

**Answer on Question #39871 – Math – Statistics and Probability**

A chartered accountant applies for a job in two firms X and Y. He estimates that the probability of his being selected in firm X is 0.7 and being rejected in Y is 0.5 and the probability that at least one of his applications rejected is 0.6. What is the probability that he will be selected in one of the firms?

	Rejected	Accepted
Firm X	$1-0.7=0.3$	0.7
Firm Y	0.5	$1-0.5=0.5$
	0.6	0.4

A="selected in firm X", B="selected in firm Y", C="selected at least in one of the firms",

$D = (\bar{A} \cap B) \cup (A \cap \bar{B}) \cup (\bar{A} \cap \bar{B})$  = "at least one of his applications is rejected".

By assignment statement,  $\Pr(D) = 0.6$ . Then

$$\Pr(A \cap B) = 1 - \Pr(D) = 1 - 0.6 = 0.4$$

Probability that at least one of applications will be selected:

$$\Pr(C) = \Pr(A \cup B) = \Pr(A) + \Pr(B) - \Pr(A \cap B) = 0.7 + 0.5 - 0.4 = 0.8$$

Probability that exactly one of application will be selected

$$\Pr(E) = \Pr((A \cap \bar{B}) \cup (\bar{A} \cap B)) = \Pr(A \cap \bar{B}) + \Pr(\bar{A} \cap B) = \Pr(A/\bar{B})\Pr(\bar{B}) + \Pr(\bar{A}/B)\Pr(B)$$

We cannot calculate this probability without additional assumptions. If we assume that events A and B are independent, then  $\Pr(A/\bar{B}) = \Pr(A)$ ,  $\Pr(\bar{A}/B) = \Pr(\bar{A})$ .

Finally, with additional assumption we have that probability that exactly one of application will be selected

$$\Pr(E) = \Pr(A/\bar{B})\Pr(\bar{B}) + \Pr(\bar{A}/B)\Pr(B) = \Pr(A) \cdot \Pr(\bar{B}) + \Pr(\bar{A}) \cdot \Pr(B) = 0.7 \cdot 0.5 + 0.3 \cdot 0.5 = 0.5$$