SETS

Set 1: Fundamentals, Roster & Set-Builder Form, Types of Sets

1. Who is credited with developing the modern theory of sets?
a) John Venn
b) Georg Cantor
c) Bertrand Russell
d) Richard Dedekind

2. A collection is considered a "well-defined collection" if:
a) It has many elements
b) We can definitely decide whether an object belongs to it or not
c) It is written using curly braces {}
d) It contains only numbers

3. Which of the following is a set?
a) The collection of all talented actors
b) The collection of all rich people
c) The collection of all prime numbers
d) The collection of all dangerous animals

4. How is the set of natural numbers denoted?
a) Q
b) Z
c) N
d) R

5. If an element 'a' belongs to a set A, it is denoted as:
a) $a \subset A$
b) $a = A$
c) $a \in A$
d) $A \in a$

6. The set of prime factors of 42 in roster form is:
a) {1, 2, 3, 6, 7, 14, 21, 42}
b) {2, 3, 7}
c) {1, 2, 3, 7}
d) {42}

7. The set-builder form of A = {3, 6, 9, 12} is:

a) {x : x is a natural number}
b) {x : x is an odd number}
c) {x : x = 3n, n ∈ N and 1 ≤ n ≤ 4}
d) {x : x is a multiple of 1.5}

8. The roster form of B = {x : x ∈ Z and $x^2 < 5$} is:
a) {-2, -1, 0, 1, 2}
b) {1, 2}
c) {0, 1, 2}
d) {-2, -1, 1, 2}

9. Which of the following pairs of sets are equal?
a) A = {1, 2, 3}, B = {2, 1, 3, 3}
b) A = {a, b, c}, B = {a, b, d}
c) A = {x : x is a vowel}, B = {a, i, o}
d) A = {1, 2}, B = {x : x is a solution of $x^2 + 3x + 2 = 0$}

10. A set which does not contain any element is called:
a) Infinite Set
b) Singleton Set
c) Empty Set
d) Equal Set

11. Which of the following is an example of an empty set?
a) {x : x ∈ N and x < 1}
b) {0}
c) {φ}
d) {x : x is a point common to any two parallel lines}

12. The set A = {x : 1 < x < 2, x ∈ N} is:
a) {1}
b) {2}
c) {1, 2}
d) ∅

13. A set with a definite number of elements is called a:
a) Finite Set
b) Infinite Set
c) Empty Set
d) Equivalent Set

14. Which of the following is a finite set?
a) The set of points on a line
b) The set of prime numbers

c) {x : x ∈ N and x is a multiple of 5}
d) The set of lines parallel to the y-axis passing through the point (5, 0)

15. Which of the following is an infinite set?
a) {x : x ∈ N and $x^2 < 50$}
b) The set of all countries in the world
c) The set of numbers which are multiples of 5
d) The set of circles passing through the origin (0,0)

16. The number of elements in a set A is denoted by:
a) n(A)
b) A
c) |A|
d) #A

17. If A = {1, 2, {3, 4}}, then n(A) is:
a) 2
b) 3
c) 4
d) 1

18. Two sets A and B are said to be equal if:
a) n(A) = n(B)
b) A ⊂ B
c) They have exactly the same elements
d) They are both finite

19. Let A = {1, 2, 3} and B = {2, 1, 3, 3}. Which statement is true?
a) A = B
b) A ≠ B
c) A ∈ B
d) B ⊂ A

20. Which of the following represents the set of all positive even integers?
a) {1, 2, 3, 4, ...}
b) {0, 2, 4, 6, ...}
c) {2, 4, 6, 8, ...}
d) {..., -4, -2, 0, 2, 4, ...}

21. The set of letters in the word "BETTER" is:
a) {B, E, T, T, E, R}
b) {B, E, T, R}
c) {B, E, T}
d) {B, E, T, E, R}

22. The symbol for the set of integers is:
a) I
b) Z
c) Q
d) W

23. The set $\{x : x \in R, 5 < x < 9\}$ in roster form is:
a) {5, 6, 7, 8, 9}
b) {6, 7, 8}
c) Cannot be represented in roster form as it is infinite
d) {6, 7, 8, 9}

24. The set of all real numbers is denoted by:
a) N
b) Z
c) Q
d) R

25. Which of these collections is NOT a set?
a) The collection of all days of a week
b) The collection of all difficult chapters in mathematics
c) The collection of all integers less than 5
d) The collection of all states in India

26. The set of all rational numbers is denoted by:
a) Q
b) R
c) Z
d) N

27. The set $\{x : x \text{ is a positive integer and } x^2 < 25\}$ in roster form is:
a) {1, 2, 3, 4, 5}
b) {0, 1, 2, 3, 4}
c) {1, 2, 3, 4}
d) {1, 4, 9, 16}

28. Which of the following is a singleton set?
a) $\{x : x \in Z \text{ and } x^2 = 4\}$
b) $\{x : x \in N \text{ and } x^2 = 4\}$
c) $\{x : x \in N \text{ and } 2 < x < 4\}$
d) {x : x is an even prime number}

29. The set-builder form of {0} is:

a) {x : x is an integer}
b) {x : x is a whole number}
c) {x : x is an integer and x + 1 = 1}
d) {x : x is a real number}

