DST

Tutorial -9

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Q1 Write the set $A = \{1, 4, 9, 16, 25 \cdots\}$ in set builder form?

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

$\Rightarrow A = \{x : x \text{ is a square of natural number}\}$

$\Rightarrow A = \{x : x = n^2 \text{ where } n \in N\}$

Q2 Write 3 examples of each finite & infinite set in set builder form.

Finite sets

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

$n(A) = 4$

ii) $B = \{x : x \in Z \text{ and } x^2 - 81 = 0\}$

iii) $C = \{-15, 25\}$ $\quad n(C) = 2$

Infinite Sets

i) Set of all points in a plane
ii) Set of all whole numbers.
iii) Set of all integers divisible by 2.

Q3
(a) Finite
(b) Infinite
(c) Finite
(d) Infinite
(e) Finite
(f) Infinite
(g) Finite
(h) Infinite

Q4
A = P
B = T
C = M
D = Q
X = R

Q5 (a) $n(A) = 0$

(b) $n(B) = 2$

(c) $n(C) = 12$

(d) $n(Z^+) = 99$

(e) $n(D) = 5$

(f) $n(\text{MALAYALAM}) = 4$

Q6 (i) $A = \{4, 6, 7, 8\}$

(ii) $B = \{4, 6, 7, 8, 5, 9, 10, 11\}$

iii) $A \cup B = \{4, 5, 6, 7, 8, 9, 10, 11\}$

iv) $A \cap B = \{4, 6, 7, 8\}$

Q7 (i) $\{1, 2, 3, 4, 6, 7\} = X \cap Y$

(ii) $\{4, 8, 9\} = X \cap Y$

(iii) $\{\phi\} = X \cap Y$

Q8 Write all possible partitions of set S

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

i) $\{\{1, 2, 3\}\}$

ii) $\{\{1, 2\}, \{3\}\}$

iii) $\{\{1, 3\}, \{2\}\}$

iv) $\{\{2, 3\}, \{1\}\}$

v) $\{\{1\}, \{2\}, \{3\}\}$

All possible partitions

Q9

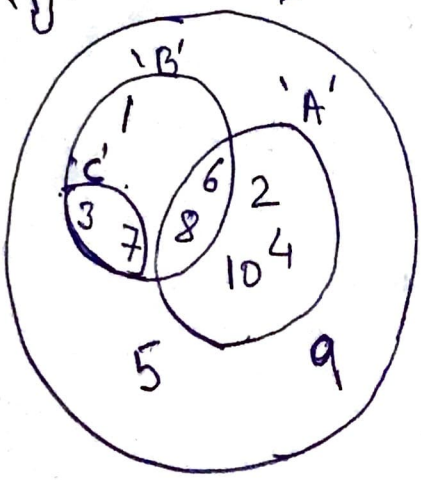
$U = \{1, 2, 3 \text{ --- } , 9, 10\}$

$A = \{2, 4, 6, 8, 10\}$

$B = \{1, 3, 6, 7, 8\}$

$C = \{3, 7\}$

a)



b) $A \cap B = \{6, 8\}$

$A \cup C = \{2, 3, 4, 6, 7, 8, 10\}$

$A' = \{1, 3, 5, 7, 9\}$

$B' = \{2, 4, 5, 9, 10\}$

$B \cap A' = \{1, 3, 7\}$

$B \cap C' = \{1, 6, 8\}$

$A - B = \{2, 4, 10\}$

$A \Delta B = (A - B) \cup (B - A) = \{2, 4, 10, 1, 3, 7\}$

$= \{1, 2, 3, 4, 7, 10\}$

c) $C - B = \phi$

Q10 To Prove: $A \Delta B = (A - B) \cup (B - A)$

we know $A - B = A \cap B'$ (i)

$A \Delta B = (A \cup B) \cap (A \cap B)'$

$= (A \cup B) \cap (A' \cup B')$

$= (A \cap (A' \cup B')) \cup (B \cap (A' \cup B'))$

$= (A \cap B') \cup (B \cap A')$

$= (A - B) \cup (B - A)$ from (i)