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Solutions of

UNIT#17

Exercise 17.1

Class 10 Math Sindh Board

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Solutions of Exercise 17.1

1. Write the following sets in tabular form

(i) $A =$ Set of all integers between -3 and 3

$$A = \{-2, -1, 0, 1, 2\}$$

(ii) $B =$ Set of composite numbers less than 11

$$B = \{4, 6, 8, 9, 10\}$$

(iii) $C = \{x \mid x \in P, 5 < x \leq 13\}$ where P is the set of prime numbers

$$C = \{7, 11, 13\}$$

(iv) $D = \{y \mid y \in O, 7 < y < 17\}$ where O is the set of odd natural numbers

$$D = \{9, 11, 13, 15\}$$

(v) $E = \{z \mid z \in \mathbb{R}, z^2 = 121\}$

$$E = \{-11, 11\}$$

(vi) $F = \{p \mid p \in \mathbb{Q}, p^2 = -1\}$ No rational number satisfies $p^2 = -1$.

$$F = \emptyset$$

2. Write the following sets in set-builder form

(i) $A =$ Set of all rational numbers between 5 and 6

$$A = \{x \mid x \in \mathbb{Q}, 5 < x < 6\}$$

(ii) $B = \{1, 2, 3, 4, 6, 12\}$

$$B = \{x \mid x \text{ is a positive divisor of } 12\}$$

(iii) $C = \{0, \pm 1, \pm 2, \ldots, \pm 40\}$

$$C = \{x \mid x \in \mathbb{Z}, -40 \leq x \leq 40\}$$

(iv) $D = \{-4, -2, 0, 2, 4\}$

$$D = \{x \mid x \in E, -4 \leq x \leq 4\}$$

(v) $E = \{1, 4, 9, 16, 25\}$

$$E = \{x \mid x \text{ is the square of first five natural numbers}\}$$

(vi) $F = \{-1, -3, -5, -7, \ldots\}$

$$F = \{x \mid x \text{ is a negative odd integer}\}$$

3. Write any five examples of empty set

1. Whole numbers less than 0: $\emptyset$
2. Set of boy students in a girls college: $\emptyset$
3. $\{x \in \mathbb{N} \mid x^2 = -1\} = \emptyset$
4. $\{x \in \mathbb{R} \mid x^2 = -1\} = \emptyset$
5. Set of women presidents of Pakistan: $\emptyset$

4. Classify as finite or infinite

- Set of Asian countries: Finite
- Set of all medical universities of the world: Finite
- Set of real numbers between 6 and 9: Infinite
- Set of even prime numbers: Finite
- Set of odd integers less than 5: Infinite

5. Write an equivalent set, an improper subset and three proper subsets

(i) $P = \{a, e, i, o, u\}$

Three proper subsets: $\{a, i\}$, $\{e, u\}$, $\{i, o\}$
Improper subset: P itself
Equivalent set: $\{1, 2, 3, 4, 5\}$

(ii) $Q = \{-2, -1, 0, 1, 2\}$

Three proper subsets: $\{-1, 0\}$, $\{1, 2\}$, $\{0, 2\}$
Improper subset: Q
Equivalent set: $\{a, b, c, d, e\}$

6. Two examples of singleton sets

$$\{x \mid x \in \mathbb{N}, x^2 = 16\} = \{4\}$$

$$\{x \mid x \in \mathbb{Z}, -1 < x < 1\} = \{0\}$$

7. Power sets

(i) $A = \{5, 10, 15\}$

$P(A) = \{\emptyset, \{5\}, \{10\}, \{15\}, \{5, 10\}, \{5, 15\}, \{10, 15\}, \{5, 10, 15\}\}$

(ii) $B = \{0, 1, 2, 3\}$

$$P(B) = \{\emptyset, \{0\}, \{1\}, \{2\}, \{3\}, \{0,1\}, \{0,2\}, \{0,3\}, \{1,2\}, \{1,3\}, \{2,3\}, \{0,1,2\}, \{0,1,3\}, \{0,2,3\}, \{1,2,3\}, \{0,1,2,3\}\}$$

8. Find a set

(i) Only two proper subsets

Not possible.

(ii) Only one proper subset

A singleton set, e.g. $\{a\}$

(iii) No proper subset

Null set $\emptyset$