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* Examples on sets of integers :-

ex. (1) Find the no. of integers ≤ 200 which are divisible by 2 or 5.

⇒

$n(S)$ = no. of integers = 200

$n(A)$ = no. of integers divisible by 2

$= \frac{200}{2} = 100$

$n(B)$ = no. of integers divisible by 5

$= \frac{200}{5} = 40$

$n(A \cap B)$ = The no. of integer divisible by 2 and 5

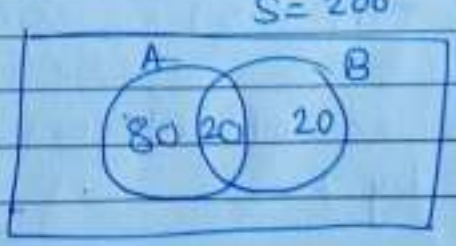
$= \frac{200}{2 \times 5} = 20$

∴ The no. of integers divisible by 2 or 5 or (both)

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

$= 100 + 40 - 20$

$= 120$



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ex. (2) Among the integers 1 to 300 how many are divisible by 3 or 5 or 7 and are divisible by 3 nor by 5 nor by 7? How many are divisible by 3 but not by 5, nor by 7?

⇒

we have,

$n(U)$ = The no. of integers in set = 300

$n(T)$ = no. of integers divisible by $3 = \frac{300}{3} = 100$

$n(F)$ = no. of integers divisible by $5 = \frac{300}{5} = 60$

$n(S)$ = no. of integers divisible by $7 = \frac{300}{7} = 42$

$n(T \cap F) = \frac{300}{3 \times 5} = 20$

$n(T \cap S) = \frac{300}{3 \times 7} = 20$

$n(F \cap S) = \frac{300}{5 \times 7} = 8$

$n(T \cap F \cap S) = \frac{300}{3 \times 5 \times 7} = 2$

The no. of integers divisible by 3 or by 5 or by 7.

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$n(T \cup F \cup S) = n(T) + n(F) + n(S) - n(T \cap F) - n(T \cap S) - n(F \cap S) + n(T \cap F \cap S)$

$= 100 + 60 + 42 - 20 - 14 - 8 + 2$

$= 162$

∴ The no. of integers not divisible by 3 nor by 5 nor by 7.

$n(\overline{T \cup F \cup S}) = n(U) - n(T \cup F \cup S)$

$= 300 - 162$

$= 138$

The no. of integers divisible by 3 but not by 5, not by 7.

$n(T - F - S) = n(T \cap \overline{F \cup S}) = n(T \cap \overline{F} \cap \overline{S})$

$= n(T) - n(T \cap F) - n(T \cap S) + n(T \cap F \cap S)$

$= 100 - 20 - 14 + 2$

$= 68.$

ex (3) Find the no. of integers between 1 and 1000 that are i) not divisible by 3 nor by 5 nor by 7 ii) not divisible by 5 & by 7 but divisible by 3 ?

⇒

i) 457 ii) 229.