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SETS

SUBJECT : MATHEMATICS
CHAPTER NUMBER:10
CHAPTER NAME :SETS

SUBTOPIC : Types of Sets Finite and Infinite Set.

PERIOD NO:5

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Learning outcomes

- Students will be able to define different types of sets.
- Students will be able to identify sets as finite or infinite set.

PREVIOUS KNOWLEDGE TEST

1. Write the following sets in roster form:

(i) the set of first five odd counting numbers

(ii) the set of all even natural numbers less than 101

(iii) {months of year whose names begin with a vowel}

(iv) {one-digit natural numbers which are perfect squares}

(v) the set of multiples of 7 which lie between -20 and 25

Negative numbers and Integers

- Students will Learn types of sets with the help of a video .
- https://www.youtube.com/watch?v=VBzlvKP-2yI(8)

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Types of Sets

1. Empty set
2. Singleton set
3. Finite set
4. Infinite set
5. Equal sets
6. Equivalent sets
7. Universal set
8. Subset
9. Proper subset
10. Superset
11. Proper superset
12. Power set

Kinds of Sets

- **Empty Sets or Null Sets** – sets with no elements.
  - **A = {girls in New York St. that have dicks}**
  - **A = { } or A = Ø**. The set has 0 cardinality.
- **Infinite Sets** – sets with an infinite number of elements. Unlisted elements are denoted by ellipses.
  - **F = {x|x is a number}**
- **Finite Sets** – sets with an exact number of elements.
  - **H = {penises Chad has}.** n(H)= 27.

Finite Sets

Determine which of the following sets are finite:

(a) Set of Prime numbers NO

(b) Set of two digit Prime numbers

$\{11, 13, 17, \ldots\ldots 97\}$.

(c) Letters in the English alphabet.

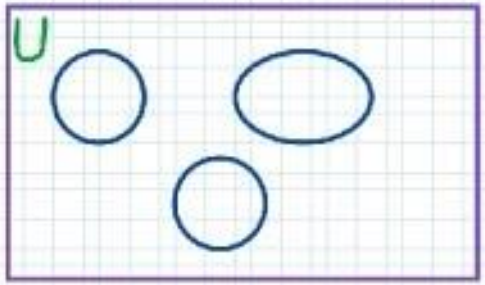
(d) Integers which are multiples of 5.

(e) Days of the week

Finite Set: $N = \{1, 2, 3, 4\}$

Infinite Set: $N = \{1, 2, 3 \ldots\}$

Universal Set. U/ξ



Evaluation QuestionEX-10 D

4. State, which of the following are finite or infinite sets:

(i) Set of integers

(ii) {Multiple of 5}

(iii) {Fractions between 1 and 2}

(iv) {Number of people in India}

(v) Set of trees in the world

Evaluation Question

Solution:

(i) We know, integers are infinite

Hence, set of integers are infinite

(ii) We know, multiple of 5 are infinite

Hence, set {Multiples of 5} is infinite

(iii) There are infinite number of fractions between 1 and 2

Hence, set {Fractions between 1 and 2} is infinite

(iv) There is finite number of people in India

Hence, set {Number of people in India} is finite

(v) There are infinite number of trees in world

Hence, set of trees in world is infinite

Evaluation Question

5. State, whether or not the following sets are empty:

(i) {Prime numbers divisible by 2}

(ii) {Negative natural numbers}

(iii) {Women with height 5 metre}

(iv) {Integers less than 5}

(v) {Prime numbers between 17 and 23}

Evaluation Question

Solution:

(i) The number 2 is a prime number and also divisible by 2

Hence, set {Prime numbers divisible by 2} is not empty

(ii) The natural number starts from 1

Hence, set {Negative natural numbers} is empty

(iii) There are no women with height 5 metre

Hence, set {Women with height 5 metre} is empty

(iv) There are integers less than 5

Hence, set {Integers less than 5} is not empty

(v) There are prime numbers between 17 and 23

Hence, set {Prime numbers between 17 and 23} is not empty

Evaluation Question

6. State, if the given pairs of sets are equal sets or equivalent sets:

(i) {Natural numbers less than five} and {Letters of the word 'BOAT'}

(ii) {2, 4, 6, 8, 10} and {even natural numbers less than 12}

(iii) {1, 3, 5, 7, ...} and set of odd natural numbers

(iv) {Letters of the word MEMBER} and {Letters of the word 'REMEMBER'}

(v) {Negative natural numbers} and {50^{th} day of a month}

Evaluation Question

(i) {Natural numbers less than five} and {Letters of the word ‘BOAT’}

Here, both the sets have same number of elements

Hence, the given set of pair is equivalent

(ii) {2, 4, 6, 8, 10} is the Roster Form for the even natural numbers less than 12

Hence, the given set of pair is equal

(iii) {1, 3, 5, 7} is the Roster Form for the set of odd natural numbers

Hence, the given set of pair is equal

Evaluation Question

(iv) {Letters of the word MEMBER} and {Letters of the word 'REMEMBER'}

Here, the letters of both the sets are same

Hence, the given set of pair is equal

(v) We know, there is no negative natural numbers and there is no month which has 50 days

Thus both sets are empty

Hence, the given set of pair is equal

Additional Homework

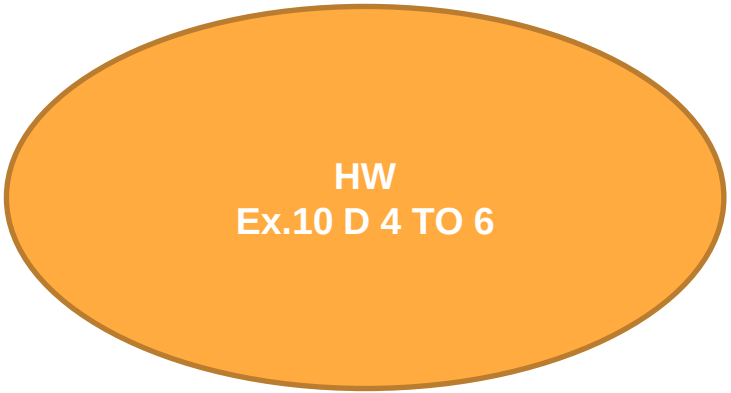
1 State, which of the following pairs of sets are disjoint :

(i) {0, 1, 2, 6, 8} and {odd numbers less than 10}.

(ii) {birds} and {trees}

(iii) {x : x is a fan of cricket} and {x : x is a fan of football}.

(iv) A = {natural numbers less than 10} and B = {x : x is a multiple of 5}.



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