Unit 1 · Sets

WORKSHEET

Full marks 33

Name _____ Class _____ Roll no. _____ Date _____ Marks _____ / 33

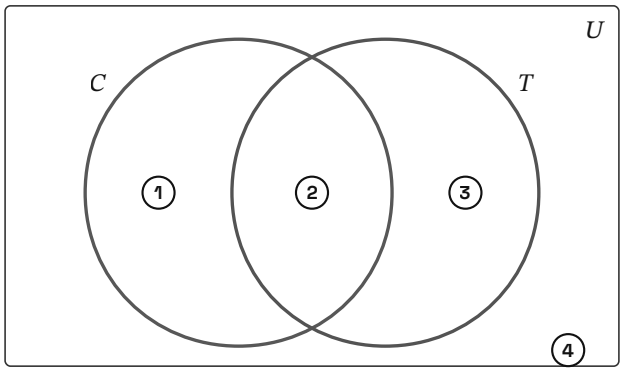
1 Key words [3]

Match each word or symbol in Column A with its meaning in Column B. Write the letter in the box. One meaning in Column B is not needed. Each match carries 0.5 mark.

Column A		Column B
1. universal set	☐	**a.** the elements in both sets
2. cardinal number	☐	**b.** the number of elements in neither A nor B
3. disjoint sets	☐	**c.** how many elements a set has
4. intersection	☐	**d.** the elements in A or B or both
5. $n_0(A)$	☐	**e.** the set of everything being talked about
6. $n(\overline{A \cup B})$	☐	**f.** the number of elements in A only
		g. sets with no element in common

2 Fill the diagram [2]

In a class, 15 students like coffee (C), 10 like tea (T), 6 like both and 5 like neither. Write the number of students that belongs in each numbered region. Each carries 0.5 mark.



1. _____ **2.** _____

3. _____ **4.** _____

3 Multiple choice [5]

Choose the correct option for each of the following questions.

i. If $A \subset B$, then $n(A \cup B)$ is equal to [1]

a. $n(A)$ **b.** $n(B)$

c. $n(A) + n(B)$ **d.** $n(B) - n(A)$

ii. In a survey, "did not like both games" means the people **[1]**

a. outside both circles
b. everywhere except the overlap
c. in the overlap only
d. who like the first game only

iii. In a three-set Venn diagram, $n(P \cap Q) = 15$ and $n(P \cap Q \cap R) = 6$. What is $n_0(P \cap Q)$? **[1]**

a. 21
b. 15
c. 9
d. 6

iv. Of 50 people, 30 drink tea, 25 drink coffee and 10 drink both. How many drink neither? **[1]**

a. 15
b. 10
c. 5
d. 0

v. In a school, 70% of the students like football and 50% like cricket, and every student likes at least one of them. What percentage like both? **[1]**

a. 50%
b. 30%
c. 20%
d. 120%

4 Very short answers **[3]**

Write very short answers to the following questions.

a. Write in cardinality notation: the number of students who like neither Mathematics (M) nor Science (S). **[1]**

b. If $n(U) = 40$ and $n(\overline{A}) = 15$, find $n(A)$. **[1]**

c. How many regions does a Venn diagram of three overlapping sets have, counting the region outside all the circles? **[1]**

5 Short answers **[6]**

Write short answers to the following questions.

a. Explain why the formula $n(A \cup B) = n(A) + n(B) - n(A \cap B)$ takes away $n(A \cap B)$. **[2]**

b. In a class, 25 students like momo, 18 like chowmein and 7 like both. Sita wrote: "At least one: $25 + 18 + 7 = 50$." Find her mistake and write the correct answer. **[2]**

c. For two sets, $n(A \cup B) = 50$, $n_0(A) = 18$ and $n_0(B) = 20$. Find $n(A \cap B)$ and $n(A)$. **[2]**

6 Survey problems **[12]**

Solve the following problems. Draw a Venn diagram for each and show your working.

a. A survey of 900 people of a community found that 525 read *Madhupark*, 450 read *Yuba Manch*, and 75 read neither magazine. **[4]**

i. Show the information in a Venn diagram.
ii. Find the number who read both.
iii. Find the number who read only one.

Answer: _____

b. At a conference of 320 participants, 60 only sing and 100 only dance. The number who do neither is three times the number who do both. **[4]**

i. Show the information in a Venn diagram.

ii. Find how many do neither.

iii. Find the number who do at most one of the two.

Answer: _____

c. In a survey of 60 students, 23 played volleyball, 15 basketball and 20 cricket. 7 played volleyball and basketball, 5 basketball and cricket, and 4 volleyball and cricket, while 15 played none of the games. **[4]**

i. Show the information in a Venn diagram.

ii. Find how many played all three games.

iii. How many played volleyball and cricket only?

Answer: _____

7 Think **[2]**

Think, then answer.

In a class of 40, 25 students like football and 22 like cricket. Hari says that at least 7 students must like both. Is he right? What is the largest number who could like both?

8 Activity: Survey your class

(not marked)

Ask every student in your class two questions: “Do you like cricket?” and “Do you like football?” Count the answers, fill in the table, and draw the Venn diagram on the back of this sheet.

What you count	Number of students
asked in all, $n(U)$	
like cricket, $n(C)$	
like football, $n(F)$	
like both, $n(C \cap F)$	
like cricket only, $n_0(C)$	
like football only, $n_0(F)$	
like neither	

Do your four regions add up to the number you asked? Check with $n(C) + n(F) - n(C \cap F) + \text{neither} = n(U)$.