

Q. The probabilities that A and B will die within a year are p and q respectively, then the probability that only one of them will be alive at the end of the year is:-

Soln:- Required probability is $P[(A \text{ will die and } B \text{ will live}) \text{ or } (B \text{ will die and } A \text{ alive})]$. $\therefore P[(A \cap B') \cup (B \cap A')]$

as events are independent

$$\text{So } P = P(A) \times P(B') + P(B) \cdot P(A')$$

$$= P(1-q) + q(1-p)$$

$$= p + q - 2pq.$$