BYJU'S Home Learning Program

Topic covered:

- **Fundamentals of Mathematics (Session- 1)**

Worksheet

1. Which of the following is/are a set?
   a. $\{x : x$ is a natural number and x is biggest number$\}$
   b. The collection of students in Bangalore
   c. The collection of all small flowers
   d. $\{x: x$ is the tallest member of parliament$\}$

2. Which of the following is correct notation?
   a. $\in \to$ there exist
   b. $\forall \to$ for all
   c. $\exists \to$ such that
   d. $: \to$ belongs to

3. To represent a set, how many notations exist?
   a. Only one
   b. 2
   c. More than 2
   d. 0

4. Which of the following is roster form of $\{x : x$ is even prime number greater than 2$\}$?
   a. $\{0\}$
   b. 0
   c. $\{\}$
   d. $\{2\}$

5. The set builder form of $\{2, 4, 6, 8, 10\}$ is
   a. $\{x : x$ is even natural number less than 10$\}$
   b. $\{x : x = 2n$ where $n \in \mathbf{N}$ such that $n < 6\}$
   c. $\{x : x = 2n + 1$ where $n \in \{1, 2, 3\}\}$
   d. $\{x : x = 2n$ where $n \in \mathbf{Z}$ such that $n < 6\}$

6. If $A = \{1, 3, 5\}$, $B = \{2, 4, 6\}$, $c = \{1, 4\}$ then which of the following is universal set?
   a. $\{0, 1, 2, 3, 4, 5\}$
   b. $\{1, 2, 3, 4, 6\}$
   c. $\{0, 1, 2, 3, 4, 5, 6, 7, 8\}$
   d. ϕ

7. Which of the following is a finite set?
   a. $\mathbf{N}$
   b. $\mathbf{Z}$
   c. $\mathbf{R}$
   d. $\mathbf{W-N}$

8. If $A = \{x : x$ is a member of family of circles$\}$, $B = \{ x : x$ is a vowel in English alphabet$\}$, then

   a. A is finite B is not
   b. A is infinite but B is not
   c. both A and B are finite
   d. neither A nor B are finite

9. The set builder form of $\left\{\frac{1}{2}, \frac{2}{3}, \frac{3}{4}, \frac{4}{5}, \frac{5}{6}\right\}$ is

   a. $\{x : x = \dfrac{n}{n+1}$, where n is a natural number and $1 \leq n \leq 6\}$

   b. $\{ x : x = \dfrac{n}{n+1}$, where n is a natural number and $1 \leq n \leq 5\}$

   c. $\{ x : x = \dfrac{n}{n+1}$, where n is a natural number and $2 \leq n \leq 6\}$

   d. $\{ x : x = \dfrac{n}{n-1}$, where n is a natural number and $1 \leq n \leq 5\}$

10. The roster form of the set $\{ x : x$ is a two-digit natural number such that sum of its digits is 9$\}$

    a. $\{09, 18, 27, 36, 45, 54, 63, 72, 81, 90\}$
    b. $(09, 18, 27, 36, 45, 54, 63, 72, 81, 90)$
    c. $[09, 18, 27, 36, 45, 54, 63, 72, 81, 90]$
    d. $\{18, 27, 36, 45, 54, 63, 72, 81, 90\}$

11. If $A = \{1, 2, 3, 4, 5\}$ then which of the following is correct?

    a. $3 \notin A$
    b. $\{2\} \in A$
    c. $\phi \in A$
    d. $4 \in A$

12. The most appropriate option for the following sets
    A is set of letters of the word 'debit card'
    B is set of letters of the word 'bad credit'

    a. A and B are equivalent sets
    b. A and B are un equal sets
    c. A and B are similar sets
    d. A and B are identical sets

13. The most appropriate option for the following sets
    A is set of letters of the word 'NARAYANA'
    B is set of letters of the word 'ARANYA'

    a. A and B are equivalent sets
    b. A and B are equal sets
    c. A and B are similar sets
    d. $A > B$

14. The universal set of the following sets is
    A is set of similar triangles
    B is set of right-angled triangles
    C is set of equilateral triangles

    a. The collection of all angles
    b. The collection of all triangles
    c. The collection of all straight lines
    d. None of these

15. The number of elements in a set is called

    a. total number
    b. number set
    c. roster notation
    d. cardinal number

16. In roster notation of a set

    a. order of elements is important
    b. elements represented in square brackets
    c. all elements will possess common property
    d. none of the above

17. Which of the following is singleton set?

    a. $\{\, x : |x| = 1;\ x \in \mathbf{Z}\}$
    b. $\{\, x : |x| = 5;\ x \in \mathbf{N}\}$
    c. $\{x : x \text{ is even prime number greater than } 2\}$
    d. $\{\, x : x = y + 2 \text{ where } y \text{ is natural number such that } 2 < y < 5\}$

