SETS

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Solution of WORKSEET NO: 3

Solution of S-3

1 → let C_1 → denotes number of individuals exposed to chemical C_1

C_2 → ------ chemical C_2

Given: $n(U) = 200$

$n(C_1) = 120$, $n(C_2) = 50$, $n(C_1 \cap C_2) = 30$

i) $n(C_1 \cap C_2') = n(C_1) - n(C_1 \cap C_2)$

$= 120 - 30 = 90$ Ans

ii) $n(C_2 \cap C_1') = n(C_2) - n(C_1 \cap C_2)$

$= 50 - 30 = 20$ Ans

iii) $n(C_1 \cup C_2) = n(C_1) + n(C_2) - n(C_1 \cap C_2)$

$= 120 + 50 - 30 = 140$

iv) $n(C_1' \cap C_2') = n(U) - n(C_1 \cup C_2)$

$= 200 - 140 = 60$

-x-

2 → A → set of Students drinking limca

B → " " " drinking Mirinda

Given $n(U) = 700$

$n(A) = 180$, $n(B) = 275$, $n(A \cap B) = 95$

To find $n(A' \cap B')$

$= n(U) - n(A \cup B)$

$= n(U) - [n(A) + n(B) - n(A \cap B)]$

$= 700 - (180 + 275 - 95) = 340$ Ans

S-3 Solutions

NS: 3 → A → Set of Students taking Chemistry class

B → " " " " Physics "

