Probability Assignment -I

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12.13.2.16 Question. 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.

Events are listed in the following table:-

A	Student reads Hindi newspaper
B	Student reads English newspaper

Given,

$$\Pr(A) = \frac{60}{100} = 0.6 \tag{1}$$

$$\Pr(B) = \frac{40}{100} = 0.4 \tag{2}$$

$$\Pr(AB) = \frac{20}{100} = 0.2 \tag{3}$$

(a) Here we have to find the probablity of the event that selected students neither reads hindi nor English i.e. $(\Pr(A+B))'$

$$(\Pr(A+B))' = 1 - \Pr(A+B) \tag{4}$$

$$= 1 - (\Pr(A) + \Pr(B) - \Pr(AB)) \tag{5}$$

$$= 1 - (0.6 + 0.4 - 0.2) \tag{6}$$

$$= 1 - 0.8 \tag{7}$$

$$= 0.2 \tag{8}$$

answer: $(\Pr(A+B))' = 0.2$

(b) Here We have to find the probablity of the event that selected student reads English newspaper provided that she already reads Hindi newspaper. i.e. $\Pr(B|A)$

$$\Pr(B|A) = \frac{\Pr(BA)}{\Pr(A)} \tag{9}$$

$$= \frac{0.2}{0.6} \tag{10}$$

$$= \frac{1}{3} \tag{11}$$

answer: $\Pr(B|A) = \frac{1}{3}$

(c) Here We have to find the probablity of the event that selected student reads Hindi newspaper provided that she already reads English newspaper. i.e. $\Pr(A|B)$

$$\Pr(A|B) = \frac{\Pr(AB)}{\Pr(B)} \tag{12}$$

$$= \frac{0.2}{0.4} \tag{13}$$

$$= \frac{1}{2} \tag{14}$$

answer: $\Pr(A|B) = \frac{1}{2}$