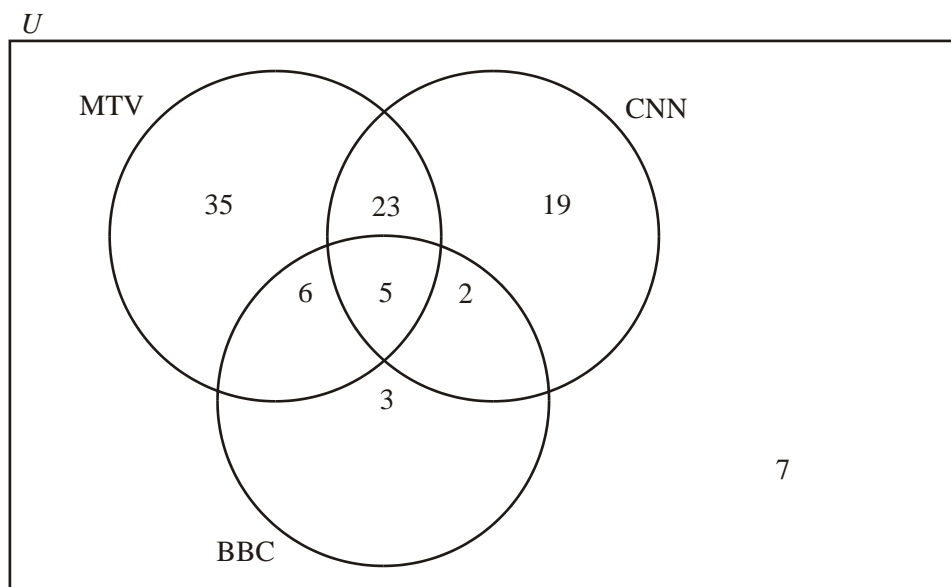


1. 100 students were asked which television channel (MTV, CNN or BBC) they had watched the previous evening. The results are shown in the Venn diagram below.



From the information in the Venn diagram, write down the number of students who watched

- both MTV and BBC;
- MTV or BBC;
- CNN and BBC but not MTV;
- MTV or CNN but not BBC.

(Total 4 marks)

2. A group of 30 children are surveyed to find out which of the three sports cricket (C), basketball (B) or volleyball (V) they play. The results are as follows:

3 children do not play any of these sports
 2 children play all three sports
 6 play volleyball and basketball
 3 play cricket and basketball
 6 play cricket and volleyball
 16 play basketball
 12 play volleyball.

- Draw a Venn diagram to illustrate the relationship between the three sports played.

(1)

- On your Venn diagram indicate the number of children that belong to each region.

(3)

- How many children play only cricket?

(2)

(Total 6 marks)

3. A poll was taken of the leisure time activities of 90 students.
- 60 students watch TV (T), 60 students read (R), 70 students go to the cinema (C).
 26 students watch TV, read **and** go to the cinema.
 20 students watch TV and go to the cinema only.
 18 students read and go to the cinema only.
 10 students read and watch TV only.

- (a) Draw a Venn diagram to illustrate the above information.
- (b) Calculate how many students
- only watch TV;
 - only go to the cinema.

(Total 8 marks)

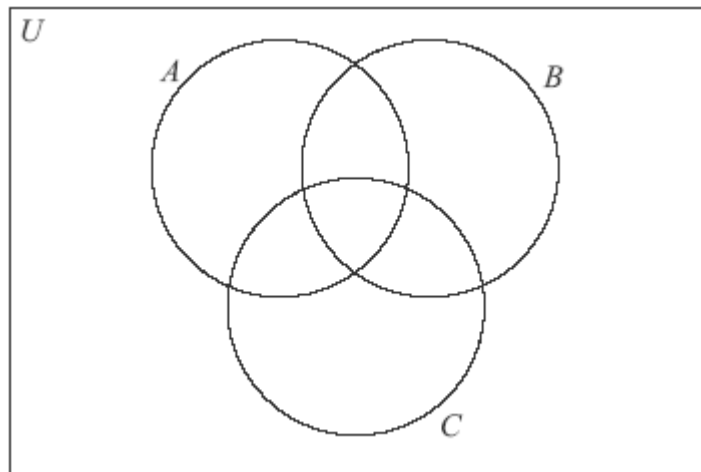
4. U is the set of all the **positive** integers less than or equal to 12.
 A , B and C are subsets of U .

$$A = \{1, 2, 3, 4, 6, 12\}$$

$$B = \{\text{odd integers}\}$$

$$C = \{5, 6, 8\}$$

- (a) Write down the number of elements in $A \cap C$. (1)
- (b) List the elements of B . (1)
- (c) Complete the following Venn diagram with **all** the elements of U .



