

AI5002: Assignment 7

Pradyumn Sharma
AI21MTECH02001

Download all latex codes from

<https://github.com/96143/Assignment-7/blob/main/assignment%207.tex>

Download all Python codes from

https://github.com/96143/Assignment-7/blob/main/Assignment_7.ipynb

$P(X=2) = P(\text{Two doublet and one non doublet})$

$$= \frac{1}{6} \times \frac{1}{6} \times \frac{5}{6} + \frac{1}{6} \times \frac{5}{6} \times \frac{1}{6} + \frac{5}{6} \times \frac{1}{6} \times \frac{1}{6} \quad (2.0.6)$$

$$= \frac{5}{216} + \frac{5}{216} + \frac{5}{216} \quad (2.0.7)$$

$$= \frac{15}{216} \quad (2.0.8)$$

$P(X=3) = P(\text{Three doublets})$

$$= \frac{1}{6} \times \frac{1}{6} \times \frac{1}{6} \quad (2.0.9)$$

$$= \frac{1}{216} \quad (2.0.10)$$

1 PROBLEM

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

2 SOLUTION

Let X denotes the number of doublets. X can take the value 0,1,2 or 3.

Possible doublets are (1,1), (2,2), (3,3), (4,4), (5,5) and (6,6)

Probability of getting a doublet $= \frac{6}{36} = \frac{1}{6}$

Probability of not getting a doublet $= 1 - \frac{1}{6} = \frac{5}{6}$

Now,

$P(X = 0) = P(\text{No doublet})$

$$= \frac{5}{6} \times \frac{5}{6} \times \frac{5}{6} \quad (2.0.1)$$

$$= \frac{125}{216} \quad (2.0.2)$$

$P(X = 1) = P(\text{One doublet and two non doublet})$

$$= \frac{1}{6} \times \frac{5}{6} \times \frac{5}{6} + \frac{5}{6} \times \frac{1}{6} \times \frac{5}{6} + \frac{5}{6} \times \frac{5}{6} \times \frac{1}{6} \quad (2.0.3)$$

$$= \frac{25}{216} + \frac{25}{216} + \frac{25}{216} \quad (2.0.4)$$

$$= \frac{75}{216} \quad (2.0.5)$$

\therefore The required probabilities are shown in the figure

X	0	1	2	3
P(X)	125/216	75/216	15/216	1/216