NCERT: Class XI

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16.4.7 [1] A and B are two events such that $\Pr(A) = 0.54, \Pr(B) = 0.69$ and $\Pr(\text{AB}) = 0.35$. Find

(a) $\Pr(\text{A} + \text{B})$

(b) $\Pr(A'B')$

(c) $\Pr(AB')$

(d) $\Pr(A'B)$

Solution:

(a) By addition theorem of probability, we know that

$$\begin{aligned}\Pr(\text{A} + \text{B}) &= \Pr(A) + \Pr(B) - \Pr(AB) && (16.4.1.1)\\ &= 0.54 + 0.69 - 0.35 && (16.4.1.2)\\ &= 0.88 && (16.4.1.3)\end{aligned}$$

(b)

$$\begin{aligned}\Pr(A'B') &= \Pr((1-A)(1-B)) && (16.4.2.4)\\ &= \Pr((1 - A - B + AB) && (16.4.2.5)\\ &= \Pr((1 - (A + B - AB)) && (16.4.2.6)\\ &= 1 - \Pr((\text{A} + \text{B})) && (16.4.2.7)\\ &= 1 - 0.88 && (16.4.2.8)\\ &= 0.12 && (16.4.2.9)\end{aligned}$$

(c)

$$\begin{aligned}\Pr(AB') &= \Pr((A)(1-B)) && (16.4.3.10)\\ &= \Pr(A - AB) && (16.4.3.11)\\ &= \Pr(A) - \Pr(AB) && (16.4.3.12)\\ &= 0.54 - 0.35 && (16.4.3.13)\\ &= 0.19 && (16.4.3.14)\end{aligned}$$

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

(d) Similarly,

$$\begin{aligned}
\Pr(A'B) &= \Pr((1-A)(B)) && (16.4.4.15)\\
&= \Pr(B - AB) && (16.4.4.16)\\
&= \Pr(B) - \Pr(AB) && (16.4.4.17)\\
&= 0.69 - 0.35 && (16.4.4.18)\\
&= 0.34 && (16.4.4.19)
\end{aligned}$$