Assignment 3

AI1110: Probability and Random Variables

Indian Institute of Technology Hyderabad

Rudransh Mishra
AI21BTECH11025

9 April 2022

NCERT Grade 12

Question 8

A die is thrown three times,

E : 4 appears on the third toss,
F : 6 and 5 appears respectively on first two tosses.

Determine P($\frac{E}{F}$)

Solution.

Probability of 4 appearing on the third toss,
P(E): $\frac{1}{6}$
Probability of 6 appearing on the first toss,
P1: $\frac{1}{6}$
Probability of 5 appearing on the second toss,
P2: $\frac{1}{6}$

Probability of 5 appearing on the second toss AND 6 appearing on the first toss, P(F) is given as:

$$P(F) = P1 \times P2 \tag{1}$$

$$= \frac{1}{6} \times \frac{1}{6} = \frac{1}{36} \tag{2}$$

Probability of E∪F, $P(E \cup F)$ is given as:

$$P(E \cup F) = P(E) \times P(F) \tag{3}$$

$$= \frac{1}{6} \times \frac{1}{36} = \frac{1}{256} \tag{4}$$

We know that,
Probability of A occurring IF B occurs, $P(A|B)$ is given as:

$$\text{P(A} \mid \text{B)} = \frac{P(A \cup B)}{P(B)} \tag{5}$$

$\therefore$ The probabilty of the problem being solved, P(Solved) will be given by

$$\text{P(E} \mid \text{F)} = \frac{P(E \cup F)}{P(F)} \tag{6}$$

$$\text{P(E} \mid \text{F)} = \frac{(\frac{1}{256})}{(\frac{1}{36})} \tag{7}$$

$$\text{P(E} \mid \text{F)} = \frac{1}{6} \tag{8}$$

$\therefore$ The probabilty P($\frac{E}{F}$) will be 1/6.