

BOARD – ICSE

CLASS –7

TOPIC – PROBABILITY SOLVED QUESTIONS

1. Find, whether or not, each of the following collections represent a set:

- (i) The collection of good students in your school.
- (ii) The collection of the numbers between 30 and 45.

Solution:

- (i) It is not a set as it is not well defined.
- (ii) It is a set
- (iii) It is not a set as it is not well defined.

2. Express each of the following sets in roster form :

- (i) Set of odd whole numbers between 15 and 27.
- (ii) A = Set of letters in the word "CHITAMBARAM"
- (iii) B = {All even numbers from 15 to 26}

Solution:

- (i) {17, 19, 21, 23, 25}
- (ii) A = {C, H, I, T, A, M, B, R}
- (iii) B = {16, 18, 20, 22, 24, 26}

3. Express each of the following sets in set-builder notation (form)

- (i) {3, 6, 9, 12, 15}
- (ii) {2, 3, 5, 7, 11, 13, ...}
- (iii) {1, 4, 9, 16, 25, 36}

Solution:

- (i) {3, 6, 9, 12, 15}
= {x : x is a natural number divisible by 3 ; x < 18}
- (ii) {2, 3, 5, 7, 11, 13, ...}
= {x : x is a prime number}
- (iii) {1, 4, 9, 16, 25, 36}

4. Given: A = {x: x is a multiple of 2 and is less than 25}

B = {x: x is a square of a natural number and is less than 25}

C = {x : x is a multiple of 3 and is less than 25}

D = {x: x is a prime number less than 25}

Write the sets A, B, C and D in roster form.

Solution:

$$A = \{x : x \text{ is a multiple of 2 and is less than 25}\}$$

$$= \{2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24\}$$

$$E = \{x : x \text{ is a square of natural number and is less than 25}\}$$

$$= \{1, 4, 9, 16\}$$

$$C = \{x : x \text{ is a multiple of 3 and is less than 25}\}$$

$$= \{3, 6, 9, 12, 15, 18, 21, 24\}$$

$$D = \{x : x \text{ is a prime number less than 25}\}$$

$$= \{2, 3, 5, 7, 11, 13, 17, 19, 23\}$$

5. Write the cardinal number of each of the following sets

(i) A = Set of days in a leap year

(ii) B = Set of numbers on a clock-face.

(iii) C = $\{x : x \in \mathbb{N} \text{ and } x \leq 7\}$

Solution:

(i) $n A = 366$

(ii) $n B = 12$

(iii) $n C = 7$

6. For each set, given below, state whether it is finite set infinite set or the null set

(i) $\{\text{natural numbers more than 100}\}$

(ii) $A = \{x : x \text{ is an integer between 1 and 2}\}$

(iii) $B = \{x : x \in \mathbb{W} ; x \text{ is less than 100}\}$.

Solution:

(i) $\{\text{Natural numbers more than 100}\}$

= It is an infinite set

(ii) $A = \{x : x \text{ is an integer between 1 and 2}\}$

It is a null set

(iii) $B = \{x : x \in \mathbb{W}, x \text{ is less than 100}\}$

It is finite set as it has 100 elements i.e. from 0 to 99.

7. State, which of the following pairs of sets are disjoint:

(i) $\{0, 1, 2, 6, 8\}$ and $\{\text{odd numbers less than 10}\}$.

(ii) $\{\text{birds}\}$ and $\{\text{tress}\}$

(iii) $\{x : x \text{ is a fan of cricket}\}$ and $\{x : x \text{ is a fan of football}\}$.

Solution:

(i) $\{0, 1, 2, 6, 3\}$ and $\{\text{odd numbers less than } 10\}$
 $\Rightarrow \{0, 1, 2, 6, 8\}$ and $\{1, 3, 5, 7, 9\}$

These sets are not disjoint sets as there is one element (1) is common.

(ii) $\{\text{Eirds}\}$ and $\{\text{trees}\}$

These are disjoint sets as there is no common element in term

(iii) $\{x : x \text{ is a fan of cricket}\}$ and $\{x : x \text{ is a fan of football}\}$

These are not disjoint sets as there can be a person who is fan of both the games.

8. State whether the given pairs of sets are equal or equivalent.

(i) $A = \{\text{first four natural numbers}\}$ and $B = \{\text{first four whole numbers}\}$.

(ii) $A = \{\text{Set of letters of the word "FOLLOW"}\}$ and $B = \{\text{Set of letters of the word "WOLF"}\}$.

(iii) $E = \{\text{even natural numbers less than } 10\}$ and $O = \{\text{odd natural numbers less than } 9\}$

Solution:

(i) $A = \{\text{first four natural numbers}\}$
 $= \{1, 2, 3, 4\}$

$B = \{\text{first first whole number}\}$
 $= \{0, 1, 2, 3\}$

These are equivalent sets as both have equal number of elements but not same.

(ii) $A = \{\text{Set of letters of the word FOLLQW}\}$
 $= \{F, O, L, W\}$

$B = \{\text{Set of letters of the word 'WOLF'}\}$
 $= \{F, O, L, W\}$

These are equal sets as these have same and equal elements.

(iii) $E = \{\text{even natural numbers less than } 10\}$
 $= \{2, 4, 6, 8\}$

$O = \{\text{odd natural numbers less than } 9\}$
 $= \{1, 3, 5, 7\}$

These are equivalent sets as both have equal number of elements but not the same

9. Examine which of the following sets are the empty sets:

(i) The set of triangles having three equal sides.

(ii) The set of lions in your class,

(iii) $\{x \mid x + 3 = 2 \text{ and } x \in \mathbb{N}\}$

Solution:

(i) The set of triangles having three equal sides. This is not an empty set

(ii) The set of lions in your class This is an empty set

(iii) $\{x: x + 3 = 2 \text{ and } x \in \mathbb{N}\}$

$$x + 3 = 2 \implies x = 2 - 3 = -1$$

which is not a natural number.

\therefore It is an empty set.

10. Which of the following represent the null set?

$\emptyset, \{0\}, \{ \}, \{\emptyset\}$

Solution:

\emptyset and $\{ \}$ are the null sets other are not as there have same element