

Assignment

Sub - Mathematics
Semester - 2, Core Course - 3

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Topic - Real Analysis (Unit - 1)

1. Find $\sup A$ & $\inf A$, where

a) $A = \{x \in \mathbb{R} : 3x^2 + 8x - 3 < 0\}$.

b) $A = \{\frac{1}{m} + \frac{1}{n} : m, n \in \mathbb{N}\}$.

c) $A = \{x \in \mathbb{R} : x^2 < \dots\}$.

2. Give an example of an infinite set $S \subset \mathbb{R}$ such that

(i) S has only one limit point

(ii) S has no limit point

(iii) S has three limit points.

3. Show that -1 and 1 are the limit points of

$$A = \left\{ (-1)^n \left(1 + \frac{1}{n}\right) : n \in \mathbb{N} \right\}$$

4. Show that the sets

(i) $\{1 + \frac{1}{n} : n \in \mathbb{N}\} \cup \{-1 - \frac{1}{n} : n \in \mathbb{N}\}$

(ii) $\{-2, 2\} \cup \{\frac{1}{n} : n \in \mathbb{N}\} \cup \{-\frac{1}{n} : n \in \mathbb{N}\}$

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are not closed sets. Also find their derived sets

5. Show that the set $(0, 1) - \{\frac{1}{n} : n = 2, 3, 4, \dots\}$ is open.