

# PROBABILITY

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**13.2.9** <sup>1</sup> If A and B are two events such that  $P(A) = \frac{1}{4}$ ,  $P(B) = \frac{1}{2}$  and  $P(A \cap B) = \frac{1}{8}$  find  $P(A' \cap B')$

**Solution:** Given,

$$P(A) = \frac{1}{4} \quad (13.2.9.1)$$

$$P(B) = \frac{1}{2} \quad (13.2.9.2)$$

$$P(A, B) = \frac{1}{8} \quad (13.2.9.3)$$

$$P(A', B') = P(A + B)' \quad (13.2.9.4)$$

$$= 1 - P(A + B) \quad (13.2.9.5)$$

$$= 1 - [P(A) + P(B) - P(A, B)] \quad (13.2.9.6)$$

$$= 1 - \left( \frac{1}{4} + \frac{1}{2} - \frac{1}{8} \right) \quad (13.2.9.7)$$

$$= 1 - \left( \frac{2}{8} + \frac{4}{8} - \frac{1}{8} \right) \quad (13.2.9.8)$$

$$= 1 - \frac{5}{8} \quad (13.2.9.9)$$

$$= \frac{3}{8} \quad (13.2.9.10)$$

$$\boxed{P(A', B') = \frac{3}{8}} \quad (13.2.9.11)$$

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<sup>1</sup>Read question numbers as (CHAPTER NUMBER).(EXERCISE NUMBER).(QUESTION NUMBER)