18. If $A = \{x : x \text{ is a letter of the word 'RAMANA'}\}$,
    $B = \{\, x : x \text{ is a letter of the word 'MISSISSIPPI'}\}$,
    $C = \{x : x \text{ is a letter of the word 'NOOKBOOK'}\}$ Then relation between cardinality of sets A, B and C is

    a. $n(A) = n(B) = n(C)$
    b. $n(A) = 2.n(B) = n(C)$
    c. $n(A) + n(C) = n(B)$
    d. $n(B) > n(A) > n(C)$

19. If $A = \{(a, b) : a^2 + b^2 = 25 \text{ and } a, b \in \mathbf{N}\}$ then $n(A) =$

    a. 1
    b. 2
    c. 4
    d. 12

20. A is set of letters of the word 'SARIKA', B is set of letters of the word 'RAKASI', then A and B are

    a. Equivalent but not equal
    b. Equal but not equivalent
    c. Equal and equivalent
    d. Neither equal nor equivalent

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ANSWER KEY

Question No.	1	2	3	4	5	6	7	8	9	10
Correct Answer	(b, d)	(b)	(b)	(c)	(b)	(c)	(d)	(b)	(b)	(d)

Question No.	11	12	13	14	15	16	17	18	19	20
Correct Answer	(d)	(d)	(b)	(b)	(d)	(d)	(b)	(a)	(b)	(c)

SOLUTIONS

Answer 1 :

(a) Biggest- adjective, so not a set
(b) Clearly it is a set as it is well defined collection
(c) Small- adjective, so not a set
(d) Clearly it is a set as it is well defined collection (only one element)

Answer 2 :

$\in \to$ belongs to; $\forall \to$ for all; $\exists \to$ there exist; $: \to$ such that

Answer 3 :

(i)   Roster form
(ii)   Set builder form
So total 2 notations exist.

Answer 4 :

There is no even prime number, greater than 2. So, it is an empty set.

Answer 5 :

(a) $\{2, 4, 6, 8\} \neq \{2, 4, 6, 8, 10\}$
(b) $\{2, 4, 6, 8, 10\} = \{2, 4, 6, 8, 10\}$
(c) $\{3, 5, 7\} \neq \{2, 4, 6, 8, 10\}$
(d) $\{\cdots - 4, -2, 0, 2, 4, 6, 8, 10\} \neq \{2, 4, 6, 8, 10\}$

Answer 6 :

A set which contain all elements of set A, B and C is universal set
$\therefore$ 1,2,3,4,5,6 should be there, so option (c) is correct.

Answer 7 :

(a) $'N'$ is infinite set
(b) $'Z'$ is infinite set
(c) $'R'$ is infinite set
(d) $'W - N' = \{0\}$ is finite set

Answer 8 :

A is infinite set and B finite set

Answer 9 :

$\left\{\frac{1}{2},\frac{2}{3},\frac{3}{4},\frac{4}{5},\frac{5}{6}\right\}$ here every element is of the form $\frac{k}{k+1}$;

$\therefore$ set $=\{x: x = \frac{n}{n+1}; 1 \le n \le 5$ and $n \in N\}$

Answer 10 :

xy such that $x + y = 9$ and $x \ne 0 \rightarrow$ {multiple of 9} = { $18, 27, \cdots 90$}

Answer 11 :

Only element belongs/not-belongs to set A
From the options $4 \in A$ is correct

Answer 12 :

$A = \{a, b, c, d, e, i, t, r\}; B = \{a, b, c, d, e, i, t, r\}$
$\therefore A = B \Rightarrow A$ and B are equivalent and identical sets
$\therefore$ Most appropriate answer is identical sets.

Answer 13 :

$A = \{A, N, R, Y\}; B = \{A, N, R, Y\}$
$\Rightarrow A$ and B are equal sets.

Answer 14 :

All the given sets are based on triangles
$\therefore$ universal set is set of all triangles

Answer 15 :

The number of elements in a set called cardinal number

Answer 16 :

Roster notation of a set is represented in curly brackets with elements separated by comma and there is no importance to order of elements.

Answer 17 :

(a) Set $= \{-1, 1\}$
(b) Set $= \{5\}$
(c) Set $= \{ \}$
(d) Set $= \{5, 6\}$
So, option (b) is correct.

Answer 18 :

$A = \{A, M, N, R\} \Rightarrow n(A) = 4; \quad B = \{I, M, P, S\} \Rightarrow n(B) = 4; \quad C = \{B, K, O, N\} \Rightarrow n(C) = 4$
$\therefore n(A) = n(B) = n(c)$

Answer 19 :

$A = \{(3,4), (4,3)\} \Rightarrow n(A) = 2$

Answer 20 :

$A = \{A, I, K, S, R\}; B = \{A, I, K, S, R\} \Rightarrow n(A) = n(B)$ also $A = B$
$\Rightarrow A$ and B are equivalent and equal sets.