Why

We speak of a function which always bends up.

Definition

A *convex* real-valued function is a function defined on a convex set of real numbers for which the result of the function on a convex combination of any two points in the domain is smaller than the convex combination of the same length of the value of the function on the endpoints.

Notation

Let R denote the set of real numbers. Let $A \subset R$ be a convex set. The function $f : A \to R$ is convex if, for any $a, b \in A$ and $t \in [0, 1]$,

$$f(ta + (1 - t)b) \leq tf(a) + (1 - t)f(b).$$

Convex Functions

Real Functions   Convex Sets

Intervals   Affine Sets   Set Operations

N-Dimensional Space   Algebras

Real Numbers   Space   Operations

Rational Numbers   Functions

Integer Numbers   Relations

Natural Numbers   Cartesian Products

Successor Sets   Set Intersections   Set Powers

Pair Intersections   Unordered Triples   Ordered Pairs

Pair Unions   Set Symmetric Differences

Set Unions   Set Complements

Unordered Pairs   Empty Set   Set Differences

Set Specification

Set Inclusion

Standardized Accounts

Definitions   Accounts

Deductions   Quantified Statements

Logical Statements

Statements

Identities   Sets

Names

Objects   Letters