

CORRECTION DU TEST N°05

E est l'ensemble des boules numérotées de 1 à 30 inclus. On choisit au hasard l'une de ces boules.

On considère les évènements :

A = "il est un multiple de 2"

B = "il est un multiple de 3"

C = "il est un multiple de 6"

D = "il est un multiple de 2 mais pas de 6"

1- Donner, en extension, les ensembles A, B, C, D .

$$A = \{2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30\}$$

$$B = \{3, 6, 9, 12, 15, 18, 21, 24, 27, 30\}$$

$$C = \{6, 12, 18, 24, 30\}$$

$$D = \{2, 4, 8, 10, 14, 16, 20, 22, 26, 28\}$$

2- Calculer les probabilités de A, B, C, D .

$$\Omega = \llbracket 1, 30 \rrbracket$$

$$|\Omega| = 30$$

Il y a équiprobabilité car le choix se fait au hasard

$$P(A) = \frac{15}{30} = \frac{1}{2} = \frac{3}{6}$$

$$P(C) = \frac{5}{30} = \frac{1}{6}$$

$$P(B) = \frac{10}{30} = \frac{1}{3} = \frac{2}{6}$$

$$P(D) = \frac{10}{30} = \frac{1}{3} = \frac{2}{6}$$

3- Calculer la probabilité de $A \cap B, A \cup B, A \cap C, \bar{A} \cap \bar{B}, B \cap C, A \cap B \cap C$ puis $A \cup B \cup C$

$$P(A \cap B) = P(C) = \frac{1}{6} \quad \text{car } A \cap B = C$$

$$P(A \cup B) = P(A) + P(B) - P(A \cap B) = \frac{3}{6} + \frac{2}{6} - \frac{1}{6} = \frac{4}{6} = \frac{2}{3}$$

$$P(A \cap C) = P(C) = \frac{1}{6} \quad \text{car } A \cap C = C$$

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

$$P(B \cap C) = P(C) = \frac{1}{6} \quad \text{car } B \cap C = C$$

$$P(A \cap B \cap C) = P(C) = \frac{1}{6} \quad \text{car } A \cap B \cap C = C$$

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

$$P(A \cup B \cup C) = \frac{3}{6} + \frac{2}{6} + \frac{1}{6} - \frac{1}{6} - \frac{1}{6} - \frac{1}{6} + \frac{1}{6} = \frac{4}{6} = \frac{2}{3}$$