

2. Assume that A, B, C and D are four mutually independent events, having the probability of 0.32, 0.46, 0.71 and 0.55 respectively. Compute

(a) $\Pr[(A \cap \bar{B}) \cup (B \cap \bar{C}) \cup (C \cap \bar{D}) \cup (D \cap \bar{A})]$

We have : $(A \cap \bar{B}) \cup (B \cap \bar{C}) = (A \cup \bar{C}) \cap (B \cup \bar{B}) = (A \cup \bar{C})$

and : $(C \cap \bar{D}) \cup (D \cap \bar{A}) = (C \cup \bar{A}) \cap (D \cup \bar{D}) = (C \cup \bar{A})$

So :

$\Pr[(A \cap \bar{B}) \cup (B \cap \bar{C}) \cup (C \cap \bar{D}) \cup (D \cap \bar{A})] = \Pr[(A \cup \bar{C}) \cap (C \cup \bar{A})] = 1$

(b) $\Pr[(\bar{A} \cup \bar{B} \cup C) \cap (C \cap \bar{D})]$

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