Equality

à Properties of Equality

1. $a = a$ Reflexive
2. If $a = b$, then $b = a$ Symmetric
3. If $a = b$ and $b = c$, then $a = c$ Transitive

à Principal of substitution

$a = b$ means that a and b are names for the same object. Therefore, a may replace b (and b may replace a) in any sentence without changing the truth of the sentence.

Axioms

Commutative	$x + y = y + x$	$x \times y = y \times x$
Associative	$x + (y + z) = (x + y) + z$	$x \times (y \times z) = (x \times y) \times z$
Identity elements	$x + 0 = x$	$x \times 1 = x$
Inverse elements	$x + (-x) = 0$	$x \times \frac{1}{x} = 1,\ x \neq 0$

Distribution of multiplication over addition $a(b + c) = ab + ac$

Definitions

ì Definition. Subtraction

$x - y$ means $x + (-y)$

ì Definition. Division

$x \div y$ means $\frac{x}{y}$ means $x \times \frac{1}{y}$, where $y \neq 0$