(4)
 (Total 6 marks)

5. One day the number of customers at three cafés, “Alan’s Diner” (A), “Sarah’s Snackbar” (S) and “Pete’s Eats” (P) was recorded and are given below.

17 were customers of Pete’s Eats only
 27 were customers of Sarah’s Snackbar only
 15 were customers of Alan’s Diner only
 10 were customers of Pete’s Eats **and** Sarah’s Snackbar **but not** Alan’s Diner
 8 were customers of Pete’s Eats **and** Alan’s Diner **but not** Sarah’s Snackbar

- (a) Draw a Venn Diagram, using sets labelled A , S and P , that shows this information. (3)

There were 48 customers of Pete’s Eats that day.

- (b) Calculate the number of people who were customers of all three cafés. (2)

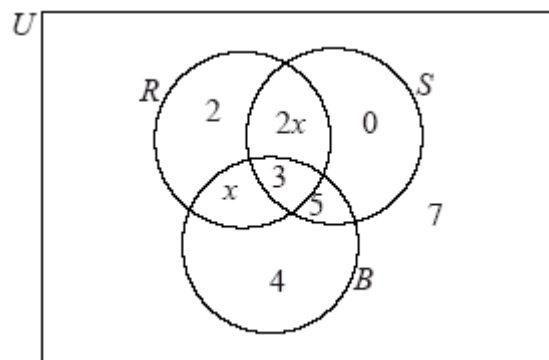
There were 50 customers of Sarah’s Snackbar that day.

- (c) Calculate the total number of people who were customers of Alan’s Diner. (3)

- (d) Write down the number of customers of Alan’s Diner that were also customers of Pete’s Eats. (1)

- (e) Find $n[(S \cup P) \cap A']$. (2)
- (Total 11 marks)**

6. A survey was carried out in a year 12 class. The pupils were asked which pop groups they like out of the *Rockers* (R), the *Salseros* (S), and the *Bluers* (B). The results are shown in the following diagram.



- (a) Write down $n(R \cap S \cap B)$. (1)
- (b) Find $n(R')$. (2)
- (c) Describe which groups the pupils in the set $S \cap B$ like. (2)
- (d) Use set notation to describe the group of pupils who like the *Rockers* and the *Bluers* but do not like the *Salseros*. (2)

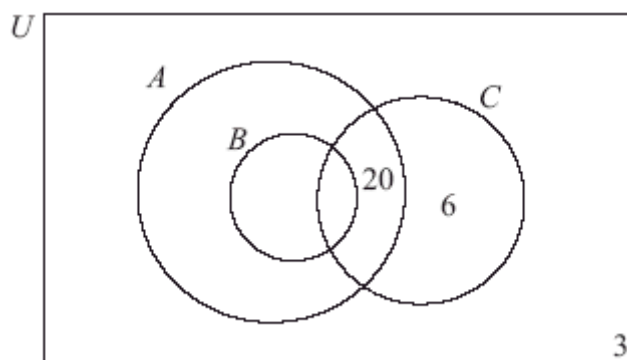
There are 33 pupils in the class.

- (e) (i) Find x .
(ii) Find the number of pupils who like the *Rockers*.

(3)
(Total 10 marks)

7. The Venn diagram below represents the students studying Mathematics (A), Further Mathematics (B) and Physics (C) in a school.

