Why

What does it mean for a function to continuous, or uninterrupted.

Definition

Consider a function from the real numbers to the real numbers.

The function is *continuous at a point* in its domain if for every positive real number, there is a positive real number such that every pointin the domain which is the second positive number close to the first element has result which is the first positive number close to the second.

A function is *continuous* if it is continuous at every point of its domain.

Notation

Let $f : \mathbf{R} \to \mathbf{R}$. Then f is continuous at $x \in \mathbf{R}$ if

$$(\forall \varepsilon > 0)(\exists \delta > 0)(|x - y| < \delta \longrightarrow |f(x) - f(y)| < \varepsilon)$$

for all $y \in \mathbf{R}$.

Then f is continuous.

$$(\forall x \in R)(\forall \varepsilon > 0)(\exists \delta > 0)(|x - y| < \delta \longrightarrow |f(x) - f(y)| < \varepsilon)$$

for all $y \in \mathbf{R}$.

Real Continuity

Absolute Value

Interval Length

Intervals

Real Line

Real Order

Rational Order   Real Numbers

Rational Numbers   Integral Line

Natural Fractions   Integer Arithmetic

Integer Products   Natural Additive Identity   Natural Multiplicative Identity

Natural Arithmetic   Identity Elements

Integer Order   Integer Sums   Natural Powers   Operations

Comparisons   Integer Numbers   Natural Products

Orders   Converse Relations   Equivalence Relations   Natural Sums   Functions

Natural Order   Relations   Recursion Theorem

Ordered Pair Projections   Peano Axioms

Set Products   Natural Induction

Ordered Pairs   Set Powers   Natural Numbers

Unordered Triples   Successor Sets   Intersection of Empty Set   Partitions

Pair Unions   Set Intersections   Set Symmetric Differences

Set Unions   Set Complements   Pair Intersections

Unordered Pairs   Empty Set   Set Differences

Set Specification   Geometry

Set Equality

Set Inclusion

Deductions

Quantified Statements

Logical Statements

Statements

Identities   Sets

Names

Letters   Objects

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