Assignment 1

Amaan - EP20BTECH11003

Download all python codes from

https://github.com/amaan28/Assignment1/blob/main/Assignment1/codes/Assignment1.py

and latex-tikz codes from

https://github.com/amaan28/Assignment1/blob/main/Assignment1/Assignment1.tex

Question 5.27

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

Solution

Let $X \in \{0, 1, 2, 3\}$ denote a random variable whose value represents the number of doublets obtained in 3 throws of a pair of dice. We can describe the whole experiment using Binomial probability distribution, given by,

$$Pr(X = r) = {}^{n}C_{r} p^{r} q^{n-r} \tag{0.0.1}$$

where, r is the number of successes, n is the total number of trials(throws) and p and q are the probabilities of success(doublet) and failure(no doublet) respectively, such that,

$$p + q = 1 \tag{0.0.2}$$

Given, n=3, and, we can find,

$$p = \frac{1}{6} \tag{0.0.3}$$

$$q = \frac{5}{6} \tag{0.0.4}$$

Putting the above information in the equation (0.0.1), we get,

$$Pr(X = 0) = \frac{125}{216} \tag{0.0.5}$$

$$Pr(X = 1) = \frac{25}{72} \tag{0.0.6}$$

$$Pr(X = 2) = \frac{5}{72} \tag{0.0.7}$$

$$Pr(X = 3) = \frac{1}{216} \tag{0.0.8}$$

X=r	0	1	2	3
Pr(X=r)	$\frac{125}{216}$	$\frac{25}{72}$	$\frac{5}{72}$	$\frac{1}{216}$