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SETS

SUBJECT : MATHEMATICS
CHAPTER NUMBER:10
CHAPTER NAME :SETS
SUBTOPIC : Rule or Set Builder Method, Some Important Sets
PERIOD NO: 4

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Learning outcomes

- Students will be able to define different types of sets .
- Students will be able to write sets in set builder form.
- Students will be able to apply set builder form notation to write infinite sets.

PREVIOUS KNOWLEDGE TEST

1. State, whether true or false:

(i) Sets {4, 9, 6, 2} and {6, 2, 4, 9} are not the same.

(ii) Sets {0, 1, 3, 9, 4} and {4, 0, 1, 3, 9} are the same.

(iii) Sets {5, 4} and {5, 4, 4, 5} are not the same.

SETS

- Students will Learn set builder form of set with the help of a video .
- https://www.youtube.com/watch?v=FLgiccWl434&t=31s(14)

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Set Builder and Interval Notation

Set Builder Notation – is a mathematical shorthand for accurately stating a specific group of numbers.

$\mathbb{Z}$ - the set of integers

$\mathbb{N}$ - the set of natural numbers

$\mathbb{R}$ - the set of real numbers

$\mathbb{Q}$ - the set of rational numbers

Example 1: $\{x \in \mathbb{Z} \mid -4 \leq x < 3\} = \{-4, -3, -2, -1, 0, 1, 2\}$

x is a member of the set of integers such that x is greater than or equal to -4 and less than 3.

Interval Notation – a similar method to set builder notation that uses brackets instead of inequality signs.

"[" or "]" - same as $\leq$ or $\geq$ and "(" or ")" - same as $<$ or $>$.

Example 2: $\{x \in \Re \mid -4 \leq x < 3\}$

Set Builder Notation

$$A = \{1, 2, 3, 4, 5\}$$

$$A = \{x \mid x \in N,\ 1 \leq x \leq 5\}$$

$$D = \{2, 4, 6, 8, 10, 12, 14\}$$

$$D = \{2x \mid x \in N,\ 1 \leq x \leq 7\}$$

Evaluation Question EX10-D

1. State, whether the given set is infinite or finite:

(i) {3, 5, 7, ……..}

(ii) {1, 2, 3, 4}

(iii) {……., -3, -2, -1, 0, 1, 2}

(iv) {20, 30, 40, 50, …, 200}

(v) {7, 14, 21, ……., 2401}

Evaluation Question

Solution:

(i) Set {3, 5, 7, …. } is infinite

(ii) Set {1, 2, 3, 4} is finite

(iii) Set {….., -3, -2, -1, 0, 1, 2} is infinite

(iv) Set {20, 30, 40, 50, …., 200} is finite

(v) Set {7, 14, 21, ….., 2401} is finite

Evaluation Question

2. Which of the following sets is empty?

(i) Set of counting numbers between 5 and 6

(ii) Set of odd numbers between 7 and 19.

(iii) Set of odd numbers between 7 and 9

(iv) Set of even numbers which are not divisible by 2

(v) {0}

Evaluation Question

Solution:

(i) We know that, there is no counting number between 5 and 6

Hence, the given set is empty

(ii) There are elements in the set of odd numbers between 7 and 19

Hence, the given set is not empty

(iii) We know that, there is no odd number between 7 and 9

Hence, the given set is empty

(iv) We know that, there is no even number that is not divisible by 2

Hence, the given set is empty

(v) We find one element in the given set

Hence, the given set is not empty

Evaluation Question

3. State, which pair of sets, given below, are equal sets or equivalent sets:

(i) {3, 5, 7} and {5, 3, 7}

(ii) {8, 6, 10, 12} and {3, 2, 4, 6}

(iii) {7, 7, 2, 1, 2} and {1, 2, 7}

(iv) {2, 4, 6, 8, 10} and {a, b, d, e, m}

(v) {5, 5, 2, 4} and {5, 4, 2, 2}

Evaluation Question

Solution:

(i) {3, 5, 7} and {5, 3, 7}

The elements are same in both the sets

Hence, the given pair of sets is equal

(ii) {8, 6, 10, 12} and {3, 2, 4, 6}

The elements of both the sets are different but the number of elements is same

Hence, the given pair of sets is equivalent

Evaluation Question

(iii) {7, 7, 2, 1, 2} and {1, 2, 7}

The elements are same in both the sets

Hence, the given pair of sets is equal

(iv) {2, 4, 6, 8, 10} and {a, b, d, e, m}

The elements of both the sets are different but number of elements is same

Hence, the given pair of sets is equivalent

(v) {5, 5, 2, 4} and {5, 4, 2, 2}

The elements are same in both the sets

Hence, the given pair of sets is equal

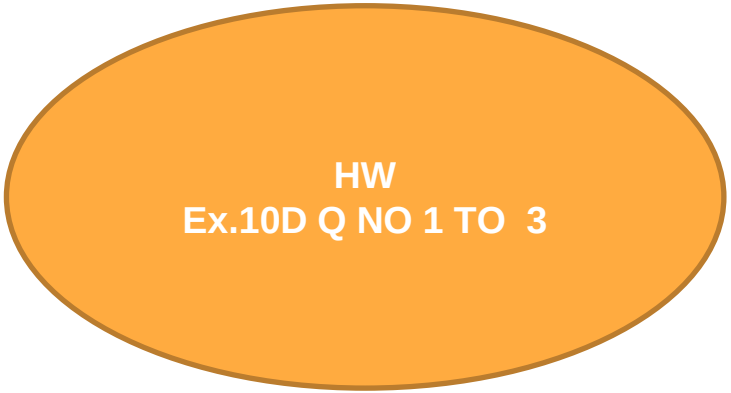
Additional Homework

1. Write the following sets in tabular form:

(i) {x : x is a factor of 98}

(ii) {x : x is a multiple of 11 and 0 ≤ x < 80}

(iii) {y : y is a two-digit natural number divisible by 5}



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