UNIVERSITE DE CERGY-POINTOISE
L2 ECO-FIN-G
Cours de Probabilités.
Imèd CHERIF

TD 1

Exercice 1 : Soit $E = \{0,1,2\}$.
Déternimer $\mathcal{P}(\mathrm{E})$, la famille de toutes les parties de E.

Exercice 2 : Soit $E = \{(0,1),(1,0),(1,1)\}$.
Déternimer $\mathcal{P}(\mathrm{E})$, la famille de toutes les parties de E.

Exercice 3 : Soit $E = \{a,b,c,d,e\}$. Soit $A = \{a,b\}, B = \{b,d,e\}$ et $C = \{a,e\}$.
Déterminer : $\boxed{1}\, A \cup B$, $\boxed{2}\, A \cap B$, $\boxed{3}\, \overline{A}$, $\boxed{4}\, A \backslash B$, $\boxed{5}\, A \cap \overline{B}$, $\boxed{6}\, (A \cup B) \cup C$, $\boxed{7}\, A \cup (B \cup C)$, $\boxed{8}\, (A \cap B) \cap C$, $\boxed{9}\, A \cap (B \cap C)$, $\boxed{10}\, A \cap (B \cup C)$, $\boxed{11}\, (A \cap B) \cup (A \cap C)$, $\boxed{12}\, A \cup (B \cap C)$, $\boxed{13}\, (A \cup B) \cap (A \cup C)$, $\boxed{14}\, \overline{A \cup B}$, $\boxed{15}\, \overline{A} \cap \overline{B}$, $\boxed{16}\, \overline{A \cap B}$, $\boxed{17}\, \overline{A} \cup \overline{B}$.

Exercice 4 : Soit E un ensemble. Soit A, B et C trois sous-ensembles de E.
Montrer que :
$\boxed{1}\, A \subset A \cup B$ $\boxed{2}\, A \cap B \subset A$ $\boxed{3}\, A \cup A = A$ $\boxed{4}\, A \cap A = A$ $\boxed{5}\, A \cup E = E$ $\boxed{6}\, A \cap E = A$
$\boxed{7}\, A \cup \varnothing = A$ $\boxed{8}\, A \cap \varnothing = \varnothing$ $\boxed{9}\, A \cup B = B \cup A$ $\boxed{10}\, A \cap B = B \cap A$
$\boxed{11}\, (A \cup B) \cup C = A \cup (B \cup C)$ $\boxed{12}\, (A \cap B) \cap C = A \cap (B \cap C)$
$\boxed{13}\, A \cap (B \cup C) = (A \cap B) \cup (A \cap C)$ $\boxed{14}\, A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$ $\boxed{15}\, \overline{\overline{A}} = A$
$\boxed{16}\, \overline{\varnothing} = E$ $\boxed{17}\, \overline{E} = \varnothing$ $\boxed{18}\, \overline{A \cup B} = \overline{A} \cap \overline{B}$ $\boxed{19}\, \overline{A \cap B} = \overline{A} \cup \overline{B}$.

Exercice 5 : Soit E un ensemble. Soit A et B deux sous-ensembles de E.
On pose $A \Delta B = (A \backslash B) \cup (B \backslash A)$.
Montrer que: $A \backslash B = A \cap \overline{B}$.
En déduire que : $A \Delta B = (A \cup B) \backslash (A \cap B)$.

Exercice 6 : Soit $E = [1,2]$ et $F = [3,4]$.
Déterminer et tracer les produits cartésien $E \times F$ et $F \times E$.

On rappelle que :
$A \cup B = \left\{x \in E \,/\, x \in A \text{ } \underline{ou} \text{ } x \in B\right\}$, $A \cap B = \left\{x \in E \,/\, x \in A \text{ } \underline{et} \text{ } x \in B\right\}$,
$A \backslash B = \left\{x \in E \,/\, x \in A \text{ } \underline{et} \text{ } x \notin B\right\}$, $\overline{A} = \left\{x \in E \,/\, x \notin A\right\}$.