

RD Sharma
Solutions
Class 11 Maths
Chapter 1
Ex 1.3

Sets Ex 1.3 Q1

- (i) This set is non-empty as 10 is an even natural number divisible by 5.
- (ii) As 2 belongs to this set, so it is non-empty.
- (iii) $x^2 - 2 = 0 \Rightarrow x^2 = 2 \Rightarrow x = \pm\sqrt{2} \notin \mathbb{Q}$, the set of rational numbers
So, this set is empty.
- (iv) This set is empty as there is no natural number x such that $x < 8$
and simultaneously $x > 12$.

(v) This set is empty as any two parallel lines never intersect each other.

Sets Ex 1.3 Q2

- (i) Infinite, since with a common centre infinitely many circles can be drawn in a plane.
- (ii) Finite, as there are only 26 letters of English Alphabet.
- (iii) Infinite, $\therefore \{x \in \mathbb{N} : x > 5\} = \{6, 7, 8, \dots\}$ Which is infinite.
- (iv) Finite, $\therefore \{x \in \mathbb{N} : x, 200\} = \{1, 2, 3, \dots, 199\}$ Which is finite.
- (v) Infinite, $\therefore \{x \in \mathbb{Z} : x < 5\} = -\{\dots, -3, -2, -1, 0, 1, 2, 3, 4\}$ Which is infinite.
- (vi) $\{x \in \mathbb{R} : 0 < x < 1\}$ is an infinite set \therefore an interval is an infinite set.

Sets Ex 1.3 Q3

$$A = \{1, 2, 3\}$$
$$B = \{x \in \mathbb{R} : (x - 1)^2 = 0\}$$
$$= \{x \in \mathbb{R} : x = 1, 1\}$$
$$= \{1\}$$
$$C = \{1, 2, 3\} \text{ (}\therefore \text{ repetition is not allowed in a set)}$$
$$D = \{x \in \mathbb{R} : x^3 - 6x^2 + 11x - 6 = 0\}$$
$$= \{x \in \mathbb{R} : (x - 1)(x^2 - 5x + 6) = 0\} \quad [\therefore x = 1 \text{ satisfies the above equation}]$$
$$= \{x \in \mathbb{R} : (x - 1)(x - 2)(x - 3) = 0\}$$
$$= \{x \in \mathbb{R} : x = 1, 2, 3\}$$
$$= \{1, 2, 3\}$$

Hence the set A, C and D are equal.

Sets Ex 1.3 Q4

$$A = \{a, e, p, r\}$$
$$B = \{a, e, p, r\} \text{ (repetition of 'p' is not allowed)}$$
$$C = \{e, o, p, r\}$$

as $A = B \neq C$, \therefore the sets are not equal

Sets Ex 1.3 Q5

Two finite sets are said to be equivalent if they have the same number of elements.
As A and C have same number of elements, and B and D also have same number of elements.

$\therefore A$ is equivalent to C & B is equivalent to D .

Sets Ex 1.3 Q6

(i)
Two sets A and B are said to be equal if every elements of A is an elements of B and vice-versa.

We have, $A = \{2, 3\}$

and $B = \{x : x \text{ is a solution of } x^2 + 5x + 6 = 0\}$

$$= \{x : x^2 + 3x + 2x + 6 = 0\}$$
$$= \{x : x(x + 3) + 2(x + 3) = 0\}$$
$$= \{x : (x + 3)(x + 2) = 0\}$$
$$= \{x : x = -2, -3\}$$
$$= \{-2, -3\}$$

Hence $A \neq B$.

(ii)

$$A = \{W, O, L, F\}$$
$$B = \{F, O, L, W\} \quad [\therefore \text{ repetition is not allowed}]$$
$$= \{W, O, L, F\} \quad [\text{The order in which the elements are written does not matter.}]$$

Hence $A = B$

Sets Ex 1.3 Q7

$$A = \{0, a\}$$
$$B = \{1, 2, 3, 4\}$$
$$C = \{4, 8, 12\}$$
$$D = \{3, 1, 2, 4\}$$
$$= \{1, 2, 3, 4\}$$
$$E = \{1, 0\}$$

$$C = \{0, 4, 14\}$$

$$= \{4, 8, 12\}$$

$$G = \{1, 5, 7, 11\}$$

$$H = \{a, b\}$$

The sets B and D are equal.

The sets C and F are equal.

As A, E and H have same number of elements so they are equivalent.

As B, D and G have same number of elements, so they are equivalent

Also C and F have same number of elements, so they are equivalent.

Sets Ex 1.3 Q8

$$A = \{1, 2\}$$

$$B = \{1, 2\}$$

$$C = \{3, 1\}$$

$$D = \{1, 3\} \quad [\because \text{the odd natural numbers less than 5 are 1 and 3}]$$

$$E = \{1, 2\} \quad [\because \text{repetition is not allowed}]$$

$$F = \{1, 3\} \quad [\because \text{repetition is not allowed}]$$

\therefore A, B and E are equal

Aslo, C, D and F are equal

Sets Ex 1.3 Q9

The set formed by distinct letters of the word "CATARACT" are $\{C, A, T, R\}$.

The set formed by distinct letters of the word "TRACT" are $\{T, R, A, C\}$

Hence the two set are equal.