Question 12.13.2.9
If $A$ and $B$ are two events such that $\Pr(A) = \frac{1}{4}, \Pr(B) = \frac{1}{2}$ and $\Pr(AB) = \frac{1}{8}$ . Find $\Pr(A'B')$.
**solution:** Since,

$$A'B' = (A+B)' \tag{1}$$
$$\implies \Pr(A'B') = \Pr\left((A+B)'\right) \tag{2}$$
$$= 1 - \Pr((A+B)) \tag{3}$$

we also know that,

$$\Pr(A+B) = \Pr(A) + \Pr(B) - \Pr(AB) \tag{4}$$
$$= \frac{1}{4} + \frac{1}{2} - \frac{1}{8} \tag{5}$$
$$= \frac{5}{8} \tag{6}$$

Hence, by substituting in (2) we get

$$\Pr(A'B') = 1 - \frac{5}{8} \tag{7}$$
$$= \frac{3}{8} \tag{8}$$