Assignment 4

Varenya Upadhyaya EP20BTECH11026

Problem

A fair dice is rolled twice. The probability that an odd number will follow an even number is

(a) $\dfrac{1}{2}$ (b) $\dfrac{1}{6}$ (c) $\dfrac{1}{3}$ (d) $\dfrac{1}{4}$

Solution

Let a random variable $X \in \{0, 1\}$ denote the possible outcomes of the event of rolling a die.

Dice output	X	Number
Even number	0	$n(X = 0) = 3$
Odd number	1	$n(X = 1) = 3$

TABLE 4: Outcome of the Experiment

$$\Pr(X = 0) = \frac{n(X = 0)}{n(X = 0) + n(X = 1)} = \frac{3}{6} \quad (0.0.1)$$

$$= \frac{1}{2} \quad (0.0.2)$$

$$\Pr(X = 1) = \frac{n(X = 1)}{n(X = 0) + n(X = 1)} = \frac{3}{6} \quad (0.0.3)$$

$$= \frac{1}{2} \quad (0.0.4)$$

If E denotes the event that an odd number follows an even then,

$$\Pr(E) = \Pr(X = 0) \times \Pr(X = 1) \quad (0.0.5)$$

$$= \frac{1}{2} \times \frac{1}{2} \quad (0.0.6)$$

$$= \frac{1}{4} \quad (0.0.7)$$

The required probability is $\dfrac{1}{4}$; option (d) is correct.