Why

We speak of functions which always bends up.[1]

Definition

Suppose $X \subset \mathbf{R}$ is a convex set. A function $f : X \to \mathbf{R}$ is *convex* if

$$f(tx + (1 - t)y) \leq tf(x) + (1 - t)f(y)$$

for all $y \in [0, 1]$ and $x, y \in X$.

In other words, a 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.

f is *concave* if $-f$ is convex.

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[1] Future editions may expand.

Real Convex Functions
Real Convex Sets
Real Functions
Real Halfspaces
Topological Interior
Real Hyperplanes
Subspace Orthogonal Complements
Subspace Dimension
Vector Space Dimension
Affine Set Dimension
Vector Space Basis
Affinely Independent Vectors
Span
Linearly Dependent Vectors
Orthogonal Complement
Real Subspace Dimension
Real Affine Sets and Subspaces
Real Affine Hulls
Vector Subspace
Real Vector Basis
Real Subspaces
Real Affine Sets
Linear Combinations
Real Inner Products
Vectors as Matrices
Independent Set of Real Vectors
Real Vector Span
Real Affine Combinations
Vectors
Real Inner Product
Real Matrices
N-Dimensional Line Segments
Topological Closures
Real Translates
Real Linear Combinations
Space Inner Product
N-Dimensional Line
Real Norm
Real Linear Equation
Arrays
Topologies
Real Set Closures
Space Norm
Linear Functions
Real Vector
Metrics
Real Limits
Plane Inner Product
Plane Norm
N-Dimensional Space
Space Vector
Plane Vector Sums and Differences
Right Triangle Sides Relation
Space Distance
Plane Vector
Distance
Absolute Value
Real Squares
Real Arithmetic
Plane Distance
Interval Length
Real Multiplicative Inverse
Intervals
Real Products
Real Space
Square Numbers
Real Additive Inverse
Real Plane
Real Line
Real Sequences
Rational Arithmetic
Rational Multiplicative Inverse
Square
Integral List
Real Sum
Real Order
Real Summation
Fields
Rational Sums
Rational Products
Geometry
Rational Order
Real Numbers
Natural Summation
Sequence
Rings
Rational Numbers
Natural Fraction
Integer Arithmetic
Lists
Natural Multiplicative Identity
Natural Addition Identity
Set Numbers
Direct Products
Integer Products
Identity Elements
Natural Arithmetic
Finite Sets
Inverse Elements
Equivalent Sets
Natural Powers
Integer Sums
Element Function
Integer Order
Comparisons
Family Operations
Function Inverses
Natural Equations
Family Unions and Intersections
Natural Products
Integer Numbers
Operations
Order
Function Composition
Function Images
Equation
Families
Natural Sums
Converse Relations
Equivalence Relations
Functions
Natural Order
Recursion Theorem
Relations
Peano Axioms
Ordered Pair Projection
Natural Induction
Natural Numbers
Set Products
Generalized Set Dualities
Set Symmetric Differences
Successor Sets
Set Powers
Set Unions and Intersections
Ordered Pairs
Set Complements
Unordered Triples
Set Dualities
Intersection of Empty Set
Set Partitions
Set Differences
Set Unions
Pair Unions
Set Intersections
Unordered Pairs
Empty Set
Pair Intersections
Set Specification
Set Equality
Set Inclusion
Deductions
Quantified Statements
Logical Statements
Statements
Sets
Identities
Names
Letters
Objects