT-2

B PREMSAGAR - EE22BTECH11013

Question XH-3.2023: Given a fair six-faced dice where the faces are labelled '1','2','3','4','5', and '6'. what is the probability of getting a '1' on the first roll of the dice and a '4' on the second roll ?

Solution: Let,

$$Pr(X = k) = \begin{cases} p, & \text{success} \\ 1 - p, & \text{failure} \end{cases} \quad (1)$$

Now, the binomial PMF calculates the probability of obtaining exactly "k" successes in a fixed number of "n" independent trials, each with a probability of success "p": with parameters given below,

TABLE 0
PARAMETERS FOR PMF

parameter	value
n	2
p	$\frac{1}{6}$
k	2
$1 - p$	$\frac{5}{6}$

Now,

$$\Pr(X = k) = {}^nC_k (p)^k (1 - p)^{n-k} \quad (2)$$

$$\Pr(X = 2) = {}^2C_2 \left(\frac{1}{6}\right)^2 \left(1 - \frac{1}{6}\right)^{2-2} \quad (3)$$

$$= {}^2C_2 \left(\frac{1}{6}\right)^2 \left(\frac{5}{6}\right)^0 \quad (4)$$

$$= \frac{1 \times 1^2}{6^2} \quad (5)$$

$$= \frac{1}{36} \quad (6)$$

$$= 0.028 \quad (7)$$

Hence, probability of getting a '1' on the first roll of the dice and a '4' on the second roll is 0.028