Properties of Numbers

Associative law for addition

$$a + (b + c) = (a + b) + c$$

Existence of additive identity

$$a + 0 = 0 + a = a$$

Existence of additive inverse

$$a + (-a) = (-a) + a = 0$$

Commutative law of addition

$$a + b = b + a$$

Associative law for multiplication

$$a \times (b \times c) = (a \times b) \times c$$

Existence of multiplication identity

$$a \times 1 = 1 \times a = a$$

Existence of multiplicative inverse

$$a \times a^{-1} = a^{-1} \times a = 1, for\ a \neq 0$$

Commutative law for multiplication

$$a \times b = b \times a$$

Distributive law of multiplication over addition

$$a \times (b + c) = (a \times b) + (a \times c)$$

Distributive law of multiplication over subtraction

$$a \times (b - c) = (a \times b) - (a \times c)$$

Distributive law of division over addition

$$(b + c) \div a = (b \div a) + (c \div a)$$

Distributive law of division over subtraction

$$(b - c) \div a = (b \div a) - (c \div a)$$

Types of Number

TABLE 1 COMMON SETS

Set	Meaning	Example	Description/Example
$\mathbb{N}$	The natural numbers	$\{1, 2, 3, \dots\}$	Can sometimes be assumed to include 0, especially by computer scientists
$\mathbb{Z}$	The integers	$\{\dots -2, -1, 0, 1, 2 \dots\}$	
$\mathbb{Z}^+$	The positive integers	$\{0, 1, 2 \dots\}$	
$\mathbb{Q}$	The rational numbers		
$\mathbb{R}$	The real numbers		
$\mathbb{C}$	Complex numbers		

Note that:
$$\mathbb{N} \subset \mathbb{Z} \subset \mathbb{Q} \subset \mathbb{R} \subset \mathbb{C}$$