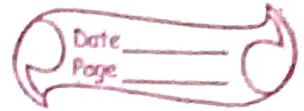


1.1, 3



Part 1: M.C.

1. Given $A = \{1, 3, 6, 8, 9, 12, 15\}$ and $B = \{6, 9, 12\}$

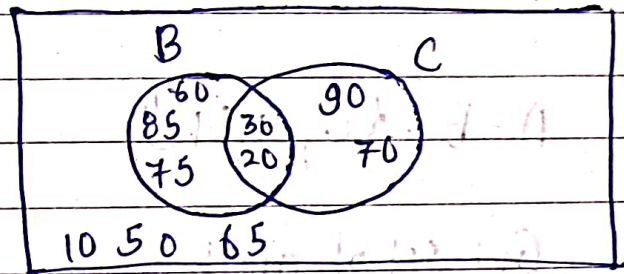
(D) $B \subset A$

2. Which is an example of disjoint sets?

(C) $E = \{\text{even numbers}\}$ and $F = \{\text{odd numbers}\}$

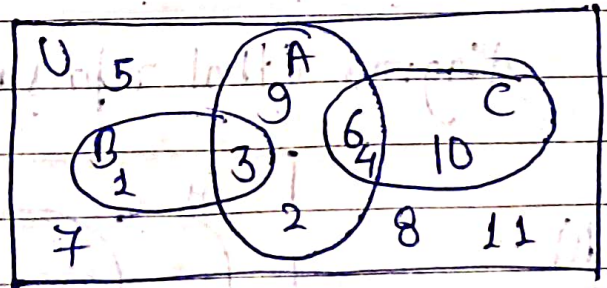
3. What is the complement of B union C , $(B \cup C)'$?

(B) $\{10, 50, 65\}$



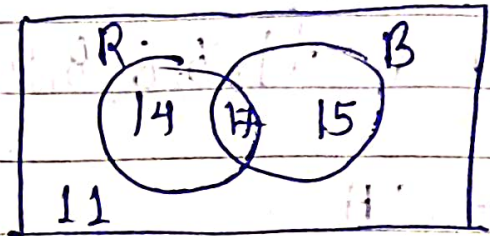
4. Which sets are disjoint?

(D) B and C are disjoint.



5. How many elements are in R union B , $n(R \cup B)$?

$$n(R \cup B) = 14 + 17 + 15 = 46$$



(C) 46

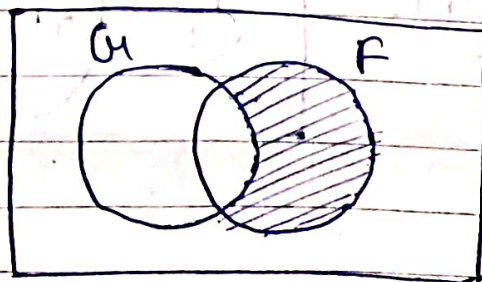
6. $A = \{0, 2, 3, 4, 9, 11\}$

$B = \{2, 3, 6, 8, 9, 10\}$, what is A minus B , $A \setminus B$?

$$A - B = \{0, 4, 11\}$$

7. G : set of girls
 F : set of children who like fencing.

diagram that represents boys who like fencing?



A)

8. 25 elements in a universal set.

$$n(A) = 14$$

$$n(B) = 15$$

$$n(A \cap B) = 6$$

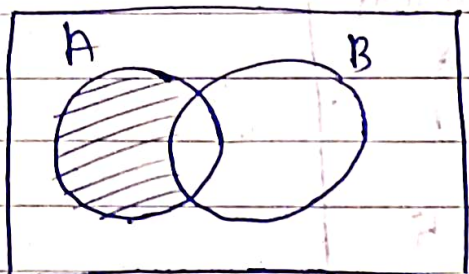
$$n(A \cup B) = n(A) + n(B) - n(A \cap B)$$

$$= 14 + 15 - 6$$

$$= 29 - 6 = 23$$

(C) 23

9.



