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	{1,2}	1:Group1 ,2:Group2
Y	{0,1}	0:New product not introduced ,1:New product introduced

Table 2: Random variables(RV) X,Y

Event	Probability	Description
$\Pr(X=1)$	0.6	First group winning
$\Pr(X=2)$	0.4	Second group winning
$\Pr(Y=1 \mid X=1)$	0.7	Introducing 1 if 1 wins
$\Pr(Y=1 \mid X=2)$	0.3	Introducing 1 if 2 wins

Table 4: Probabilities

$$\Pr(X=2 \mid Y=1) = \frac{\Pr(2)\Pr(1 \mid 2)}{\Pr(1)\Pr(1 \mid 1) + \Pr(2)\Pr(1 \mid 2)} \tag{13.1.11.1}$$

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

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

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