Example 1 (Independent events, reunion, intersection)

Consider A and B, two events from a sample space S.

A and B are independent and equally likely.

With $P(A \cap B) = 0.25$, calculate $P(\bar{A} \cap \bar{B})$.

Answer:

If A and B are independent, $P(A \cap B) = P(A) \times P(B)$, so $P(A) \times P(B) = 0.25$

Considering that $P(A) = P(B) = \sqrt{0.25} = 0.5$,

$P(A \cup B) = P(A) + P(B) - P(A \cap B) = 0.5 + 0.5 - 0.25 = 0.75$

As $P(\bar{A} \cap \bar{B}) = 1 - P(A \cup B) = 1 - 0.75 = 0.25$

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