Esercizio 1

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$P(A) = \frac{1}{3}$

$P(B) = \frac{1}{4}$

$P(A \cap B) = \frac{1}{12}$

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② Sono INDIPENDENTI ?

$P(A \cap B) = P(A) \cdot P(B)$

$P(A) \cdot P(B) = \frac{1}{3} \cdot \frac{1}{4} = \frac{1}{12}$

$P(A \cap B) = \frac{1}{12}$

A e B Sono indipendenti

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① $P(A \cup B)$, Siccome e Sono indipendenti

$P(A \cup B) = 1 - P(\bar{A}) \cdot P(\bar{B})$

$= 1 - [1 - P(A)] \cdot [1 - P(B)]$

$\longrightarrow$

$P(A \cup B) = P(\overline{\overline{A \cup B}})$

$= 1 - P(\overline{A \cup B})$

$= 1 - P(\bar{A} \cap \bar{B})$ → Siccome $\bar{A}$ e $\bar{B}$ sono indipend.

$= 1 - P(\bar{A}) \cdot P(\bar{B})$

$= 1 - [1 - P(A)] \cdot [1 - P(B)]$

$= 1 - [1 - \frac{1}{3}] \cdot [1 - \frac{1}{4}]$

$= 1 - \frac{2}{3} \cdot \frac{3}{4} = 1 - \frac{6}{12} = 1 - \frac{1}{2} = \frac{1}{2}$

$= 1 - P(\bar{A} \cap \bar{B})$ → Siccome $\bar{A}$ e $\bar{B}$ sono indipend.

$= 1 - P(\bar{A}) \cdot P(\bar{B})$

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(2) Essendo A e B indipendenti lo sono anche i complementi

- $P(A \cap \bar{B}) = P(A) \cdot P(\bar{B}) = \frac{1}{3} \cdot \frac{3}{4} = \frac{3}{12} = \frac{1}{4}$
- $P(\bar{A} \cap B) = P(\bar{A}) \cdot P(B) = \frac{2}{3} \cdot \frac{1}{4} = \frac{2}{12} = \frac{1}{6}$
- $P(\bar{A} \cap \bar{B}) = P(\bar{A}) \cdot P(\bar{B}) = \frac{2}{3} \cdot \frac{3}{4} = \frac{6}{12} = \frac{1}{2}$

$P(\bar{A} \cup \bar{B}) = [P(\bar{A}) + P(\bar{B}) - P(\bar{A} \cap \bar{B})$

$= \frac{3}{4} + \frac{2}{3} - \frac{1}{2} = \frac{9+8-6}{12} = \frac{11}{12}$

$$P(\bar{A} \cup \bar{B}) = 1 - P(A) \cdot P(B)$$

$$= 1 - \frac{1}{4} - \frac{1}{3}$$

$$= 1 - \frac{1}{12}$$

$$= \frac{11}{12}$$