

UTB
EXAMENS Probabilität

299)

L = La Vaujeurois

E = EL pairs.

$$P(L) = 0,23$$

$$P(E) = 0,14$$

$$P(L \cap E) = 0,06$$

$$a) P(L | E) = \frac{P(L \cap E)}{P(E)} = \frac{0,06}{0,14} = \frac{3}{7}$$

$$b) P(E | L) = \frac{P(E \cap L)}{P(L)} = \frac{0,06}{0,23} = \frac{6}{23}$$

c) EL premier a point sur 42185x. approx.
" deux " " 2608x. approx.

300)

~~$$P(M) = 0,06$$~~

~~$$P(C) = 0,08$$~~

~~$$P(M \cap C) = 0,02$$~~

$$a) P(A) = 0,06$$

$$P(B) = 0,08$$

$$P(A \cap B) = 0,02$$

$$b) P(A \cup B) = P(A) + P(B) - P(A \cap B)$$

$$= 0,06 + 0,08 - 0,02$$

$$= \frac{3}{25} = \boxed{0,12}$$

$$301) \begin{aligned} p(A) &= 0,5 \\ p(B) &= 0,3 \\ p(A \cap B) &= 0,1 \end{aligned}$$

$$a) p(A|B) = \frac{p(A \cap B)}{p(B)} = \frac{0,1}{0,3} = \frac{1}{3}$$

$$p(A|A \cap B) = \frac{p(A \cap (A \cap B))}{p(A \cap B)} = \frac{p(A \cap B)}{p(A \cap B)} = 1$$

$$b) p(A \cap B | A \cup B) = \frac{p((A \cap B) \cap (A \cup B))}{p(A \cup B)}$$

$$= \frac{p(A \cap B)}{p(A \cup B)} = \frac{0,1}{0,7} = \frac{1}{7}$$

$$\begin{aligned} \alpha) (A \cap B) \cap (A \cup B) &= [(A \cap B) \cap A] \cup [(A \cap B) \cap B] \\ &= (A \cap B) \cup (A \cap B) \\ &= A \cap B \end{aligned}$$

$$\begin{aligned} \beta) p(A \cup B) &= p(A) + p(B) - p(A \cap B) \\ &= 0,5 + 0,3 - 0,1 = 0,7 \end{aligned}$$

304)

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

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

$$0.7 = 0.4 + 0.5 - x$$

$$x = 0.4 + 0.5 - 0.7$$

$$x = \underline{0.2}$$

$$P(A^c \cap B^c) = P((A \cup B)^c) = \cancel{P} 1 - P(A \cup B)$$

$$= 1 - 0.2 = 0.8$$

305). $P(B) = 0.3$

$$P(A|B) = 0.1$$

~~$$P(A \cap B) = ?$$~~

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

$$\Rightarrow 0.1 = \frac{P(A \cap B)}{0.3} \Rightarrow \underline{P(A \cap B) = 0.03}$$

EXERCICIS VIIB

PROBABILITAT

17) Si sabem que la probabilitat dels esdeveniments A , B , $A \cap B$ és $p(A) = \frac{1}{3}$, $p(B) = \frac{2}{5}$ i $p(A \cap B) = \frac{1}{15}$, troba les probabilitats

a) que es compleixi algun dels esdeveniments A o B

$$p(A \cup B) = p(A) + p(B) - p(A \cap B)$$

$$p(A \cup B) = \frac{1}{3} + \frac{2}{5} - \frac{1}{15} = \frac{2}{3}$$

b) que no es compleixi A però sí B .

~~probabilitat~~

$$p(B - A) = p(B) - p(A \cap B) = \frac{2}{5} - \frac{1}{15} = \frac{1}{3}$$

$$c) p((A - B) \cup (B - A)) = p(A - B) + p(B - A)$$

$$\left[\begin{array}{l} p(A - B) = p(A) - p(B \cap A) \\ = \frac{4}{15} \end{array} \right] - \frac{p((A - B) \cap (B - A))}{\begin{array}{l} p(\emptyset) \\ = 0 \end{array}} = \frac{4}{15} + \frac{1}{3} = \frac{3}{5}$$

$$d) p(A^c \cap B^c) = p((A \cup B)^c) = 1 - p(A \cup B) \\ = 1 - \frac{2}{3} = \frac{1}{3}$$

12) En un jour hi ha dues classes...

$$p(A) = 0,75$$

$$p(B) = 0,85$$

$$p(A \cap B) = 0,65$$

a) s'activa alguna de les dues

$$p(A \cup B) = p(A) + p(B) - p(A \cap B)$$

$$= 0,75 + 0,85 - 0,65$$

$$= 0,95$$

b) s'activa només una

$$p((A \setminus B) \cup (B \setminus A)) = p(A \setminus B) + p(B \setminus A)$$

$$- p((A \setminus B) \cap (B \setminus A))$$

$$= (0,75 - 0,65) + (0,85 - 0,65)$$

$$= 0$$

$$= 0,3$$

c) no se n'activa cap

$$p((A \cup B)^c) = 1 - p(A \cup B) = 1 - 0,95 = 0,05$$

1a) Determina si són compatibles o incompatibles els esdeveniments A i B , sabent que

$$P(A) = \frac{1}{4}, P(B) = \frac{1}{2} \text{ i } P(A \cup B) = \frac{2}{3}$$

A , B són incompatibles si, i només, si $A \cap B = \emptyset$

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

$$\Rightarrow \frac{2}{3} = \frac{1}{4} + \frac{1}{2} - P(A \cap B)$$

$$\Rightarrow P(A \cap B) = \frac{1}{4} + \frac{1}{2} - \frac{2}{3} = \frac{1}{12}$$

Com que $P(A \cap B) = \frac{1}{12} \Rightarrow A \cap B \neq \emptyset$,

per tant sabem que ~~$P(A \cap B) = 0$~~ $P(\emptyset) = 0$.

2a) Dels esdeveniments ...

$$P(A) = \frac{2}{5}$$

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

$$P(A^c \cap B^c) = \frac{1}{3}$$

$$P(A \cup B) ?$$

$$\Rightarrow P(A \cap B) ?$$

$$\begin{aligned} \text{a) } P(A^c \cap B^c) &= P((A \cup B)^c) = 1 - P(A \cup B) \\ \frac{1}{3} &= 1 - P(A \cup B) \end{aligned}$$

$$\Rightarrow P(A \cup B) = 1 - \frac{1}{3} = \frac{2}{3}$$

$$\begin{aligned} \text{b) } P(A \cup B) &= P(A) + P(B) - P(A \cap B) \\ \frac{2}{3} &= \frac{2}{5} + \frac{1}{3} - P(A \cap B) \end{aligned}$$

$$\Rightarrow P(A \cap B) = \frac{2}{5} + \frac{1}{3} - \frac{2}{3} = \frac{1}{15}$$