Setif1 University *TC-SM*
Faculty of sciences

Maths1
1^{st} Guided Works

Exercise 1

1. Which of the following is the set of all oceans on earth :
$E = \{Atlantic, Pacific, Arctic, Indian, Antarctic\}$
$F = \{Amazon, Nile, Mississippi, RiograND, Niagara\}$
$G = \{Asia, Africa, NorthAmerica, SouthAmerica, Antarctica, Europe, Australia\}$
All of the above.

2. Which of the following is the set of all types of matter :
$X = \{Iron, Aliminum, Nickel, Copper, Gold, Silver\}$
$Y = \{Hydrogen, Oxygen, Nitrogen, Carbondioxide\}$
$Z = \{Liquids, Solids, Gases, Plasmas\}$
None of the above.

Exercise 2

1. Write the following sets by listing their elements

(a) $S_1 = \{n \in \mathbb{N} : 5 < n < 11\}$

(b) $S_2 = \{n \in \mathbb{Z} : 5 < |n| < 11\}$

(c) $S_3 = \left\{x \in \mathbb{R} : x^2 + 2 = 0\right\}$

(d) $S_4 = \left\{x \in \mathbb{C} : x^2 + 2 = 0\right\}$

(e) $S_5 = \left\{x \in \mathbb{Z} : x^2 < 1000\right\}$

2. State the cardinality of each set above ($Card\ S_i = ...$), $i = 1, 2, 3, 4, 5$

Exercise 3

Rewrite each of the following sets in the form : $\{x \in S : \textbf{some prperties on } x\}$

(a) $A_1 = \{1, 3, 5, 7, 9, ...\}$ where $S = \mathbb{N}$.

(b) $A_2 = \{1, 8, 27, 64, ...\}$ where $S = \mathbb{N}$.

(c) $A_3 = \{-1, 0\}$ where $S = \{-1, 0, 1\}$.

Exercise 4

Let A, B and C three arbitrary sets, show the following statments :

1. $A \cup (B \cap C) = (A \cup B) \cap (A \cap C)$

2. $A \cap (B \cup C) = (A \cap B) \cup (A \cap C)$ (for students).

3. Suppose A and B are subsets of a set E, show that :

(1) $C_E^{(A \cup B)} = C_E^A \cap C_E^B$

(2) $C_E^{(A \cap B)} = C_E^A \cup C_E^B$ (for students).

4. Check the truth of the above statments for : $A = [-2, 0]$; $B = [-1, 2[$; $C =]1, 3]$ and $E = \mathbb{R}$.

Exercise 5

I. Do the following operations :

(1) $\{1, 2\} \setminus \{1, 3\}$

(2) $[1, 2] \setminus [1, 3]$

(3) $[1, 3] \setminus [1, 2]$

(4) $]1, 2] \setminus \{1, 3\}$

II. Sketch (tracer) each of the following sets in the Cartesian plane $\mathbb{R}^2$.

(a) $\{1, 2\} \times \{1, 3\}$

(b) $[1, 2] \times [1, 3]$

(c) $]1, 2] \times [1, 3]$

(d) $]1, 2] \times \{1, 3\}$

Good Luck