Sets

Exercise - 5.1

Solution-01:-

(i) It is a set

If we denote the given set by A, then,

$A = \{1, 3, 5, 7, 9, 11, 13, 15, 17, \ldots\ldots\ldots, 43, 45, 47, 49\}$

(ii) It is not a set because the given collection is not well-defined. colors may differ when we choose four among seven.

(iii) It is a set

If we denote the given set by A, then $A = \{Sun, Mon, Tue\}$.

(iv) It is not a set because the given collection is not well defined - people may differ on whether a student tall or not

(v) It is not a set because the given collection is not well defined - people may differ on whether clever may vary in the school.

(vi) It is not a set because the given collection is not well defined. People may differ on whether a rich people in Bengaluru among population or not

(vii) It is not a set because the given collection is not well defined. multiples of 5 may vary in each set.

(viii) collection of all Prime numbers.

It is a set.

If we denote the given set by A, then A = {2, 3, 5, 7, 11, 13, 17, 19, ... }

(ix) It is a set

If we denote the given set by A, then

A = { -4, -2, 2, 4, 6, 8, 10, 12, 14 }.

(x) It is not a set because people may differ on whether a cricket players is good or not

(xi) It is a set.

If we denote the given set by A, then

A = { x, y, z }.

(xii) It is not a set because people may differ on whether a student of school among the people three is healthy students or not.

Solution-02:

(i) $\in$

(ii) $\in$

(iii) $\notin$

(iv) $\notin$

(v) $\notin$

(vi) $\in$

Solution - 03 :-

(i) False

(ii) False

(iii) True

(iv) False

(v) True

(vi) False

Solution - 04 :-

(i) The given set can be written as
$\{1, 3, 5, 7, 9\}$

(ii) The given set can be written as
$\{2, 4, 6, 8, \cdots, 100\}$

(iii) The given set can be written as
{April, August, October}

(iv) The Given set can be written as
$\{1, 4, 9\}$

(v) The given set can be written as
$\{-14, -7, 0, 7, 14, 21\}$

(vi) The given set can be written as
$\{1, 2, 3, 4, 6, 9, 12, 18, 36\}$

(vii) The given set can be written as
$\{2, 3, 5\}$

(viii) The given set can be written as
$\{0, 5, 10, 15, \cdots\}$

(ix) The given set can be written as,
{C, H, E, N, A, I}

(x) The given set can be written as
{U, O, I, E}

(xi) The given set can be written as
{M, T, H, C, S}

Solution-05:-

The given set can be written as

(i) {1, 2, 3, 4, 5, 6}

{ Natural numbers less than 7 }

(ii) { 0, 1, 2, 3, 4, 5 }

{ whole numbers less than or equal to 5 }

(iii) { February, April, June, September, November }

{ Months which are having less than 31 days }

(iv) {C, I, R, C, U, M, F, E, N}

{ Letters in the word CIRCUMFERENCE }

(v) { O, A, I }

{ Vowel in the word NOTATION }.

(vi) { 1, 0, 5, 2, 6, 7 }

{ digit in the numeral 110526715 }

(vii) {1, 2, 3, 4, 6, 8, 12, 16, 24, 48}

{ x is a factor of 48 }

(viii) { 0, 11, 22, 33, 44, 55, 66, 77 }

{ Numbers are multiples of 11 bw $0 \leq x \leq 80$ }

(ix). { 10, 20, 30, 40, ..., 90 }

{ two digit natural numbers which is divisible by 10 }.

Solution-06:-

The set can be written as.

(i) $\{-2, -1, 0, 1, 2, 3\}$ Roster form

$\{x : x \in I, -2 \leq x \leq 3\}$ set Builder form.

(ii) $\{U, L, T, I, M, A\}$: Roster form

$\{x : x$ is a letter in the word 'ULTIMATUM'$\}$

set Builder form

(iii) {January, June, July}: Roster form

$\{x \mid x$ is a month of a year whose name begins with J$\}$. S.B form

(iv) $\{0, 1, 4, 9\}$: Roster form

$\{x \mid x$ is a perfect square 1 digit number$\}$

set Builder form.

Solution-07:

The given set can be written as.

(i) $\{2, 3, 5, 7, 11, 13, 17, 19, 23, 29\}$ Roster form

{Prime numbers less than 30} descriptive form.

(ii) $\{0, 8, 16, 24, 32, 40, 48\}$ Roster form

{whole numbers which are multiples of 8 and less than 50}.

(iii) $\{Q, S, T, N, P, R\}$: Rostel form

{ constants in the word 'QUESTION PAPER' }

Set Builder form

Solution-08:-

(i) Here, the members of A are whole numbers are lying less than 12 or equal to 11.

