RD Sharma Solutions Class 11 Maths Chapter 1 Ex 1.2

Sets Ex 1.2 Q1(ii)

In Roster form, we describe a set by listing its elements, reparated by commas and the elements are written within braces$\{\ \}$. If a set has infinitely many elements, them comma is followed by ..., where the dots stand for 'and so on'.

$1 \in N \ \because \ 1^2 = 1 < 25$

$2 \in N \ \because 2^2 = 4 \ < 25$

$3 \in N \ \because 3^2 = 9 \ < 25$

$4 \in N \ \because 4^2 = 16 \ < 25$

Hence , the above set can be written as $\{1, 2, 3, 4\}$

Sets Ex 1.2 Q1(iii)

In Roster form, we describe a set by listing its elements, reparated by commas and the elements are written within braces$\{\ \}$. If a set has infinitely many elements, them comma is followed by ..., where the dots stand for 'and so on'.

We note that $a < x < b$ means tha x is more than a but less than b.

The prime numbers which are more than 10 fact less than 20 are 11,13,17 and 19.

Hence the above set can be written as$\{11, 13, 17, 19\}$

Sets Ex 1.2 Q1(iv)

In Roster form, we describe a set by listing its elements, reparated by commas and the elements are written within braces{ }. If a set has infinitely many elements, them comma is followed by ..., where the dots stand for 'and so on'.

The above set can be written as $\{2,4,6,8...\}$ since all those natural numbers, which can be written as a multiple of 2 are the even natural numbers.

Sets Ex 1.2 Q1(v)

In Roster form, we describe a set by listing its elements, reparated by commas and the elements are written within braces{ }. If a set has infinitely many elements, them comma is followed by ..., where the dots stand for 'and so on'.

We know that given any $x \in R$, x is always less than or equal to itself, i.e $x \le x$
Hence the above set is empty, i.e ϕ.

Sets Ex 1.2 Q1(vi)

In Roster form, we describe a set by listing its elements, reparated by commas and the elements are written within braces{ }. If a set has infinitely many elements, them comma is followed by ..., where the dots stand for 'and so on'.

The Prime divisors of 60 are 2,3,5.
Hence the above set can be written as $\{2,3,5\}$

Sets Ex 1.2 Q1(vii)

In Roster form, we describe a set by listing its elements, reparated by commas and the elements are written within braces{ }. If a set has infinitely many elements, them comma is followed by ..., where the dots stand for 'and so on'.

The above set can be written as
$\{17,26,35,44,53,62,71,80\}$

Sets Ex 1.2 Q1(viii)

In Roster form, we describe a set by listing its elements, reparated by commas and the elements are written within braces{ }. If a set has infinitely many elements, them comma is followed by ..., where the dots stand for 'and so on'.

As repetition is not allowed in a set, the distinct letters are T,R,I,G,O,N,M,E,Y.
Hence the above set can be written as

$$\{T,R,I,G,O,N,M,E,Y\}$$

Sets Ex 1.2 Q1(ix)

In Roster form, we describe a set by listing its elements, reparated by commas and the elements are written within braces{ }. If a set has infinitely many elements, them comma is followed by ..., where the dots stand for 'and so on'.

The distinct letters are B,E,T,R.

Hence the set can be written as

$$\{B,E,T,R.\}$$

Sets Ex 1.2 Q2(i)

In set Builder form, a set is described by some characterizing property $P(x)$ of its elements x.

In this case a set can be described as $\{x : P(x) \text{hold}\}$ or $\{x | P(x) \text{holds}\}$ which is read as 'the set of all x such that $P(x)$ holds'.

The symbols ':' or 'I' is read as 'such that'.

So, the above set A in Set-Builder form may be written as

$$A = \{x \in N : x < 7\}$$

i.e A is the set of natural numbers x such that x is less than 7.

or

$$A = \{x \in N | 1 \le x \le 6\},$$

Sets Ex 1.2 Q2(ii)

In set Builder form, a set is described by some characterizing property $P(x)$ of its elements x.