30. The solution set of the equation $x^2 - 5x + 6 = 0$ in roster form is:
a) {2, 3}
b) {-2, -3}
c) {5, 6}
d) {1, 6}

31. Which of these sets is infinite?
a) The set of all points on the circumference of a circle
b) The set of all lines passing through a single point
c) The set of all triangles of area 10 cm^2
d) The set of all integers between 10 and 100

32. If A = {x | x is a letter in the word "PRINCIPAL"}, then n(A) is:
a) 9
b) 6
c) 5
d) 4

33. The set of natural numbers that divide 12 is:
a) {1, 2, 3, 4, 6, 12}
b) {2, 3, 4, 6}
c) {1, 2, 3, 4, 6}
d) {12, 6, 4, 3, 2, 1, 0}

34. The symbol for the set of positive integers is:
a) Z^+
b) N
c) Both a and b
d) Z^-

35. Which of the following is NOT a well-defined collection?
a) The collection of all smart students in your class
b) The collection of all months of the year with 31 days
c) The collection of all solutions to the equation 2x + 5 = 11
d) The collection of all states in India

36. The set {1, 2, 3, ...} represents:
a) The set of whole numbers
b) The set of natural numbers

c) The set of integers
d) The set of rational numbers

37. The set of letters needed to spell the word "CATARACT" is:
a) {C, A, T, A, R, A, C, T}
b) {C, A, T, R}
c) {A, C, R, T}
d) {A, C, T}

38. If A = {x : x ∈ N and x is a multiple of 3 less than 20}, then the number of elements in A is:
a) 5
b) 6
c) 7
d) 8

39. The set {x : x ∈ R and $x^2 = -1$} is:
a) {1}
b) {-1}
c) {i, -i} (where i is imaginary)
d) ∅

40. The set of all real numbers x such that $x^2 = 9$ is:
a) {3}
b) {-3}
c) {3, -3}
d) {9}

41. In roster form, the order of listing elements:
a) Must be ascending
b) Must be descending
c) Is important
d) Is not important

42. The set of all real numbers between 0 and 1 is an example of a/an:
a) Finite set
b) Empty set
c) Infinite set
d) Singleton set

43. Which of the following represents the null set?
a) {∅}
b) {0}
c) {}
d) 0

44. The set of all prime numbers is:
a) Finite
b) Infinite
c) Empty
d) Singleton

45. If A = {1, 2, {3, 4}}, which of the following is true?
a) {3, 4} ∈ A
b) {3} ∈ A
c) 3 ∈ A
d) 4 ∈ A

46. The set of positive integral divisors of 18 is:
a) {1, 2, 3, 6, 9, 18}
b) {2, 3, 6, 9}
c) {1, 3, 6, 18}
d) {1, 2, 3, 6, 18}

47. The set of all real numbers x satisfying $x^2 + 1 = 0$ is:
a) {1}
b) {-1}
c) {i}
d) ∅

48. The set of all natural numbers x such that x + 4 = 4 is:
a) {0}
b) {4}
c) ∅
d) {-4}

49. The set of all real numbers is a subset of:
a) The set of integers
b) The set of rational numbers
c) The set of complex numbers
d) The set of natural numbers

50. The number of elements in the set of letters of the word "MATHEMATICS" is:
a) 8
b) 11
c) 7
d) 4

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1. b) Georg Cantor
2. b) We can definitely decide whether an object belongs to it or not
3. c) The collection of all prime numbers
4. c) N
5. c) $a \in A$
6. b) {2, 3, 7}
7. c) $\{x : x = 3n, n \in N \text{ and } 1 \leq n \leq 4\}$
8. a) {-2, -1, 0, 1, 2}
9. a) A = {1, 2, 3}, B = {2, 1, 3, 3}
10. c) Empty Set
11. d) {x : x is a point common to any two parallel lines}
12. d) $\varnothing$
13. a) Finite Set
14. d) The set of lines parallel to the y-axis passing through the point (5, 0)
15. c) The set of numbers which are multiples of 5
16. a) n(A)
17. b) 3
18. c) They have exactly the same elements
19. a) A = B
20. c) {2, 4, 6, 8, ...}
21. b) {B, E, T, R}
22. b) Z
23. b) {6, 7, 8}
24. d) R
25. b) The collection of all difficult chapters in mathematics
26. a) Q
27. c) {1, 2, 3, 4}
28. d) {x : x is an even prime number}
29. c) {x : x is an integer and x + 1 = 1}
30. a) {2, 3}
31. b) The set of all lines passing through a single point
32. b) 6
33. a) {1, 2, 3, 4, 6, 12}
34. c) Both a and b (Z^+ and N)
35. a) The collection of all smart students in your class
36. b) The set of natural numbers

37. b) {C, A, T, R}
38. b) 6
39. d) ∅
40. c) {3, -3}
41. d) Is not important
42. c) Infinite set
43. c) {}
44. b) Infinite
45. a) {3, 4} ∈ A
46. a) {1, 2, 3, 6, 9, 18}
47. d) ∅
48. a) {0}
49. c) The set of complex numbers
50. a) 8