

EE23010 Assignment

Sayyam Palrecha* EE22BTECH11047

Question 10.13.3.19

Two dice are thrown at the same time. Find the probability of getting

- (i) same number on both dice.
- (ii) different numbers on both dice.

Solution: Let the random variables:

X represent the outcome of the first die,

Y represent the outcome of the second die.

Since each die has 6 sides, both X and Y can take on values from the set $\{1, 2, 3, 4, 5, 6\}$.

- (i) We need to find: $P(X = Y)$

$$P(X = Y) = \sum_{i=1}^6 P((X = i).(Y = i)) \quad (1)$$

Since both the events are independent we get,

$$= \sum_{i=1}^6 P(X = i).P(Y = i) \quad (2)$$

$$= 6 \times \left(\frac{1}{6} \cdot \frac{1}{6} \right) \quad (3)$$

$$= \frac{1}{6} \quad (4)$$

\therefore The probability of same number on both the dice is $\frac{1}{6}$.

- (ii) We need to find: $P(X \neq Y)$

$$P(X \neq Y) = 1 - P(X = Y) \quad (5)$$

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

$$= \frac{5}{6} \quad (7)$$

\therefore The probability of different numbers on both the dice is $\frac{5}{6}$.