$A = \{x : x \in W, x \leq 11\}$

(ii) $B = \{x : x = 7n, n \in N\}$

Multiples of 7 ∈ Natural numbers

(iii) $C = \{x : x = n^2, n \in N \text{ and } n \leq 7\}$

(iv) $D = \{x : x = 3n, n \in I \text{ and } -4 \leq n \leq 6\}$.

Exercise - 5.2

Solution - 01:-

(i) Given $A = \{$ all cours of Rainbow$\}$

$= \{V, I, B, G, I, O, R\}$ which has sven Elements

$n(A) = 7.$

It is a finite set

(ii) Given $A = \{x \mid x$ is a prime numbes blw 7 & 11$\}$

$= \{\ \}$

Empty set

(iii) $\{$ multiples of 5$\}$

$\{5, 10, 15, \ldots$

Infinite set

(iv) $\{$all straight Lines canbedrawn in a plan$\}$

$\{l, m, r, \ldots\}$

Infinite set

(V) $\{x \mid x$ is a digit in the numeral 5501315277$\}$

$\{5, 0, 1, 3, 2, 7\}$

finite set, 6

$n(A) = 6$

(vi) $\{x \mid x$ is a letter in the word 'SUFFICIENT'$\}$

$\{S, U, F, I, C, E, N, T\}$.

finite set

$n(A) = 8$.

(vii) $\{x \mid x$ is a vowel in the word MATHEMATICS$\}$

$\{A, E, I\}$

finite set

$n(A) = 3$

(viii) $\{x : x$ is an even whole number and $x \leq 20\}$

$\{0, 2, 4, 6, 8, 10, 12, 14, 16, 18, 20\}$

finite set

$n(A) = 11$.

(ix) $\{x : x \in I$ and $-2 \leq x < 5\}$

$\{-2, -1, 0, 1, 2, 3, 4\}$

finite set

$n(A) = 7$.

(x) $\{x : x$ is a prime number less than 25$\}$

$\{2, 3, 5, 7, 11, 13, 17, 19, 23\}$.

finite set

$n(A) = 9$.

(xi) $\{x : x$ is a prime factor of $180\}$

$\{2, 3, 5\}$, $n(A) = 3$.

(xii) $\{x : x \in N$ and x is a composite number $< 12\}$

$\{4, 6, 8, 9, 10, 12\}$

finite set, 5.

Solution - 02

(i) $A = \{2, 4, 6, 8, 10\}$

$B = \{$even natural numbers$\}$

$= \{8, 10, 12, 14, 16\}$

$A \neq B$

(ii) $A = \{3, 5, 7, 9, 11, 13\}$

$B = \{$odd natural numbers between 2 and 14$\}$

$B = \{3, 5, 7, 9, 11, 13\}$

$A = B$

(iii) $A = \{$PUPPET$\}$ $B = \{P, U, E, T\}$

$A = B$.

(iv) $A = \{x | x$ is a letter in the word SOPHIA$\}$

$B = \{x | x$ is a letter in the word MUMTAZ$\}$

$A = \{S, O, P, H, I, A\}$

$B = \{M, U, T, A, Z\}$

$A \neq B$.

(V) $A = \{$ kids 5 meters tall $\}$

$B = \{x : x \in N \text{ and } 2x = 3\}$

$A = B.$

Solution - 03.

Given that

$A = \{2, 5, 7, 8, 10\}$

$B = \{5, 7, 2, x, 10\}$

$B = \{2, 5, 7, x, 10\}$

$A = B$

then

$\boxed{x = 8}$

the numerator and denominator of the first fraction by 5.

So $\frac{2}{3} = \frac{2 \times 5}{3 \times 5}$

$= \frac{10}{15}$.

(ii) $\frac{7}{18} = \frac{42}{\square}$

The denominator in the first fraction is 18.

Numerator in the first fraction is 7.

∴ To make both fractions equal, we multiply the numerator and denominator of the first fraction by '6'

$\frac{7}{18} = \frac{7 \times 6}{18 \times 6} = \frac{42}{108}$

(iii) $\frac{4}{\square} = \frac{12}{15}$.

The numerator in the second fraction is 12.

∴ To make both fractions equal, we multiply the numerator and denominator of the first fraction by $\frac{1}{3}$

$\boxed{\frac{4}{\square} = 4x}$ $\quad \frac{12}{15} = \frac{12 \times \frac{1}{3}}{15 \times \frac{1}{3}}$

$\Rightarrow \frac{4}{5} = \frac{12}{15}$.