In this case a set can be described as $\{x : P(x) \text{hold}\}$ or $\{x | P(x) \text{holds}\}$ which is read as 'the set of all x such that $P(x)$ holds'.

The symbols ':' or 'I' is read as 'such that'.

$B = \left\{x : x = \frac{1}{n}, n \in N\right\}$

i.e B is the set of all those x such that $x = \frac{1}{n}$, where $n \in N$

Sets Ex 1.2 Q2(iii)

In set Builder form, a set is described by some characterizing property $P(x)$ of its elements x.

In this case a set can be described as $\{x : P(x) \text{hold}\}$ or $\{x | P(x) \text{holds}\}$ which is read as 'the set of all x such that $P(x)$ holds'.

The symbols ':' or 'I' is read as 'such that'.

$C = \left\{x : x = 3k,\ k \in Z^+, \text{the set of positive integers}\right\}$,

i.e C is the set of multiples of 3 including 0

Sets Ex 1.2 Q2(iv)

In set Builder form, a set is described by some characterizing property $P(x)$ of its elements x.

In this case a set can be described as $\{x : P(x) \text{hold}\}$ or $\{x | P(x) \text{holds}\}$ which is read as 'the set of all x such that $P(x)$ holds'.

The symbols ':' or 'I' is read as 'such that'.

$D = \{x \in N : 9 < x < 16\}$,

i.e D is the set of natural numbers which are more than 9 but less than 16.

Sets Ex 1.2 Q2(v)

In set Builder form, a set is described by some characterizing property $P(x)$ of its elements x.

In this case a set can be described as $\{x : P(x) \text{hold}\}$ or $\{x | P(x) \text{holds}\}$ which is read as 'the set of all x such that $P(x)$ holds'.

The symbols ':' or 'I' is read as 'such that'.

$E = \{x \in Z : -1 < x < 1\}$
or
$E = \{x \in Z : x = 0\}$

Sets Ex 1.2 Q2(vi)

In set Builder form, a set is described by some characterizing property $P(x)$ of its elements x.

In this case a set can be described as $\{x : P(x) \text{hold}\}$ or $\{x | P(x) \text{holds}\}$ which is read as 'the set of all x such that $P(x)$ holds'.

The symbols ':' or 'I' is read as 'such that'.

As $1^2 = 1$
$2^2 = 4$
$3^2 = 9$

.
$10^2 = 100$

$\therefore$ The above set may be described as
$$\{x^2 : x \in N \ \& \ 1 \le x \le 10\}$$

Sets Ex 1.2 Q2(vii)

In set Builder form, a set is described by some characterizing property $P(x)$ of its elements x.

In this case a set can be described as $\{x : P(x) \text{hold}\}$ or $\{x | P(x) \text{holds}\}$ which is read as 'the set of all x such that $P(x)$ holds'.

The symbols ':' or 'I' is read as 'such that'.

The given set can be described as
$\{x : x = 2n, n \in N\}$ ($\because$ 2, 4, 6, ... are multiples of 2)

Sets Ex 1.2 Q2(viii)

In set Builder form, a set is described by some characterizing property $P(x)$ of its elements x.

In this case a set can be described as $\{x : P(x) \text{hold}\}$ or $\{x | P(x) \text{holds}\}$ which is read as 'the set of all x such that $P(x)$ holds'.

The symbols ':' or 'I' is read as 'such that'.

