

Chapter 1 : SETS - ASSIGNMENT

(Based on KITE VICTERS Plus One Mathematics Class 02)

1. (i) Write the following sets in the roster form.
 - a. $A = \{ x : x \text{ is a letter of the word 'LOYAL'} \}$
 - b. $B = \{ x : x \text{ is a letter of the word 'ALLOY'} \}$
- (ii) What is your inference about the sets A and B.

Solution:

- (i) (a) $A = \{L, O, Y, A\}$, (b) $B = \{A, L, O, Y\}$
- (ii) Both A and B represent same set.

2. (i) Write $A = \{x : x \text{ is an integer and } -3 \leq x < 7 \}$ in roster form
- (ii) Consider the above set A. Insert the appropriate symbol \in or \notin in each of the following blank spaces.
 - (a) $-3 \dots A$
 - (b) $9 \dots A$
 - (c) $0 \dots A$
 - (d) $7 \dots A$

Solution:

- (i) $A = \{-3, -2, -1, 0, 1, 2, 3, 4, 5, 6\}$
- (ii) (a) $-3 \in A$ (b) $9 \notin A$ (c) $0 \in A$ (d) $7 \notin A$

3. Write the set

- (i) “The set of all vowels in the word EQUATION” in roster form.
- (ii) “The set of reciprocals of natural numbers” in set-builder form.
- (iii) “The set of all real numbers between 3 and 10” in set-builder form.

Solution:

- (i) $\{E, U, A, I, O\}$
- (ii) $\{x : x = \frac{1}{n}, n \in \mathbb{N}\}$
- (iii) $\{x : 3 < x < 10\}$

4. Write the following sets in set-builder form :

- (i) $A = \{14, 21, 28, 35, 42, \dots, 98\}$
- (ii) $B = \{53, 59, 61, 67, 71, 73, 79, 83, 89, 97\}$

Solution:

- (i) $A = \{x : x \in \mathbb{N}, x \text{ is a multiple of } 7, 7 < x \leq 98\}$
- (or) $A = \{x : x = 7n, n \text{ is a natural number between } 1 \text{ and } 15\}$
- (ii) $B = \{x : x \text{ is a prime number and } 50 < x < 100\}$

5. Write the set of all natural numbers x such that $4x + 9 < 50$ in roster form.

Solution:

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

$$\text{Hint : } 4 \times 1 + 9 = 13 < 50 \quad \therefore 1 \in A$$

$$4 \times 10 + 9 = 49 < 50 \quad \therefore 10 \in A$$

6. How many elements are there in the following sets :

- (i) The set of all solutions of the quadratic equation $x^2 = 25$.
 (ii) The set of squares of all natural numbers.

Solution:

(i) 2 elements [Since $x^2 = 25$, $x = -5, 5$]

(ii) Infinitely many elements [$\{1, 4, 9, 16, \dots\}$]

7. Match the following :

Roster form		Set-builder form	
(i)	$\{1, 4, 7, 10\}$	(a)	$\{x : x = \frac{n}{n+1}, n \text{ is a natural number, } 1 \leq n \leq 6\}$
(ii)	$\{1, 4, 9, 16, 25, 36\}$	(b)	$\{x : x = 5n + 1, n \text{ is a natural number } < 5\}$
(iii)	$\{6, 11, 16, 21\}$	(c)	$\{x : x = \frac{1}{n}, n \text{ is a natural number, } 1 \leq n \leq 6\}$
(iv)	$\left\{\frac{1}{2}, \frac{2}{3}, \frac{3}{4}, \frac{4}{5}, \frac{5}{6}, \frac{6}{7}\right\}$	(d)	$\{x : x = n^2, n \text{ is a natural number less than } 7\}$
		(e)	$\{x : x = 3n - 2, n \text{ is a natural number } \leq 4\}$

Solution:

Roster form		Set-builder form	
(i)	$\{1, 4, 7, 10\}$	(a)	$\{x : x = 3n - 2, n \text{ is a natural number } \leq 4\}$
(ii)	$\{1, 4, 9, 16, 25, 36\}$	(b)	$\{x : x = n^2, n \text{ is a natural number less than } 7\}$
(iii)	$\{6, 11, 16, 21\}$	(c)	$\{x : x = 5n + 1, n \text{ is a natural number } < 5\}$
(iv)	$\left\{\frac{1}{2}, \frac{2}{3}, \frac{3}{4}, \frac{4}{5}, \frac{5}{6}, \frac{6}{7}\right\}$	(d)	$\{x : x = \frac{n}{n+1}, n \text{ is a natural number, } 1 \leq n \leq 6\}$