



A Premier Institute for Pre-Medical & Pre Engineering

**SRI VIDYA
ARADHANA
ACADEMY**
"Transforming Your DREAMS Into Reality...!"**NEET/JEE**

Topic: Sets

Mathematics

Assignment 01 • Representation & Types of Sets

Chetan Sir

"Master the basics deeply — toppers are simply students who never skipped the fundamentals."

Roster (tabular) form: list each element once, order does not matter — $\{1, 2, 3\}$. **Set-builder form:** $\{x : x \text{ has property } P\}$.
 $\in$ means "belongs to", $\notin$ "does not belong".

Empty set $\emptyset$ or $\{\}$: no elements. **Singleton:** exactly one element. **Finite / Infinite:** the listing of elements ends / never ends.

Equal sets: exactly the same elements ($A = B$). **Equivalent sets:** the same *number* of elements ($n(A) = n(B)$).

SECTION A : IS IT A WELL-DEFINED SET?

- Which of the following are well-defined sets? Justify.
 (i) The vowels in the English alphabet (ii) a collection of books
 (iii) the rivers of India (iv) the ten most talented writers of India
 (v) the collection of all even integers (vi) the difficult chapters in Mathematics [NCERT]
- Which of the following are sets?
 (i) novels written by Munshi Premchand
 (ii) the most dangerous animals of the world
 (iii) all the questions in this chapter (iv) all boys in your class [NCERT]

SECTION B : ROSTER FORM

- Write the solution set of $x^2 + x - 2 = 0$ in roster form. [NCERT]
- Write $\{x : x \text{ is a positive integer and } x^2 < 40\}$ in roster form. [NCERT]
- Write $\left\{x : x \text{ is an integer and } -\frac{1}{2} < x < \frac{9}{2}\right\}$ in roster form. [NCERT]
- Write the set of all two-digit natural numbers whose digits add up to 8. [NCERT]
- Write $\{x : x^2 = x, x \in \mathbb{N}\}$ in roster form. [NCERT]
- Write the set of all distinct letters of the word **MATHEMATICS**. [NCERT]
- Write $\left\{x : \frac{x-1}{x+3} = 4, x \in \mathbb{R}\right\}$ in roster form. [NCERT]

SECTION C : SET-BUILDER FORM

- Express $\{1, 4, 9, 16, 25, \dots\}$ in set-builder form. [NCERT]
- Express $\left\{\frac{1}{2}, \frac{2}{3}, \frac{3}{4}, \frac{4}{5}, \frac{5}{6}, \frac{6}{7}\right\}$ in set-builder form. [NCERT]
- Express $\{2, 4, 8, 16, 32\}$ in set-builder form. [NCERT]
- Express $\{3, 6, 9, 12\}$ in set-builder form. [NCERT]
- Express $\{5, 25, 125, 625\}$ in set-builder form.

SECTION D : EMPTY, FINITE & INFINITE SETS

- Which of $A = \{x \in \mathbb{R} : x^2 + 1 = 0\}$, $B = \{x \in \mathbb{R} : x^2 - 16 = 0\}$, $C = \{x \in \mathbb{R} : x^2 = x + 2\}$ are empty sets? [NCERT]
- Classify $\{x : x^4 - x^3 - x^2 = 0, x \in \mathbb{N}\}$ as null, singleton, finite or infinite. [NCERT]
- State which are finite and which are infinite: (i) the set of days of the week; (ii) the solutions of $x^2 - 16 = 0$; (iii) the set of points on a line. [NCERT]
- Which is infinite? (i) $\{x \in \mathbb{N} : (x-1)(x-2) = 0\}$ (ii) $\{x \in \mathbb{N} : x \text{ is prime}\}$ (iii) $\{x \in \mathbb{N} : x^2 = 4\}$ [NCERT]
- True or false: the set of animals living on the Earth is finite; the set of circles passing through the origin is infinite. [NCERT]

SECTION E : EQUAL & EQUIVALENT SETS

20. Are $\{x : x \text{ is a letter of "FOLLOW"}\}$ and $\{y : y \text{ is a letter of "WOLF"}\}$ equal? [NCERT]
21. Identify the pair of equal sets among $A = \{0\}$, $B = \{x : x > 15 \text{ and } x < 5\}$, $C = \{x : x - 5 = 0\}$, $D = \{x : x^2 = 25\}$, $E = \{x : x \text{ is a positive integral root of } x^2 - 2x - 15 = 0\}$. [NCERT]
22. From $A = \{0, a\}$, $B = \{1, 2, 3, 4\}$, $C = \{4, 8, 12\}$, $D = \{3, 1, 2, 4\}$, $E = \{1, 0\}$, $F = \{8, 4, 12\}$, $G = \{1, 5, 7, 11\}$, $H = \{a, b\}$, list (i) all pairs of equal sets, (ii) all groups of equivalent sets.
23. Are $A = \{1, 3, 5\}$ and $B = \{x : x \text{ is an odd natural number } < 6\}$ equal? [NCERT]
24. Which of the following is a **singleton** set?
 (A) $\{x : |x| = 5, x \in \mathbb{Z}\}$
 (B) $\{x : x^2 = 4, x \in \mathbb{Z}\}$
 (C) $\{x : x^2 + x - 2 = 0, x \in \mathbb{N}\}$
 (D) $\{x : x^2 = 9, x \in \mathbb{Z}\}$
25. Which of the following is a **null** set?
 (A) $\{0\}$ (B) $\{\emptyset\}$
 (C) $\{x : x^2 + 1 = 0, x \in \mathbb{R}\}$ (D) $\{x : x > 1\}$
26. Which of the following sets is **infinite**?
 (A) the set of months of a year
 (B) $\{x \in \mathbb{N} : x < 100\}$
 (C) the set of prime numbers less than 99
 (D) $\{x \in \mathbb{R} : 0 < x < 1\}$

SECTION F : MULTIPLE CHOICE

ANSWER KEY

- | | | |
|---|--|---|
| 1. (i),(iii),(v) | 2. (i),(iii),(iv) | 3. $\{1, -2\}$ |
| 4. $\{1, 2, 3, 4, 5, 6\}$ | 5. $\{0, 1, 2, 3, 4\}$ | 6. $\{17, 26, 35, 44, 53, 62, 71, 80\}$ |
| 7. $\{1\}$ | 8. $\{M, A, T, H, E, I, C, S\}$ | 9. $\{-\frac{13}{3}\}$ |
| 10. $\{x : x = n^2, n \in \mathbb{N}\}$ | 11. $\{x : x = \frac{n}{n+1}, 1 \leq n \leq 6\}$ | 12. $\{x : x = 2^n, 1 \leq n \leq 5\}$ |
| 13. $\{x : x = 3n, 1 \leq n \leq 4\}$ | 14. $\{x : x = 5^n, 1 \leq n \leq 4\}$ | 15. only A |
| 16. null set | 17. finite, finite, infinite | 18. only (ii) |
| 19. both true | 20. equal, both = $\{F, O, L, W\}$ | 21. C and E (both = $\{5\}$) |
| 22. Equal $B=D$, $C=F$; Equiv. $\{A, E, H\}$, $\{B, D, G\}$, $\{C, F\}$ | 23. equal | 24. C |
| 25. C | 26. D | |