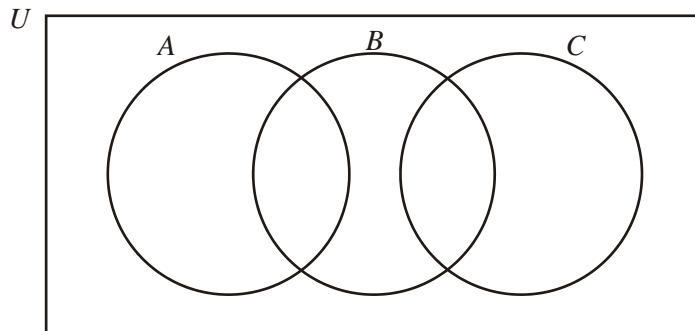
50 students study Mathematics
38 study Physics
20 study Mathematics and Physics but not Further Mathematics
10 study Further Mathematics but not Physics
12 study Further Mathematics and Physics
6 study Physics but not Mathematics
3 study none of these three subjects.



- (a) Copy and complete the Venn diagram **on your answer paper**. (3)
- (b) Write down the number of students who study Mathematics but not Further Mathematics. (1)
- (c) Write down the total number of students in the school. (1)
- (d) Write down $n(B \cup C)$. (2)

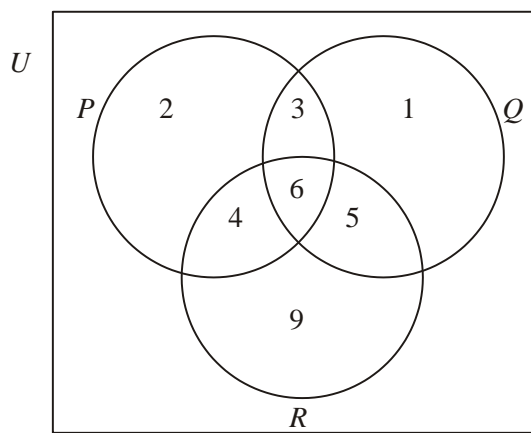
(2)
(Total 7 marks)

8. (a) Shade $(A \cup B) \cap C'$ on the diagram below.



(2)

- (b) In the Venn diagram below, the number of elements in each region is given. Find $n((P \cap Q) \cup R)$.



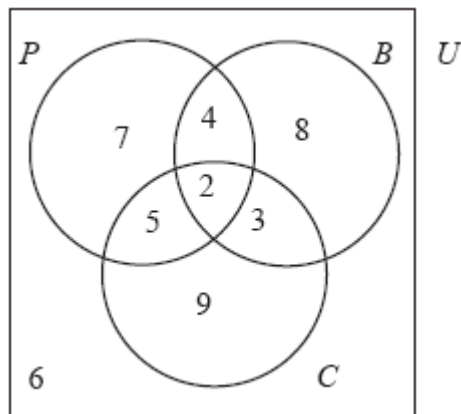
(2)

- (c) U is the set of positive integers, \mathbb{Z}^+ .
 E is the set of even numbers.
 M is the set of multiples of 3.
- (i) List the first six elements of the set M .
- (ii) List the first six elements of the set $E' \cap M$.

(2)

(Total 6 marks)

9. The Venn diagram shows the numbers of pupils in a school according to whether they study the sciences Physics (P), Chemistry (C), Biology (B).

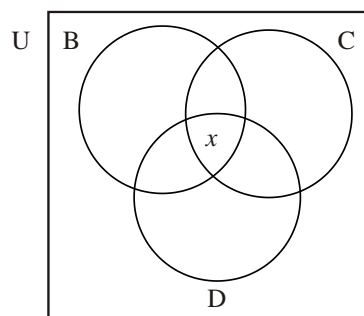


- (a) Write down the number of pupils that study Chemistry only. (1)
- (b) Write down the number of pupils that study **exactly** two sciences. (1)
- (c) Write down the number of pupils that do not study Physics. (2)
- (d) Find $n[(P \cup B) \cap C]$. (2)
- (Total 6 marks)**

10. A school offers three activities, basketball (B), choir (C) and drama (D). Every student must participate in at least one activity.

16 students play basketball only.
 18 students play basketball and sing in the choir but do not do drama.
 34 students play basketball and do drama but do not sing in the choir.
 27 students are in the choir and do drama but do not play basketball.

- (a) Enter the above information on the Venn diagram below. (2)



99 of the students play basketball, 88 sing in the choir and 110 do drama.

- (b) Calculate the number of students x participating in all three activities. (1)
- (c) Calculate the total number of students in the school. (3)

(Total 6 marks)

11. At a certain school there are 90 students studying for their IB diploma. They are required to study at **least one** of the subjects: Physics, Biology or Chemistry.

