

Assignment 3

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Abstract—This document contains the solution for Assignment 3 (CBSE Class 11 Ex 16.3 Q.15)

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 $P(E \cap F) = \frac{1}{8}$, find

- (i) $P(E \text{ or } F)$
- (ii) $P(\text{not } E \text{ and not } F)$

Solution:

- (i) $P(E \cup F)$

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

$$P(A \cup B) = P(A) + P(B) - P(A \cap B) \quad (1)$$

$$\rightarrow P(E \cup F) = P(E) + P(F) - P(E \cap F) \quad (2)$$

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

$$\boxed{P(E \cup F) = \frac{5}{8}} \quad (4)$$

- (ii) $P(E' \cap F')$

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

$$P(A' \cap B') = (P(A \cup B))' \quad (5)$$

$$\rightarrow P(E' \cap F') = (P(E \cup F))' \quad (6)$$

$$\Rightarrow P(E' \cap F') = 1 - P(E \cup F) \quad (7)$$

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

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