

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

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

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

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

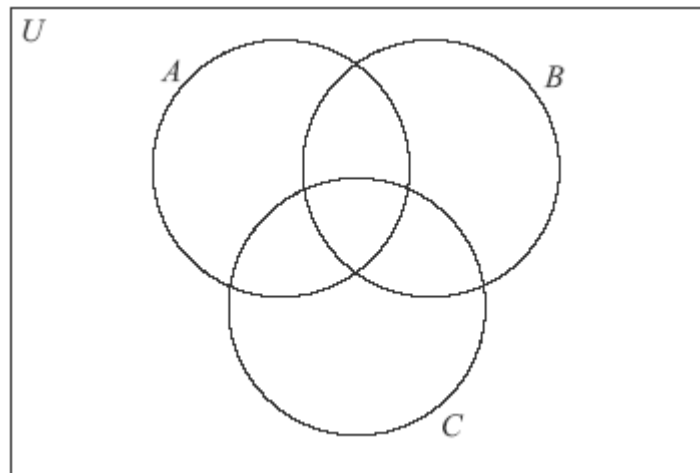
- (a) Write down the number of elements in $A \cap C$.

(1)

- (b) List the elements of B .

(1)

- (c) Complete the following Venn diagram with **all** the elements of U .

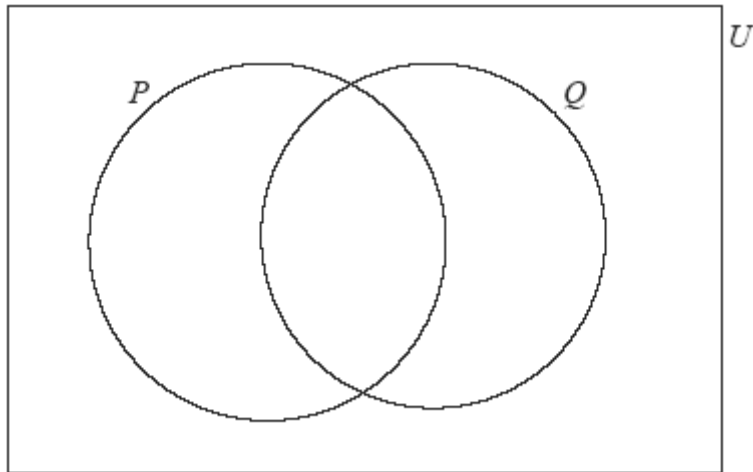


(4)

(Total 6 marks)

2. The sets P , Q and U are defined as

$U = \{\text{Real Numbers}\}$, $P = \{\text{Positive Numbers}\}$ and $Q = \{\text{Rational Numbers}\}$.

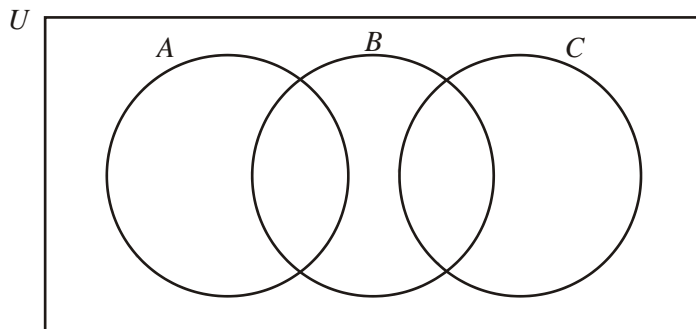


Write down in the correct region on the Venn diagram the numbers

$\frac{22}{7}$, 5×10^{-2} , $\sin(60^\circ)$, 0 , $\sqrt[3]{-8}$, $-\pi$

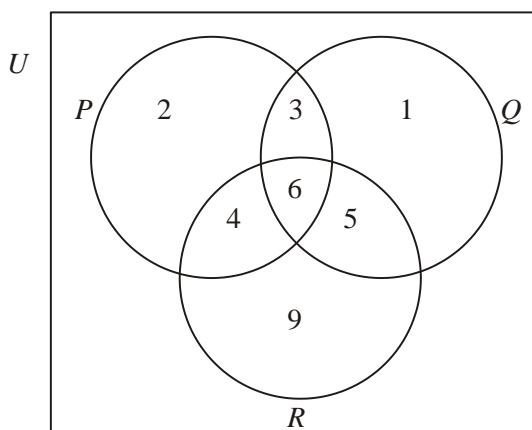
(Total 6 marks)

