

Functions and Relations

Note Title

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Functions

(arithmetic) negation

square

sine

square root

exponential

floor

Notations for function application

Binary Operators

Symmetry

A binary operator \oplus is said to be *symmetric* (or *commutative*) if

$$[x \oplus y = y \oplus x]$$

Examples

Non-examples

Associativity

A binary operator \oplus is said to be *associative* if

$$[x \oplus (y \oplus z) = (x \oplus y) \oplus z]$$

Examples

Non-examples

Distributivity / Factorisation

A function f is said to *distribute* over the operator \oplus if there is an operator \otimes such that

$$[f.(x \oplus y) = f.x \otimes f.y]$$

Examples

Non-examples

Binary Relations

A binary relation is a boolean-valued function of two arguments.

Reflexive

A relation R is reflexive if
 $[x R x]$

Examples

Non-examples

Symmetry

A relation R is *symmetric* if
 $[xRy = yRx]$

Examples

Non-examples

Transitivity

A relation R is *transitive* if, for all x, y and z ,
whenever xRy and yRz it is also the case that xRz .

Examples

Non-examples

Anti-symmetry

A relation R is *anti-symmetric* if, for all x and y , whenever xRy and yRx it is also the case that $x=y$.

Examples

Non-examples

Ordering

A relation that is reflexive, transitive and anti-symmetric is an *ordering* relation.

Examples