NCERT Solutions for Class-XI Maths

Chapter-1 Exercise-1.2

NCERT Math Class 11

1. Which of the following are examples of the null set
(i) Set of odd natural numbers divisible by 2
(ii) Set of even prime numbers
(iii) $\{x : x$ is a natural numbers, $x < 5$ and $x > 7\}$
(iv) $\{y : y$ is a point common to any two parallel lines $\}$

1. (i) A set of odd natural numbers divisible by 2 is a null set because no odd number is divisible by 2 .
(ii) A set of even prime numbers is not a null set because 2 is an even prime number.
(iii) $\{x : x$ is a natural number, $x < 5$ and $x > 7\}$ is a null set because a number cannot be simultaneously less than 5 and greater than 7.
(iv) $\{y : y$ is a point common to any two parallel lines $\}$ is a null set because parallel lines do not intersect. Hence, they have no common point.

2. Which of the following sets are finite or infinite
(i) The set of months of a year
(ii) {1, 2, 3 ...}
(iii) {1, 2, 3 ... 99, 100}
(iv) The set of positive integers greater than 100
(v) The set of prime numbers less than 99

2. (i) The set of months of a year
Solution: Given: The set of months of a year.
As we know set is a collection of well defined objects.
Let we represent the given set in roaster form:
⇒ Set of months of a year is {January, February, march, April, May, June, Jule, August, September, October, November, December}.
Because the set contain 12 elements. Hence, it is a finite set.

(ii) {1, 2, 3, . . .}
Solution: Given: {1, 2, 3, . . .}.
As we know set is a collection of well defined objects.
As it is already represented in roaster form:

⇒ Set = {1, 2, 3, . . .}.
Because the set contain infinite number of natural numbers. Hence, it is an infinite set.

(iii) {1, 2, 3, . . .99, 100}
Solution: Given: {1, 2, 3, . . .99, 100}.
As we know set is a collection of well defined objects.
As it is already represented in roaster form:
⇒ Set = {1, 2, 3, . . .99, 100}.
Because the set contain finite number from 1 to 100.Hence, it is a finite set.

(iv) The set of positive integers greater than 100.
Solution: Given: The set of positive integers greater than 100.
As we know set is a collection of well defined objects.
Let we represent the set in roaster form:
⇒ Set of positive integers greater than 100 = {100,101,102,…}.
Because the set contain an infinite number from 100 to infinity. Hence, it is an infinite set.

(v) The set of prime numbers less than 99
Solution: Given: The set of prime numbers less than 99.
As we know set is a collection of well defined objects.
Let we represent the set in roaster form:
⇒ The set of prime numbers less than 99 = { 2, 3, . . .99}.
Because the set contain finite prime number from 2 to 99.Hence, it is a finite set.

3. State whether each of the following set is finite or infinite:
(i) The set of lines which are parallel to the x-axis
(ii) The set of letters in the English alphabet
(iii) The set of numbers which are multiple of 5
(iv) The set of animals living on the earth
(v) The set of circles passing through the origin $(0,0)$

3. (i) The set of lines which are parallel to the x-axis is an infinite set because lines parallel to the x-axis are infinite in number.
(ii) The set of letters in the English alphabet is a finite set because it has 26 elements.
(iii) The set of numbers which are multiple of 5 is an infinite set because multiples of 5 are infinite in number.
(iv) The set of animals living on the earth is a finite set because the number of animals living on the earth is finite (although it is quite a big number).

(v) The set of circles passing through the origin $(0,0)$ is an infinite set because infinite number of circles can pass through the origin.

4. In the following, state whether A = B or not:
(i) A = {a, b, c, d}; B = {d, c, b, a}
(ii) A = {4, 8, 12, 16}; B = {8, 4, 16, 18}
(iii) A = {2, 4, 6, 8, 10}; B = {x: x is positive even integer and x ≤ 10}
(iv) A = {x: x is a multiple of 10}; B = {10, 15, 20, 25, 30 ...}

4. (i) A = { a, b, c, d } B = { d, c, b, a }
Solution: Given: A = { a, b, c, d } B = { d, c, b, a }.
Two set A and B are said to be equal if they have exactly same elements then we say A = B.
Because elements of set A and B do not have significant order but A and B have same element.
∴ A=B.

