



4.5.1 Number Systems

Natural numbers $\mathbb{N}$

The positive whole numbers used for counting.

$$\mathbb{N} = \{0, 1, 2, 3, 4, 5, 6, 7, \dots\}$$

Integer numbers $\mathbb{Z}$

The positive and negative whole numbers.

$$\mathbb{Z} = \{\dots, -3, -2, -1, 0, 1, 2, 3, \dots\}$$

Rational numbers $\mathbb{Q}$

Any number that can be expressed as a fraction or ratio.

$$\mathbb{Q} = \{-1, 1, 1/2, 4.25, 5, 6.1, 7\dots\}$$

Irrational numbers

Numbers that cannot be written as a fraction of two integers.

$$\pi, \sqrt{2}, \sqrt{3}, \sqrt{5}$$

Real numbers $\mathbb{R}$

The combination of the rational and irrational numbers.

They are often used for measurements.

$$\mathbb{R} = \{1, 1/2, \sqrt{5}, 4.25, 5, \sqrt{7}\dots\}$$

Key relationships between number sets

Remember: the main number sets are nested: $\mathbb{N} \subset \mathbb{Z} \subset \mathbb{Q} \subset \mathbb{R}$.

Every natural number is an integer, every integer is rational, and every rational number is real.

Irrational numbers are also real numbers, but they are not rational because they cannot be written exactly as a fraction.





Ordinal numbers

Numbers used to describe the position of objects.

E.g. An index of a value in an array.

