Assignment-2

EE22BTECH11012-A.Chhatrapati

Question 12.13.2.16 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: Given,

Random Variables	Events	probability
$\Pr(A)$	The probability of reading Hindi newspaper.	$\frac{6}{10}$
$\Pr(B)$	The probability of reading English newspaper.	$\frac{4}{10}$
$\Pr(AB)$	The probability of reading both Hindi and English newspaper.	$\frac{2}{10}$

$$(a)\, \Pr(A'B') = \Pr((A+B)') \tag{1}$$

$$= 1 - \Pr(A+B) \tag{2}$$

$$= 1 - (\Pr(A) + \Pr(B) - \Pr(AB)) \tag{3}$$

$$= 1 - \left(\frac{6}{10} + \frac{4}{10} - \frac{2}{10}\right) \tag{4}$$

$$= \frac{2}{10} \tag{5}$$

$$(b)\, \Pr(B|A) = \frac{\Pr(BA)}{\Pr(A)} \tag{6}$$

$$= \frac{\frac{2}{10}}{\frac{6}{10}} \tag{7}$$

$$= \frac{1}{3} \tag{8}$$

$$(c)\, \Pr(A|B) = \frac{\Pr(AB)}{\Pr(B)} \tag{9}$$

$$= \frac{\frac{2}{10}}{\frac{4}{10}} \tag{10}$$

$$= \frac{1}{2} \tag{11}$$