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Set :-

i) Roster form / tabular form
ii) Set-builder form / rule method / property method

i) Roster form :-

{ , }

ex :-

{1, 2, 3} ✓

ii) Set-builder form :-

{1², 2², 3², 4²} ✓

{x : x = n², n ∈ N & n ≤ 5}
n ≤ 4

Types of Set

i) NULL Set / empty Set / Void Set :-

1) { } ✓ 2) {ϕ} ✗ 3) ϕ ✓

2) Singleton Set :-

{ϕ} ✓ , {1} ✓

{0, 1, 2} ✗

3) finite Set :-

{0, 1, 2, --- n} (n = 100)

4) Infinite Set : {0, 1, 2, --- n} ✓

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cardinal number :-

$A = \{1, 2, 3, 4\}$

$n(A) = 4$

$B = \{1, 1, 2, 2, 3, 5\}$

$n(B) = 4$

universal set :-

$A = \{1, 2, 3\}$, $B = \{5, 4, 2\}$

$C = \{1, 2, 3, 4, 5, 6, 7, 8\}$

C is universal set of A & B

subset :-

$A = \{0, 1, 2, 3\}$

$B = \{1, 2\}$

$B \subseteq A$

* every set is subset of itself.

$B = \{1, 2\} \rightarrow$ set

$B = \{1, 2\} \rightarrow B \subseteq B$ ✓

* empty set is subset of every set.

$\emptyset \Rightarrow B = \{1, 2, 3\}$

$\emptyset \subseteq B$

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1) ⊘ $A = \{1, 2, 3\}$

$\emptyset$

$A = \{1, 2, 3\}$

$A_1 = \{\{1\}, \{2\}, \{3\}, \{1, 2\}, \{1, 3\}, \{1, 2, 3\}, \emptyset, \{2, 3\}\}$

* Total number of subset $= 2^{n(A)}$

$n(A)$ = cardinal number of any set

→ $A = \{1, 2, 3\}$

Total no. of subset $= 2^3$

$= 8$ ✓

② $A = \{1, 2, 2, 3, 4, 4\}$

Total no. of subset $= 2^4$

$= 16$ ✓

1) union ($\cup$)

$A = \{1, 2, 3, 4\}$, $B = \{5, 1, 3, 4\}$

$A \cup B = \{1, 2, 3, 4, 5\}$

② $A = \{1, 1, 2, 2, 3\}$, $B = \{1, 2, 5, 5, 3\}$

$A \cup B = \{1, 2, 3, 5\}$

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2) Intersection ($\cap$)

$A = \{1, 2, 3, 4\}$, $B = \{1, 1, 6, 2, 4\}$

$A \cap B = \{1, 2, 4\}$

3) difference (-)

1) $A = \{1, 2, 5, 3\}$, $B = \{5, 2, 1, 1, 3, 4\}$

$A - B = \{\}$

$B - A = \{4\}$

2) $A = \{1, 2, 3, 4\}$, $B = \{1, 5, 10, 3\}$

$A - B = \{2, 4\}$

$B - A = \{5, 10\}$

complement of a set A :-

$$A' = \bar{A} = U - A$$

$U \Rightarrow$ universal set

1) $U = \{1, 2, 3, 4, 5\}$

$A = \{1, 3\}$

$A' = \{2, 4, 5\}$

2) $A = \{1, 2, 3\}$ $A' =$ Set of all real number except $\{1, 2, 3\}$

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1) $n(A-B) = n(A) - n(A \cap B)$
2) $n(B-A) = n(B) - n(A \cap B)$
3) $n(A \cup B) = n(A) + n(B) - n(A \cap B)$
4) $n(A') = n(U) - n(A)$

$n(A-B) = n(A) - n(A \cap B)$

$A = \{1, 2, 3\}$, $B = \{2, 3\}$

$n(A \cup B) = n(A) + n(B) - n(A \cap B)$

Q $n(A) = 10$, $n(B) = 5$, $n(A \cup B) = 4$
$n(A \cap B) = ?$

$n(A \cup B) = n(A) + n(B) - n(A \cap B)$
$4 = 10 + 5 - n(A \cap B)$
$n(A \cap B) = 15 - 4$
$= 11$ Ans

cardician product :-

$A = \{1, 2, 3\}$, $B = \{10, 20, 4\}$

$A \times B = \{(1,10), (1,20), (1,4), (2,10), (2,20), (2,4)$
$(3,10), (3,20), (3,4)\}$

$B \times A = \{(10,1), (10,2), (10,3), (20,1), (20,2), (20,3)$
$(4,1), (4,2), (4,3)\}$

Q If $A = \{1, 4\}$, $B = \{4, 5\}$, $C = \{5, 7\}$ then determine $(A \times B) \cap (A \times C)$

$(A \times B) \cap (A \times C)$

$(A \times B) = \{(1,4), (1,5), (4,4), (4,5)\}$

$(A \times C) = \{(1,5), (1,7), (4,5), (4,7)\}$

$(A \times B) \cap (A \times C) = \{(4,5), (1,5)\}$ ✓

Q Let A, B, C be any three sets then prove that $A \times (B \cap C) = (A \times B) \cap (A \times C)$

Suppose $(x, y) \in A \times (B \cap C)$

Q-1 if $U = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$
$A = \{2, 3, 4, 5\}$ & $B = \{4, 5, 6, 7, 8\}$ then find—

(i) $n(A')$

(ii) $n(A \cap B)$

(iii) $n(A - B)$

(iv) $n(A \cup B)$

(v) ~~$n(A') = \{6, 7, 8, 9, 10\}$~~

Teacher's Signature