$\because 5^1 = 5$
$5^2 = 25$
$5^3 = 125$
$5^4 = 625$

$\therefore$ The above set can be described as
$$\{x : x = 5^n, 1 \le n \le 4\}$$

Sets Ex 1.2 Q3(i)

The integers whose squares are less than or equal to 10 are:

$(-3)^2 = 9 < 10$
$(-2)^2 = 4 < 10$
$(-1)^2 = 1 < 10$
$0^2 = 0 < 10$
$1^2 = 1 < 10$
$2^2 = 4 < 10$
$3^2 = 9 < 10$

The square of other integers are more than 10

Hence $A = \{0, \pm 1, \pm 2, \pm 3\}$
or
$$A = \{0, -1, -2, -3, 1, 2, 3\}$$

Sets Ex 1.2 Q3(ii)

Let's find the values of $x = \frac{1}{2n - 1}$, for $1 \le n \le 5$

for $n = 1, x = \frac{1}{1} = 1$

for $n = 2,\ x = \frac{1}{2 \times 2 - 1} = \frac{1}{4 - 1} = \frac{1}{3}$

for $n = 3,\ x = \frac{1}{2 \times 3 - 1} = \frac{1}{6 - 1} = \frac{1}{5}$

for $n = 4,\ x = \frac{1}{2 \times 4 - 1} = \frac{1}{8 - 1} = \frac{1}{7}$

for $n = 5,\ x = \frac{1}{2 \times 5 - 1} = \frac{1}{10 - 1} = \frac{1}{9}$

Hence, $B = \left\{1, \frac{1}{3}, \frac{1}{5}, \frac{1}{7}, \frac{1}{9},\right\}$

Sets Ex 1.2 Q3(iii)

Hence $C = \{0,1,3,4,\}$

Sets Ex 1.2 Q3(iv)

The vowels in the word EQUATION are E, U, A, I, O.

Since the order in which the elements of a set are written is unmaterial, $D = \{A, E, I, O, U\}$

Sets Ex 1.2 Q3(v)

A month has either 28, 29, 30 or 31 days.

Out of the 12 months in a year , the months that have 31 days are:
January, March, May, July, August, October, December.

$\therefore E = \{$February, April, June, September, November$\}$

Sets Ex 1.2 Q3(vi)

The distinct letters of the word 'MISSISSIPPI' are M, I, S, P

Hence $F = \{M, I, S, P\}$

Sets Ex 1.2 Q4

(i) $\{A, P.L, E\} \leftrightarrow \{x : x$ is a letter of the word "APPLE"$\}$

(ii) The solution set of $x^2 - 25 = 0$ is $x = \pm 5$

Hence, $\{-5, 5\} \leftrightarrow \{x : x^2 - 25 = 0\}$

(iii) The solution set of $x + 5 = 5$ is $x = 0$

Hence, $\{0\} \leftrightarrow \{x : x + 5 = 5, x \in Z\}$

(iv) The natural numbers which are divisor of 10 are 1, 2, 5, 10

Hence, $\{1, 2, 5, 10\} \leftrightarrow \{x : x$ is a natural number and divisor of 10$\}$

(v) The distinct letters of the word "RAJASTHAN" are A, H, J, R, S, T, H

Hence, $\{A, H, J, R, S, T, N\} \leftrightarrow \{x : x$ is a letter of the word"RAJASTHAN"$\}$

(vi) The prime natural numbers which are divisor of 10 are 2, 5

Hence, $\{2, 5\} \leftrightarrow \{x : x$ is a prime natural number and a divisor of 10$\}$

Sets Ex 1.2 Q5

The vowels which precede q, that is, come before q are a, e, i, o

Hence the set of vowels in the English alphabet which precede q are

$\{a, e, i, o\}$

Sets Ex 1.2 Q6

As the cube of an odd integer is odd, and an odd positive integer has the form
$2n + 1$ for some $n \geq 0$,
Hence the set of all positive integers whose cube is odd may be written in set builder form as $\{x \in Z, x = 2n + 1, n \geq 0\}$

Sets Ex 1.2 Q7

As
$$2 = 1^2 + 1$$
$$5 = 2^2 + 1$$
$$10 = 3^2 + 1$$
$$\vdots$$
$$50 = 7^2 + 1$$

So, the above set in set builder form can be written as

$$\left\{\frac{n}{n^2 + 1} : n \in N, 1 \leq n \leq 7\right\}$$