3. (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)

4. Given \mathbb{Z} the set of integers, \mathbb{Q} the set of rational numbers, \mathbb{R} the set of real numbers.

- (a) Write down an element that belongs to $\mathbb{R} \cap \mathbb{Z}$.
- (b) Write down an element that belongs to $\mathbb{Q} \cap \mathbb{Z}'$.
- (c) Write down an element that belongs to \mathbb{Q}' .
- (d) Use a Venn diagram to represent the sets \mathbb{Z} , \mathbb{Q} and \mathbb{R} .

(Total 6 marks)

5. Let $U = \{-4, -\frac{2}{3}, 1, \pi, 13, 26.7, 69, 10^{33}\}$.

A is the set of all the integers in U .

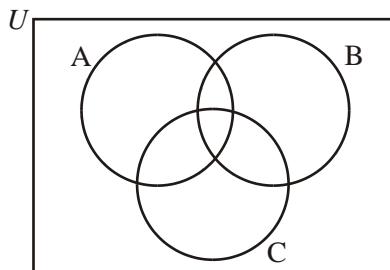
B is the set of all the rational numbers in U .

- (a) List all the prime numbers contained in U .
- (b) List all the members of A .
- (c) List all the members of B .
- (d) List all the members of the set $A \cap B$.

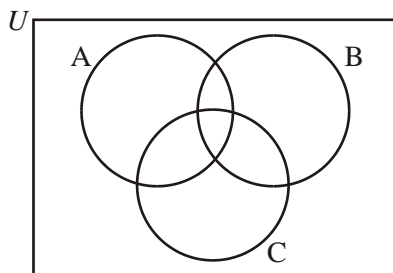
(Total 8 marks)

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

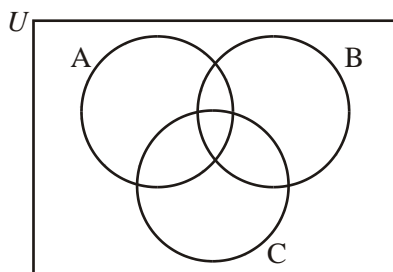
- (a) $A \cap B$



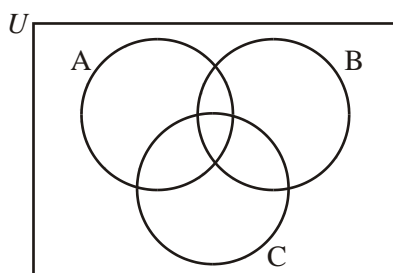
(b) $C \cup B$



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

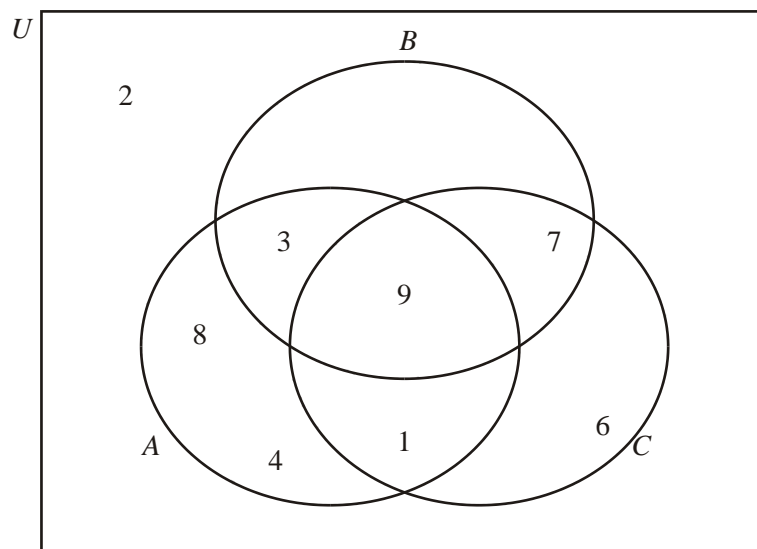


(d) $A \cap C'$



(Total 8 marks)