given $n(A) = 40$

$n(B) = 60$

) Since two classes meet as the same time

∴ there will be no common student who are taking both classes at the same time

$\Rightarrow n(A \cap B) = 0$

$\therefore n(A \cup B) = n(A) + n(B) - 0$

$= 40 + 60$

$= 100$ Ans

classes at different time

20 students are common

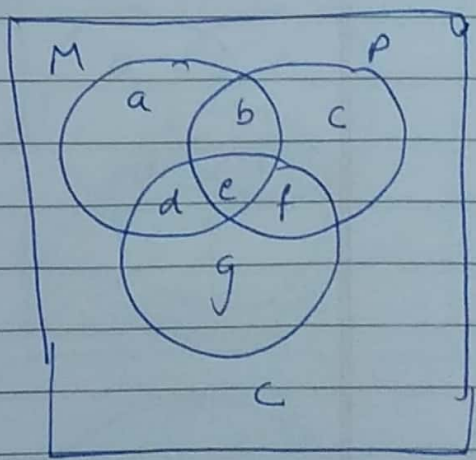
$\therefore n(A \cap B) = 20$

$n(A \cup B) = 40 + 60 - 20$

$= 80$ Ans

-x-

4 → $n(U) = 25$



$(M) = 15 = a+b+e+d$

$(P) = 12 = b+c+e+f$

$n(C) = 11 = d+e+f+g$

$n(M \cap C) = 5 = d+e$

$n(M \cap P) = 9 = b+e$

$n(P \cap C) = 4 = e+f$

$n(M \cap P \cap C) = 3 = e$

$e=3,\quad f=1,\quad b=6,\quad d=2,\quad g=5,\quad c=2$
$a=4$

(1) only chemistry $= g = 5$

(2) physics and chemistry but not Maths $= f = 1$

(3) only one of the subjects $= a+c+g = 11$

(4) atleast one of the three subject $= a+b+c+d+f+e+g$
$= 23$

(5) none of the subject $= 25-23 = 2$

(6) exactly two $= b+d+f = 9$

—×—

Qn 5 → A → set of families buy newspaper A
B → " " " " " B
C → " " " " " C

Given $n(U) = 10000$

$n(A) = 40\%$ of $10000 = 4000 = a+b+e+d$

$n(B) = 20\%$ of $10000 = 2000 = b+c+e+f$

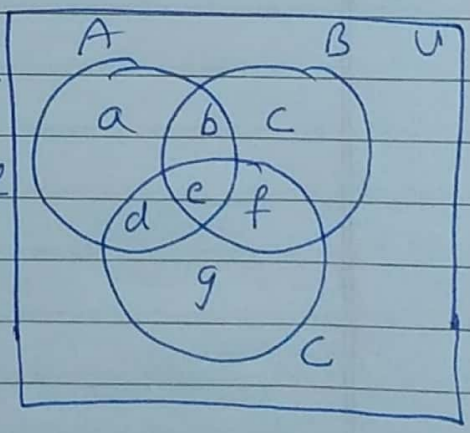
$n(C) = 1000 = d+e+f+g$

$n(A \cap B) = 500 = b+e$

$n(B \cap C) = 300 = e+f$

$n(A \cap C) = 400 = d+e$

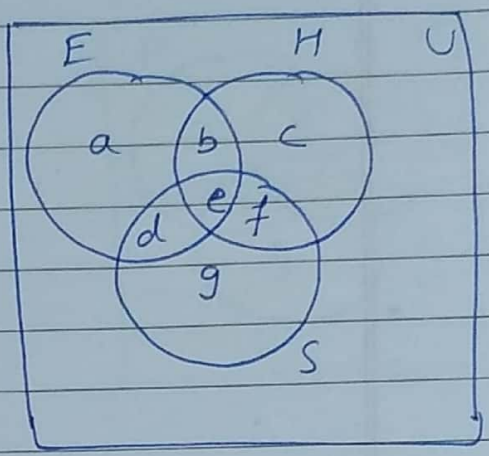
$n(A \cap B \cap C) = 200 = e$



Solve yourself

proud

Q.No 6 → given $n(U) = 100$



English only $a = 18$

English not Hindi = $a + d = 23$

$n(E \cap S) = d + e = 8$

$n(E) = a + b + e + d = 26$

$n(S) = d + e + f + g = 48$

$n(S \cap H) = e + f = 8$

no language = none = 24

IMP point ⇒ $24 = 100 - (a + b + c + d + f + g)$

$a + b + c + d + e + f + g = 76$

$a = 18$, $d = 5$, $e = 3$, $b = 0$

$f = 5$, $g = 35$, $a = 10$

(1) $n(H) = b + c + e + f$

$= 43$

(2) $n(E \cap H) = b + e = 3$ Ans

—x—

Q.No 7 → $n(U) = 500$

$n(F) = 285 = a + b + e + d$

$n(H) = 195 = d + e + f + g$

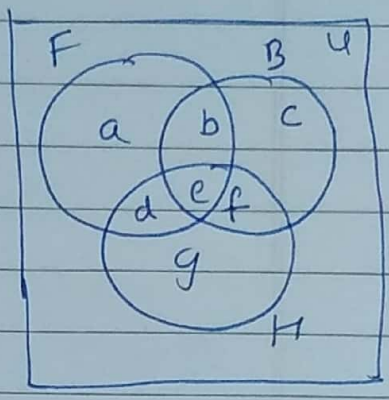
$n(B) = 115 = b + c + e + f$

$n(F \cap B) = 45 = b+e$

$n(F \cap H) = 70 = d+e$

$n(H \cap B) = 50 = e+f$

$n(\text{none of the game}) = 50$



Imp. pant

$n(\text{none}) = n(U) - n(\text{atleast one})$

$\Rightarrow 50 = 500 - n(\text{atleast one})$

$\Rightarrow n(\text{atleast one}) = 450$

$\Rightarrow a+b+c+d+e+f+g = 450$

Imp.

$n(F \cup B \cup H) = n(F) + n(B) + n(H) - n(F \cap B) - n(B \cap H) - n(F \cap H) + n(F \cap B \cap H)$

$450 = 285 + 195 + 115 - 45 - 50 - 70 + n(F \cap B \cap H)$

$\Rightarrow n(F \cap B \cap H) = 20$

$\Rightarrow \boxed{e = 20}$

$\therefore f = 30, \quad d = 50, \quad b = 25, \quad c = 40$

$g = 95, \quad a = 190$

(1) $n(F \cap B \cap C) = 20$

(2) exactly one $= a+c+g = 190 + 40 + 95 = 325$

Ans

Q.No 8 → $n(T \cup C) = 50$

$n(T \cap C') = 14$

$n(T) = 30$

(i) we know $n(T \cap C') = n(T) - n(T \cap C)$

$14 = 30 - n(T \cap C)$

$\Rightarrow n(T \cap C) = 16$ Ans

(2) we know $n(T \cup C) = n(T) + n(C) - n(T \cap C)$

$\Rightarrow 50 = 30 + n(C) - 16$

$\Rightarrow n(C) = 36$

$n(C \cap T') = n(C) - n(C \cap T)$

$= 36 - 16$

$= 20$ Ans

—x—

Q.No 9 → $n(U) = 500$

$n(A) = 400$

$n(B) = 200$

$n(A \cap B) = 50$

$n(A \cup B) = 400 + 200 - 50 = 550$

But $n(U) = 500$

Here $n(A \cup B) > n(U)$

not possible

∴ data is incorrect

Q No 10 → $n(A) = 3$
$n(B) = 6$

Minimum number of elements of $n(A \cup B) = 3$

Maximum " " " " $n(A \cup B) = 9$

Maximum " " " $n(A \cap B) = 3$

→ when $A \subset B$

→ when $A \cap B = \phi$

→ when $A \subset B$