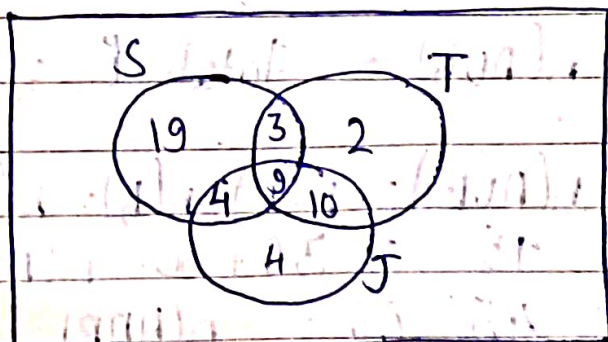
(D) $(A - B)$ $(A \setminus B)$

10.

$$n((S \cup T) \setminus J)$$

$$= 19 + 3 + 2$$

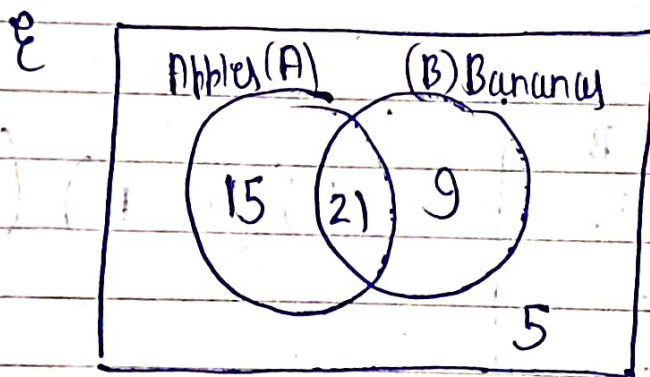
$$= 24$$



PART 2: Long answer Questions:-

1. A surveyed was conducted at Holy Spirit High school where 50 students were randomly chosen and asked whether they liked apples or banana.

Of the 50, 36 students like apples
30 students like banana
5 students do not like either apples or banana.



$$n(A \cup B) = \text{total} - E = 50 - 5 = 45$$

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

$$45 = 36 + 30 - n(A \cap B)$$

$$\Rightarrow 45 - 66 = -n(A \cap B)$$

$$\Rightarrow -21 = -n(A \cap B)$$

$$\Rightarrow n(A \cap B) = 21$$

(a) students like both apples and bananas = $n(A \cap B) = 21$

(b) only apples = 15

only bananas = 9

2. 50 students at Holy spirit high were interviewed to determine what sports they played, if any,

$$n(B) = 28$$

$$n(H) = 21$$

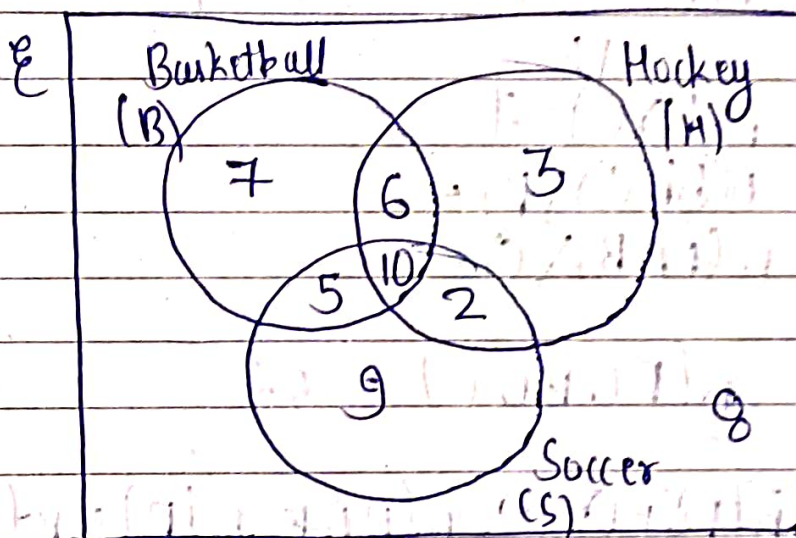
$$n(S) = 26$$

$$n(B \cap H) = 16$$

$$n(H \cap S) = 12$$

$$n(B \cap S) = 15$$

$$n(B \cap H \cap S) = 10$$



(a) students that play none of the sports

$$= 8$$

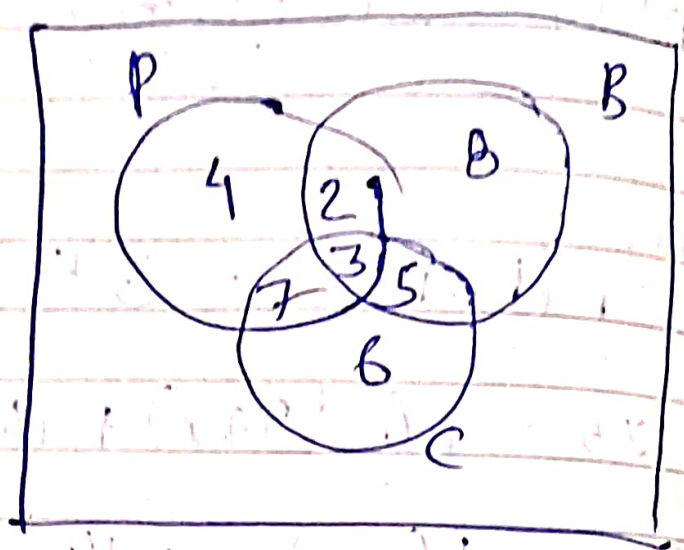
(b) students that only play basketball = 7