50 students are studying Physics,

60 students are studying Biology,

55 students are studying Chemistry,

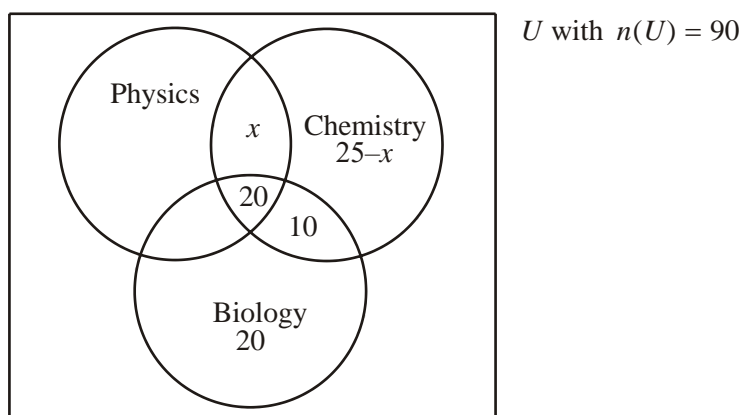
30 students are studying both Physics and Biology,

10 students are studying both Biology and Chemistry but not Physics,

20 students are studying all three subjects.

Let x represent the number of students who study both Physics and Chemistry but not Biology.
Then $25-x$ is the number who study Chemistry only.

The figure below shows some of this information and can be used for working.



- (a) Express the number of students who study Physics only, in terms of x .
- (b) Find x .
- (c) Determine the number of students studying **at least two** of the subjects.

(Total 6 marks)

12. The following results were obtained from a survey concerning the reading habits of students.

- 60% read magazine P
- 50% read magazine Q
- 50% read magazine R
- 30% read magazines P and Q
- 20% read magazines Q and R
- 30% read magazines P and R
- 10% read all three magazines

- (a) Represent all of this information on a Venn diagram. (4)
- (b) What percentage of students read exactly two magazines? (1)
- (c) What percentage of students read at least two magazines? (1)
- (d) What percentage of students do not read any of the magazines? (1)
- (Total 7 marks)**

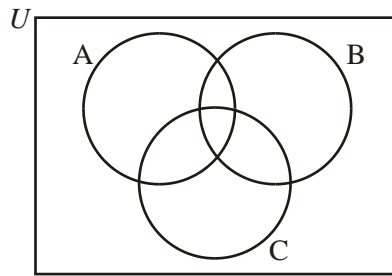
13. A committee U has three sub-committees: research R , finance F and purchasing P . No member belongs to both finance and purchasing sub-committees. Some members belong to both research and purchasing committees. All members of the finance sub-committee also belong to the research sub-committee.

Draw a Venn diagram, showing the relationship between the sets U , R , F and P .

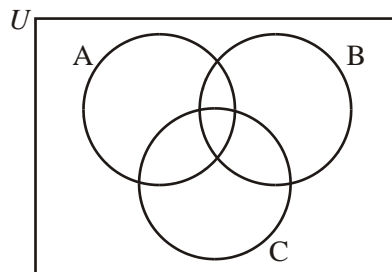
(Total 4 marks)

14. Shade the given region on the corresponding Venn Diagram.

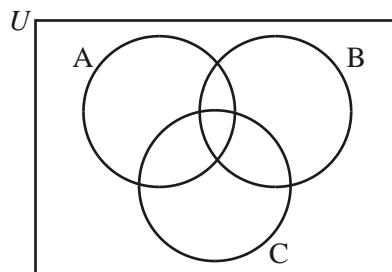
(a) $A \cap B$



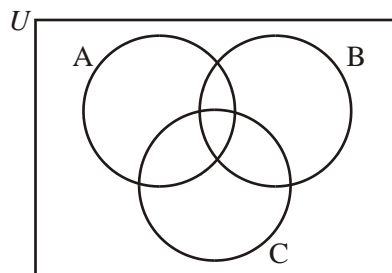
(b) $C \cup B$



(c) $(A \cup B \cup C)'$



(d) $A \cap C'$



(Total 8 marks)