(ii) A = { 4, 8, 12, 16 } B = { 8, 4, 16, 18}
Solution: Given: A = { 4, 8, 12, 16 } B = { 8, 4, 16, 18}.
Two set A and B are said to be equal if they have exactly same elements then we say A = B.
As 12 ∈ A but 12 does not belongs to B..
Because elements of set A and B do not have same element.
∴ A≠B.

(iii) A = {2, 4, 6, 8, 10} B = { x : x is positive even integer and x ≤ 10}.
Solution: Given: A = {2, 4, 6, 8, 10} B = { x : x is positive even integer and x ≤ 10}.
Let we represent the set B in roaster form:
⇒ x is positive even integer and x ≤ 10= { 2,4,6,8,10}.

Two set A and B are said to be equal if they have exactly same elements then we say A = B.
Because elements of set A and B have same element.
∴ A=B.

(iv) A = { x : x is a multiple of 10}, B = { 10, 15, 20, 25, 30, . . . }
Solution: Given: A = { x : x is a multiple of 10}, B = { 10, 15, 20, 25, 30, . . . }
Let we represent the set A in roaster form:
⇒ Set A = x is a multiple of 10= { 10, 20 , 30 ,…}.
And set B ={ 10, 15, 20, 25, 30, . . . }

Two set A and B are said to be equal if they have exactly same elements then we say A = B.

As 15 Є B but 15 does not belongs to B

Because elements of set A and B do not have same element.

∴ A≠B.

5. Are the following pair of sets equal? Give reasons.

(i) $A=\{2,3\};B=\{x:x \text{ is solution of } x^2+5x+6=0\}$

(ii) $A=\{x:x \text{ is a letter in the word FOLLOW }\};B=\{y:y \text{ is a letter in the word WOLF}$

5. (i) $A=\{2,3\};B=\{x:x \text{ is a solution of } x^2+5x+6=0\}$

The equation $x^2+5x+6=0$ can be solved as: $x(x+3)+2(x+3)=0$

$(x+2)(x+3)=0;x=-2 \text{ or } x=-3$

$\therefore A=\{2,3\};$

$\therefore A\neq B$

(ii) $A=\{x:x \text{ is a letter in the word FOLLOW }\}=\{F,O,L,W\}$

$B=\{y:y \text{ is a letter in the word WOLF}\}=\{W,O,L,F\}$

The order in which the elements of a set are listed is not significant.

$\therefore A=B$

6. From the sets given below, select equal sets:

A = {2, 4, 8, 12}, B = {1, 2, 3, 4}, C = {4, 8, 12, 14}, D = {3, 1, 4, 2}

E = {–1, 1}, F = {0, a}, G = {1, –1}, H = {0, 1}

6. **Solution: Given:** A = {2, 4, 8, 12}, B = {1, 2, 3, 4}, C = {4, 8, 12, 14}, D = {3, 1, 4, 2}

E = {–1, 1}, F = {0, a}, G = {1, –1}, H = {0, 1}

As we see,

8 Є A, but 8 does not belong to B,D,E,F,G and H

⇒ A≠B, A≠D, A≠E, A≠F, A≠G, A≠H

And 2 Є A but 2 does not belong to C

⇒ A≠C.

Now, 3 Є B, but 3 does not belong to C,E,F,G and H

⇒ B≠C, B≠E, B≠F, B≠G, B≠H

Also, 12 Є C, but 12 does not belong to D,E,F,G and H

⇒ C≠D, C≠E, C≠F, C≠G, C≠H

Also, 4 Є D, but 4 does not belong to E,F,G and H

⇒ D ≠ E, D ≠ F, D≠G, D≠H

Also, -1 Є E, but -1 does not belong to F,G and H

⇒ E ≠ F, E ≠ G, E≠H

Also, a Є F, but a does not belong to G and H
⇒F≠G, F≠H
Also, -1 Є G, but -1 does not belong to H
⇒ G ≠ H
But B = D and E = G.
As, Two set A and B are said to be equal if they have exactly same elements then we say A = B.
Because elements of set (B and D) and (E and G) do not have significant order but (B and D) and (E and G) have same element.
∴ B = D and E = G.