7. In the Venn diagram below, A , B and C are subsets of a universal set $U = \{1,2,3,4,6,7,8,9\}$.

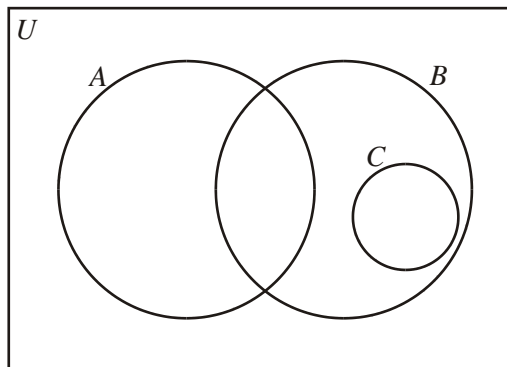


List the elements in each of the following sets.

- (a) $A \cup B$
- (b) $A \cap B \cap C$
- (c) $(A' \cap C) \cup B$

(Total 8 marks)

8. The following Venn Diagram shows the sets U , A , B and C .

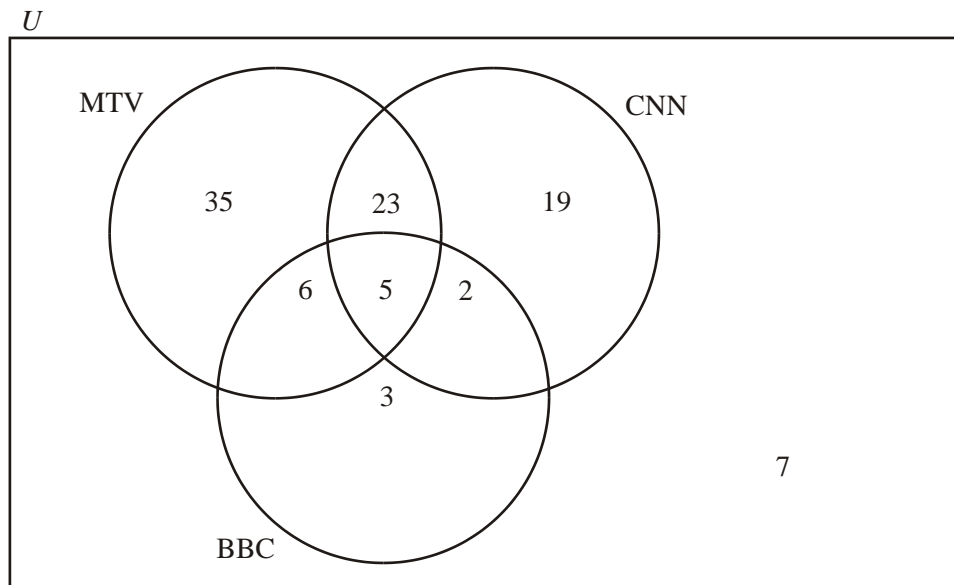


State whether the following statements are true or false for the information illustrated in the Venn Diagram.

- (a) $A \cap C = \emptyset$
- (b) $C \cup B = C$
- (c) $C \subset (A \cup B)$
- (d) $A \subset C'$

(Total 8 marks)

9. 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.



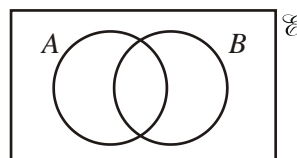
From the information in the Venn diagram, write down the number of students who watched

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

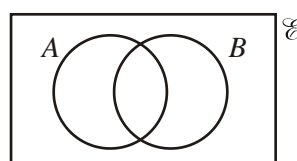
(Total 4 marks)

10. In each of the Venn diagrams, shade the region indicated.

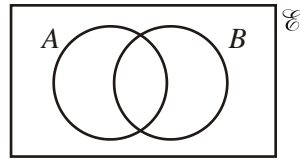
- (a) $A \cap B$



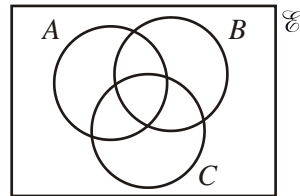
- (b) The complement of $(A \cap B)$



(c) The complement of $(A \cup B)$



(d) $A \cup (B \cap C)$



(Total 4 marks)