Assignment 8 (NCERT Class 12)

Gautam Singh (CS21BTECH11018)

***Abstract*—This document contains the solution to Question 16 of Exercise 13.2 in Chapter 13 (Probability) of the NCERT Class 12 Mathematics Textbook.**

Exercise 13.2, Q16. In a hostel, 60% of the students read Hindi newspaper, 40% read English newspaper and 20% read both Hindi and English newspapers. A student is selected at random.

(a) Find the probability that she reads neither Hindi nor English newspapers.
(b) If she reads Hindi newspaper, find the probability that she reads English newspaper.
(c) If she reads English newspaper, find the probability that she reads Hindi newspaper.

Solution: Let E be the event that the student reads the English newspaper and F be the event that the student reads the Hindi newspaper. Then, we are given that

$$\Pr(E) = 0.4 \tag{1}$$
$$\Pr(F) = 0.6 \tag{2}$$
$$\Pr(EF) = 0.2 \tag{3}$$

For any event X, we may write,

$$\Pr(X') = 1 - \Pr(X) \tag{4}$$

(a) Using De-Morgan's Laws, we need to get $\Pr(E' + F')$. Thus,

$$\Pr(E' + F') = \Pr((EF)') \tag{5}$$
$$= 1 - \Pr(EF) \tag{6}$$
$$= 1 - 0.2 = \frac{4}{5} \tag{7}$$

(b) We require $\Pr(E|F)$. Hence,

$$\Pr(E|F) = \frac{\Pr(EF)}{\Pr(F)} = \frac{0.2}{0.6} = \frac{1}{3} \tag{8}$$

(c) We need to find $\Pr(F|E)$. Therefore,

$$\Pr(F|E) = \frac{\Pr(EF)}{\Pr(E)} = \frac{0.2}{0.4} = \frac{1}{2} \tag{9}$$

The answers are verified in `codes/8_1.c`.