

PROBABILITY

T SIVA PARVATHI - FWC22089

13.4.5 ¹ Find the probability distribution of the number of successes in two tosses of a die, where a success is defined as

- (a) number greater than 4
- (b) six appears on at least one die

Solution: Given that a die tossed two times,

RV	Values	Description
X_1	$\{1,2,3,4,5,6\}$	first toss of a die
X_2	$\{1,2,3,4,5,6\}$	second toss of a die

Table 2: Random Variables(RV) X_1 and X_2

- (a) number greater than 4

$$\Pr(X_1 > 4) = 1 - \Pr(X_1 \leq 4) = \frac{1}{3} \quad (13.4.1.1)$$

$$\Pr(X_2 > 4) = 1 - \Pr(X_2 \leq 4) = \frac{1}{3} \quad (13.4.1.2)$$

Probability distribution of getting number greater than 4 is,

$$\Pr(X_1 > 4) \times \Pr(X_2 > 4) = \frac{1}{3} \times \frac{1}{3} = \frac{1}{9} \quad (13.4.1.3)$$

- (b) six appears on at least one die

$$\Pr(X_1 \neq 6) = \frac{5}{6} \quad (13.4.2.4)$$

$$\Pr(X_2 \neq 6) = \frac{5}{6} \quad (13.4.2.5)$$

$$\Pr(X_1 \neq 6) \times \Pr(X_2 \neq 6) = \frac{5}{6} \times \frac{5}{6} = \frac{25}{36} \quad (13.4.2.6)$$

Probability distribution of getting six on atleast one die is,

$$\implies 1 - \frac{25}{36} = \frac{11}{36} \quad (13.4.2.7)$$

¹Read question numbers as (CHAPTER NUMBER).(EXERCISE NUMBER).(QUESTION NUMBER)