

University of Djilali Bounaama - Khemis Miliana

Faculty of Economic, Commercial, and Management Sciences

Level: First Year (Branch 2)

Subject: Statistics 2

Exercise Series No. 1: (Set Theory, Experiments, and Events)

Exercise 1: Given the following sets: $U = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$

$$A = \{1, 3, 5, 7, 9\} \quad B = \{2, 4, 6, 8, 10\}$$

1. **Identify:** $A \cap B$; $A \cup B$; $A - B$; $B - A$
2. **Find:** \bar{A} ; \bar{B}
3. **Are the sets A and B disjoint (mutually exclusive)?** Explain why.

Exercise 2: Given the following sets: $\Omega = \{a, b, c, d, e, f\}$ $A = \{a, c, b\}$
 $B = \{b, c, d\}$

1. **Identify:** $A \cap B$; $A \cup B$; $\bar{A} \cap B$; $\overline{B \cup A}$
2. **Verify:** $\overline{B \cap A} = \bar{B} \cup \bar{A}$ (De Morgan's Law).

Exercise 3: Given the following sets:

$$\Omega = \{1, 2, 3, 4, \dots, 20\} \quad A = \{\text{Even numbers}\} \quad B = \{\text{Multiples of 3}\}$$

1. **Find:** A ; B
2. **Identify:** $A \cap B$; $A \cup B$; $A - B$; \bar{B}

Exercise 4 : Consider an experiment consisting of rolling a die once.

1. **Find the Sample Space (Omega)** of the experiment.
2. **Identify the elements of sets A and B**, where:
 - o **Event A:** Obtaining an even number.
 - o **Event B:** Obtaining a prime number.
3. **Find a set of events mutually exclusive to Event A.**