

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 $X, Y \in \{1, 2, 3, 4, 5, 6\}$ be random variables, values of which represent the outcome of dice D_1 and D_2 . It can be seen that,

$$Pr(X = Y) = \frac{1}{6} \quad (0.0.1)$$

$$Pr(X \neq Y) = 1 - Pr(X = Y) = \frac{5}{6} \quad (0.0.2)$$

Now, let $Z \in \{0, 1, 2, 3\}$ be a random variable that represents the number of times $X = Y$ hold true in the experiment done in the problem, i.e., number of doublets obtained in the experiment.

We can describe the whole experiment using Binomial probability distribution, given by,

$$Pr(Z = r) = {}^3C_r (Pr(X = Y))^r (Pr(X \neq Y))^{3-r} \quad (0.0.3)$$