Why

We name functions whose domain is the real numbers.

Definition

A *real function* is a real-valued function The domain is often an interval of real numbers, but may be any non-empty set.

Notation

$f : \mathbf{R} \to \mathbf{R}$. f is a real function. To speak of functions defined on intervals, let $a, b \in \mathbf{R}$. $g : [a, b] \to \mathbf{R}$. is a real function defined on a closed interval. $h : (a, b) \to \mathbf{R}$ is a real function defined on an open interval.

We regularly declare the interval and the function in one pass: Let $f : [a, b] \to \mathbf{R}$, read aloud as "$f$ from closed a b to $\mathbf{R}$." Or, let $f : (a, b) \to \mathbf{R}$ read aloud as "f from open a b to $\mathbf{R}$".

Examples

Example 1. *Let $c \in \mathbf{R}$. Let $f : \mathbf{R} \to \mathbf{R}$ be such that $f(x) = c$ for every $x \in \mathbf{R}$. f is a real function.*

Example 2.

Let $f : \mathbf{R} to \mathbf{R}$ with $f(x) = 2x^2 + 1$ for all $x \in R$. f is a real function.

Example 3. *Let $f : \mathbf{R} \to \mathbf{R}$ with*

$$f(x) = \begin{cases} 1 & \text{if } x \in \mathbf{Q} \\ 0 & \text{otherwise.} \end{cases}$$

f is a real function.

Real Functions

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Intervals

↓

Real Numbers

↓

Rational Numbers

↓

Integer Numbers

↓

Zero

Equation Solutions   Natural Numbers

Set Intersections   Set Unions

Equations   Set Specification

Empty Set   Set Inclusion

Set Equality   Sentences

Identity   Standardized Accounts   Sets

Accounts

Deductions   Quantified Statements

Logical Statements

Statements

Objects