

Sets

Exercise - 5.1

Solution - 01:-

(i) It is a set

If we denote the given set by A , then

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

(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 $A = \{\text{Sun, Mon, Tue}\}$

(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 $A = \{2, 3, 5, 7,$

$11, 13, 17, 19, \dots\}$.

(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 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 $\{2, 4, 6, 8, \dots, 100\}$
- (iii) The given set can be written as $\{\text{April, August, October}\}$
- (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 $\{0, 5, 10, 15, \dots\}$
- (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) $\{1, 2, 3, 4, 5, 6\}$

$\{ \text{Natural numbers less than } 7 \}$

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

$\{ \text{Whole numbers less than or equal to } 5 \}$

(iii) $\{ \text{February, April, June, September, November} \}$

$\{ \text{Months which are having less than } 31 \text{ days} \}$

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

$\{ \text{Letters in the word CIRCUMFERENCE} \}$

(v) $\{O, A, I\}$

$\{ \text{Vowel in the word NOTATION} \}$

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

$\{ \text{digit in the numeral } 110526715 \}$

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

$\{ x \mid x \text{ is a factor of } 48 \}$

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

$\{ \text{Numbers are multiples of } 11 \text{ b/w } 0 \leq x \leq 80 \}$

(ix) $\{10, 20, 30, 40, \dots, 90\}$

$\{ \text{two digit natural numbers which is} \\ \text{divisible by } 10 \}$

Solution-06:-

The set can be written as.

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

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

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

$\{x : x \text{ is a letter in the word 'ULTIMATUM'}\}$
Set Builder form

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

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

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

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

$\{\text{Prime numbers less than } 30\}$ descriptive form.

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

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

ciii) $\{Q, S, T, N, P, R\}$: Roster form

$\{ \text{constants in the word 'QUESTION PAPER'} \}$

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 $\in$ 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 $A = \{ \text{all colors of Rainbow} \}$
 $= \{ V, I, B, G, Y, O, R \}$ which has seven elements

$$n(A) = 7.$$

It is a finite set

- (ii) Given $A = \{ x \mid x \text{ is a prime number, } 6 < x < 11 \}$
 $= \{ \}$

Empty Set

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

$$\{ 5, 10, 15, \dots \}$$

Infinite set

- (iv) $\{ \text{all straight lines can be drawn in a plane} \}$
 $\{ l, m, n, \dots \}$

Infinite set

- (v) $\{ x \mid x \text{ is a digit in the numeral } 550131527 \}$

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

finite set, $\emptyset$

$$n(A) = 6$$

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

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

finite set

$$n(A) = 8.$$

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

$\{A, E, I\}$

finite set

$$n(A) = 3$$

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

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

finite set

$$n(A) = 11.$$

(ix) $\{x : x \in \mathbb{Z} \text{ and } -2 \leq x \leq 5\}$

$\{-2, -1, 0, 1, 2, 3, 4, 5\}$

finite set

$$n(A) = 7.$$

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

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

finite set

$$n(A) = 9.$$

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

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

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

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

finite set, 5

Solution - 02

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

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

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

$$A \neq B$$

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

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

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

$$A = B$$

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

$$A = B$$

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

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

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

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

$$A \neq B$$

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

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

$A = B.$

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

$x = 8$

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the numerator and denominator of the first fraction by 5.

$$\text{So } \frac{2}{3} = \frac{2 \times 5}{3 \times 5} \\ = \frac{10}{15}$$

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

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 $\frac{1}{3}$.

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

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