PROBABILITY

HARI VENKATESWARLU - FWC22058

13.1.11 [1] Two groups are competing for the position on the Board of directors of a corporation. The probabilities that the first and the second groups will win are 0.6 and 0.4 respectively. Further, if the first group wins, the probability of introducing a new product is 0.7 and the corresponding probability is 0.3 if the second group wins. Find the probability that the new product introduced was by the second group

Solution:

RV	Values	Description
X	{1}	Group
Y	{2}	Group
Z	{0,1}	New Product

Table 2: Random variables(RV) X,Y

Event	Probability	Description
$\Pr(X)$	0.6	First group winning
$\Pr(Y)$	0.4	Second group winning
$\Pr(Z \mid X)$	0.7	Introducing Z if X wins
$\Pr(Z \mid Y)$	0.3	Introducing Y if Y wins

Table 4: Probabilities

$$\Pr(Y \mid Z) = \frac{\Pr(Y)\Pr(Z \mid Y)}{\Pr(X)\Pr(Z \mid X) + \Pr(Y)\Pr(Z \mid Y)} \tag{13.1.11.1}$$

$$= \frac{(0.4)(0.3)}{(0.6)(0.7) + 0.4(0.3)} \tag{13.1.11.2}$$

$$= \frac{2}{9} \tag{13.1.11.3}$$

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