(c) play ^{hockey} basketball and soccer but not basketball = 6

3. 35 students, each student is at least one science course

$$\begin{aligned} n(P) &= 16 \\ n(B) &= 18 \\ n(C) &= 21 \end{aligned}$$

$$\begin{aligned} n(P \cap C \setminus B) &= 7 \\ n(B \cap C \setminus P) &= 5 \\ n(P \cap B \setminus C) &= 2 \end{aligned}$$



$$n(P \cup B \cup C) = 35$$

$$\begin{aligned} n(P \cup B \cup C) &= n(P \text{ only}) + n(B \text{ only}) + n(C \text{ only}) \\ &\quad + n(P \cap C \setminus B) + n(B \cap C \setminus P) + n(P \cap B \setminus C) \\ &\quad + n(P \cap B \cap C) \end{aligned}$$

$$\begin{aligned} \Rightarrow 35 &= (16 - 2 - 7 - x) + (18 - 5 - 2 - x) + (21 - 7 - 5 - x) \\ &\quad + 2 + 7 + 5 + x \end{aligned}$$

$$\Rightarrow 35 = (7 - x) + (11 - x) + (9 - x) + 2 + 7 + 5 + x$$

$$\Rightarrow 35 = (7 - x) + (11 - x) + (9 - x) + 14 + x$$

$$\Rightarrow 35 = 27 - 2x + 14$$

$$\Rightarrow 8 = -2x + 14$$

$$\Rightarrow -6 = -2x$$

$$\Rightarrow x = \frac{-6}{-2} = 3$$

$$\underline{\underline{(a)}} \quad n(P \cap B \cap C) = 3$$

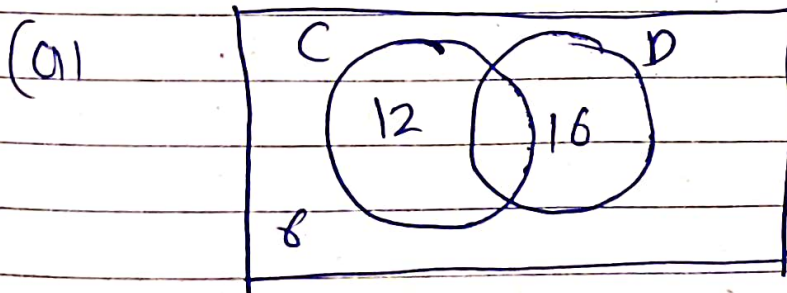
$$\underline{\underline{(b)}} \quad n(\text{taking only one science course}) = 4 + 8 + 6 = 18$$

4. 30 students.

$$\text{Dog} = 16$$

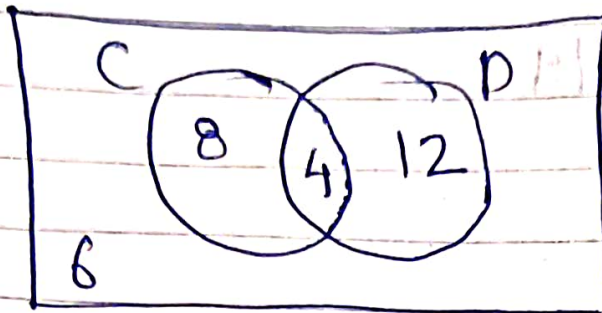
$$\text{Cat} = 12$$

not have either one = 6



error occurred when we did not take account of students who owned the both.

(b)



$$n(C \cup P) = \text{total} - \bar{C} = 30 - 6 = 24$$

$$\Rightarrow n(C \cup P) = 24$$

$$n(C \cup P) = n(C) + n(P) - n(C \cap P)$$

$$\Rightarrow 24 = 12 + 16 - n(C \cap P)$$

$$\Rightarrow 24 - 28 = -n(C \cap P)$$

$$\Rightarrow -4 = -n(C \cap P)$$

$$\Rightarrow n(C \cap P) = 4$$

