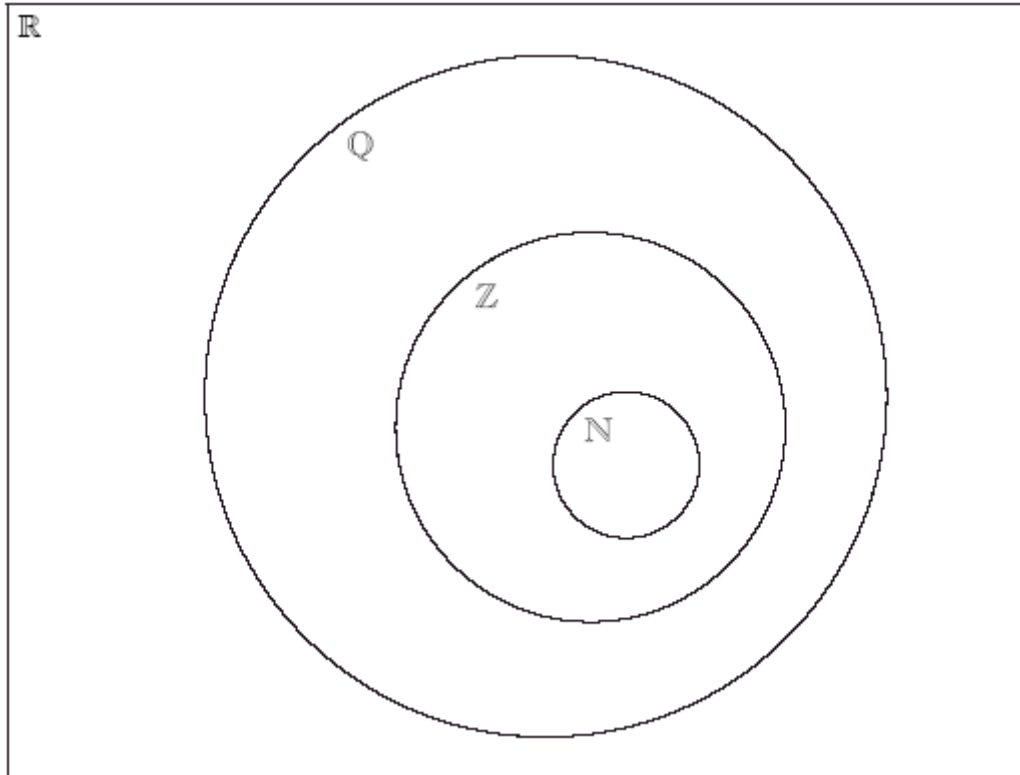


1. The Venn diagram shows the number sets \mathbb{N} , \mathbb{Z} , \mathbb{Q} and \mathbb{R} . Place each of the following numbers in the appropriate region of the Venn diagram.

$$\frac{1}{4}, -3, \pi, \cos 120^\circ, 2.7 \times 10^3, 3.4 \times 10^{-2}$$



(Total 6 marks)

2. (a) Write down the following numbers in increasing order.

$$3.5, 1.6 \times 10^{-19}, 60730, 6.073 \times 10^5, 0.006073 \times 10^6, \pi, 9.8 \times 10^{-18}.$$

- (b) Write down the median of the numbers in part (a).
(c) State which of the numbers in part (a) is irrational.

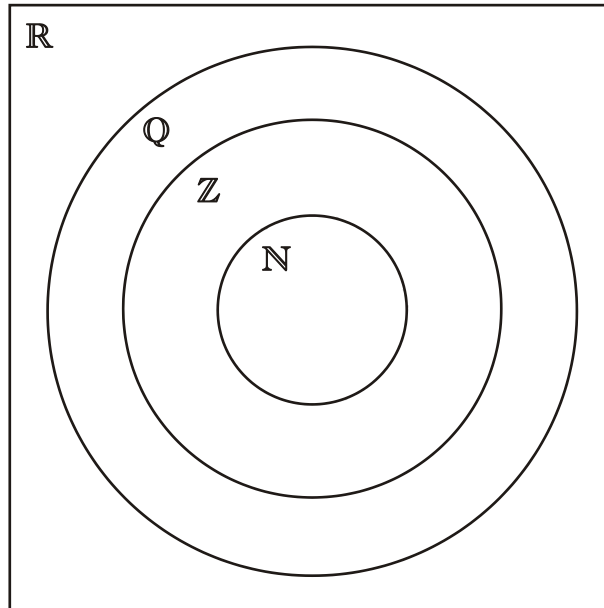
(Total 6 marks)

3. The Venn diagram below shows the universal set of real numbers \mathbb{R} and some of its important subsets:

\mathbb{Q} : the rational numbers,
 \mathbb{Z} : the integers,
 \mathbb{N} : the natural numbers.

Write the following numbers in the correct position in the diagram.

$$-1, 1, \pi, \frac{7}{16}, 3.333\dot{3}, \sqrt{3}.$$



(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.

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

(Total 6 marks)

5. (a) Given $x = 2.6 \times 10^4$ and $y = 5.0 \times 10^{-8}$, calculate the value of $w = x \times y$. Give your answer in the form $a \times 10^k$ where $1 \leq a < 10$ and $k \in \mathbb{Z}$.

(b) Which **two** of the following statements about the nature of x , y and w above are **incorrect**?

(i) $x \in \mathbb{N}$

(ii) $y \in \mathbb{Z}$

(iii) $y \in \mathbb{Q}$

(iv) $w < y$

(v) $x + y \in \mathbb{R}$

(vi) $\frac{1}{w} < x$

(Total 8 marks)

6. 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)