Assignment 3

Bhogalapalli Sahishnu, CS21BTECH11009

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Question

Q.15 [CBSE 11 Ex 16.3]:
If E and F are events such that $P(E) = \frac{1}{4}$, $P(F) = \frac{1}{2}$ and $P(EF) = \frac{1}{8}$, find
(i) $P(E \text{ or } F)$
(ii) $P(\text{not } E \text{ and not } F)$

Solution Page 1

(i) $P(EF)$

From Set theory, If there are two events A and B, we know that,

$$P(A+B) = P(A) + P(B) - P(AB) \tag{1}$$

$$\rightarrow P(E+F) = P(E) + P(F) - P(EF) \tag{2}$$

$$\Rightarrow P(E+F) = \frac{1}{4} + \frac{1}{2} - \frac{1}{8} = \frac{5}{8} \tag{3}$$

$$\boxed{P(E+F) = \frac{5}{8}} \tag{4}$$

Solution Page 2

(ii) $P(E'F')$

From set theory, If there are two events A and B, we know that,

$$P(A'B') = (P(A+B))' \tag{5}$$

$$\rightarrow P(E'F') = (P(E+F))' \tag{6}$$

$$\Rightarrow P(E'F') = 1 - P(E+F) \tag{7}$$

$$\Rightarrow P(E'F') = 1 - \frac{5}{8} = \frac{3}{8} \tag{8}$$

$$\boxed{P(E'F') = \frac{3}{8}} \tag{9}$$