Corrigé TE N°5 – Analyse combinatoire et probabilité – 3MG – Niv 1

⚠ Ex. 1. faute de frappe : "chaine"

Ex. 1 :

2 a) $C_4^{15} = \frac{15!}{11!\,4!} = \underline{1365}$

2 b) $(P_2)^4 \cdot P_4 = 2^4 \cdot 4! = \underline{384}$

2 c) 1) $\overline{A}_8^4 = 4^8 = \underline{65'536}$

2 2) $C_2^8 \cdot C_2^6 \cdot C_2^4 \cdot \underbrace{C_2^2}_{1} = \underbrace{\frac{8!}{6!\,2!}}_{28} \cdot \underbrace{\frac{6!}{4!\,2!}}_{15} \cdot \underbrace{\frac{4!}{2!\,2!}}_{6} = \underline{2520}$

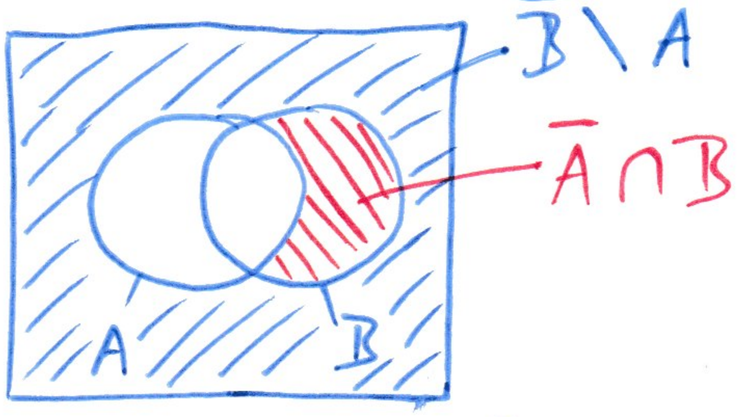
2 d) $A_3^{51} = \frac{51!}{48!} = \underline{124'950}$

Ex. 2 :

1 a) $\overline{A} = \{FFg\,;\,FgF\,;\,gFF\,;\,FFF\}$, $\overline{B} = \{FFF\,;\,ggg\}$

$\Rightarrow \overline{A} \cap \overline{B} = \{FFF\}$: il n'y a que des filles. 1

1.5 b) 1



$\Rightarrow$ Oui, ils sont incompatibles ! 1/2

(Démo. aussi possible à partir des éléments des ensembles)

2.5 c) $P(A) = \left(\frac{1}{2}\right)^3 + \left(\frac{1}{2}\right)^3 \cdot 3 = \frac{4}{8} = \frac{1}{2}$

$P(B) = 1 - 2 \cdot \left(\frac{1}{2}\right)^3 = \frac{6}{8} = \frac{3}{4}$

$P(A \cap B) = 3 \cdot \left(\frac{1}{2}\right)^3 = \frac{3}{8}$

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

$\Rightarrow$ Oui, les événements sont indépendants. 1/2

2

Ex. 3 :

2 a) $\frac{15}{100} \cdot \left(\frac{85}{100}\right)^9 \cdot 10 \simeq \underline{34,74\%}$

2 b) $\frac{15}{100} \cdot \frac{90}{100} = \frac{27}{200} = \underline{13,5\%}$

2 c) $\left(1 - \frac{27}{200}\right)^4 \cdot \frac{27}{200} \simeq \underline{7,56\%}$

3 d) $1 - \left(1 - \frac{27}{200}\right)^n > 95\%$

$$\left(\frac{173}{200}\right)^n < \frac{5}{100} \Rightarrow n > \frac{\ln\left(\frac{5}{100}\right)}{\ln\left(\frac{173}{200}\right)} \simeq 20,66 \Rightarrow \boxed{n = 21}$$

2 e) $\left(\frac{15}{100} \cdot \frac{10}{100} + \frac{85}{100}\right) \cdot \left(\frac{15}{100} \cdot \frac{20}{100} + \frac{85}{100}\right) = \underline{76,12\%}$

2 f) $\frac{10}{100} \cdot \frac{1}{2} + \frac{20}{100} \cdot \frac{1}{2} = \frac{3}{20} = \underline{15\%}$

2 g) $\dfrac{\frac{20}{100} \cdot \frac{1}{2}}{\frac{3}{20}} = \frac{2}{3} \simeq \underline{66,67\%}$

Ex. 4 :

$$P(\text{Pluie} / \text{Gagné}) = \frac{P(\text{Pluie} \cap \text{Gagné})}{P(\text{Gagné})} = \frac{\frac{1}{5} \cdot \frac{4}{10}}{\frac{1}{5} \cdot \frac{4}{10} + \frac{4}{5} \cdot \frac{7}{10}} = \frac{1}{8} = 12,5\%$$