

## 1.2 Sets of Numbers

Natural numbers:  $\mathbb{N}$

Whole numbers:  $\mathbb{N}_0$

Integers:  $\mathbb{Z}$

Positive integers:  $\mathbb{Z}^+$

Negative integers:  $\mathbb{Z}^-$

Rational numbers:  $\mathbb{Q}$

Real numbers:  $\mathbb{R}$

Complex numbers:  $\mathbb{C}$

### 26. Natural Numbers

Counting numbers:  $\mathbb{N} = \{1, 2, 3, \dots\}$ .

### 27. Whole Numbers

Counting numbers and zero:  $\mathbb{N}_0 = \{0, 1, 2, 3, \dots\}$ .

### 28. Integers

Whole numbers and their opposites and zero:

$$\mathbb{Z}^+ = \mathbb{N} = \{1, 2, 3, \dots\},$$

$$\mathbb{Z}^- = \{\dots, -3, -2, -1\},$$

$$\mathbb{Z} = \mathbb{Z}^- \cup \{0\} \cup \mathbb{Z}^+ = \{\dots, -3, -2, -1, 0, 1, 2, 3, \dots\}.$$

### 29. Rational Numbers

Repeating or terminating decimals:

$$\mathbb{Q} = \left\{ x \mid x = \frac{a}{b} \text{ and } a \in \mathbb{Z} \text{ and } b \in \mathbb{Z} \text{ and } b \neq 0 \right\}.$$

### 30. Irrational Numbers

Nonrepeating and nonterminating decimals.

**31. Real Numbers**

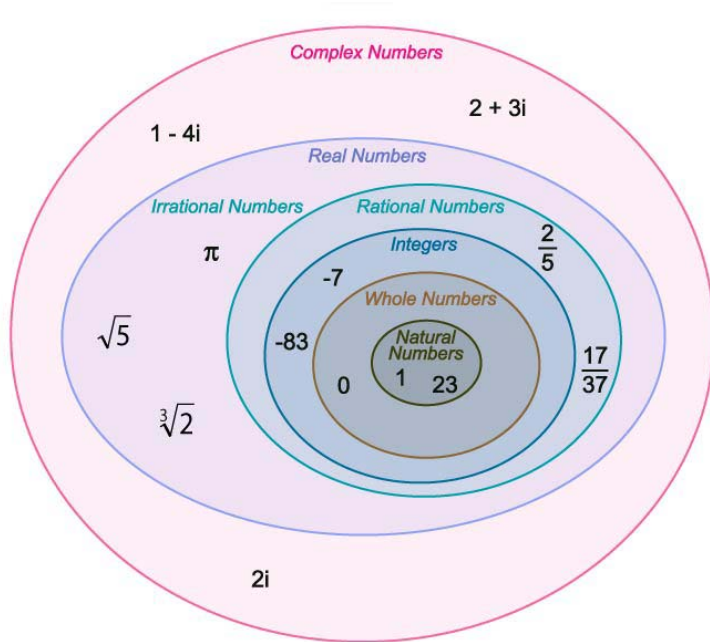
Union of rational and irrational numbers:  $\mathbb{R}$ .

**32. Complex Numbers**

$$\mathbb{C} = \{x + iy \mid x \in \mathbb{R} \text{ and } y \in \mathbb{R}\},$$

where  $i$  is the imaginary unit.

**33.  $\mathbb{N} \subset \mathbb{Z} \subset \mathbb{Q} \subset \mathbb{R} \subset \mathbb{C}$**



**Figure 5.**