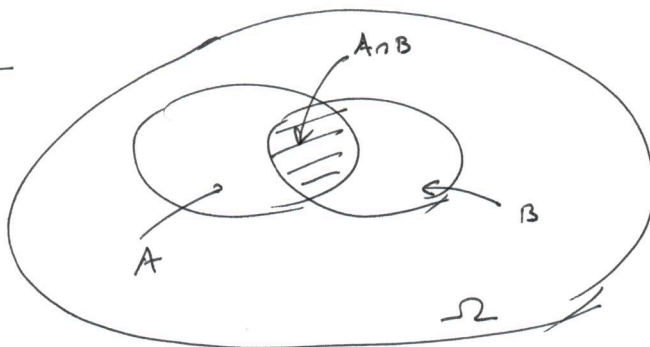


Contrôle 1, corrigé

Ex. 1.



a) $P(A \cap B) = P(A)P(B) = pq$ car A, B indépendants.

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

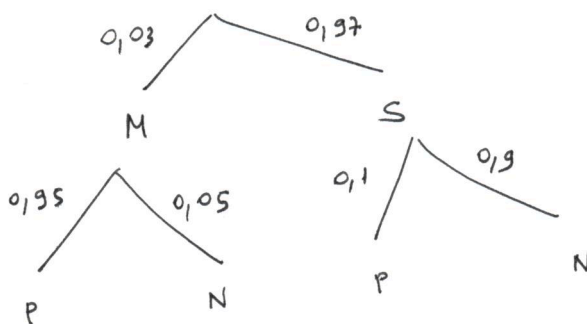
c) $P(A \setminus B) = P(A) - P(A \cap B) = p - pq$

d) $P(A \setminus B) + P(B \setminus A) = p - pq + P(B) - P(A \cap B) = p - pq + q - pq = p + q - 2pq$

e) $P(\overline{A \cup B}) = 1 - P(A \cup B) = 1 - p - q + pq = (1-p)(1-q)$

Ex 2.

M = malade
 S = sain
 P = positif
 N = négatif



a) $P(P) = P(P|M)P(M) + P(P|S)P(S) = 0,95 \cdot 0,03 + 0,1 \cdot 0,97 = 0,13$ (p. totales)

b) $P(M|P) = \frac{P(P|M)P(M)}{P(P)} = \frac{0,95 \cdot 0,03}{0,95 \cdot 0,03 + 0,1 \cdot 0,97} = 0,22$
 (Bayes)

c) $P(S|P) = 1 - P(M|P) = 0,77$

d) $P(M|N) = \frac{P(N|M)P(M)}{P(N)} = \frac{0,05 \cdot 0,03}{0,05 \cdot 0,03 + 0,9 \cdot 0,97} = 1,7 \cdot 10^{-3}$
 ou bien: $P(N) = 1 - P(P)$

e) $P(S|N) = P(\overline{M}|N) = 1 - P(M|N) = 0,998$