Why

Given a, b, c, find x to solve $ax^2 + bx + c = 0$.

Result

Proposition 1. *Let $a, b, c \in \mathbf{R}$. Then both*

$$\frac{-b + \sqrt{b^2 - 4ac}}{2a} \quad \textit{and} \quad \frac{-b - \sqrt{b^2 - 4ac}}{2a}$$

are solutions of

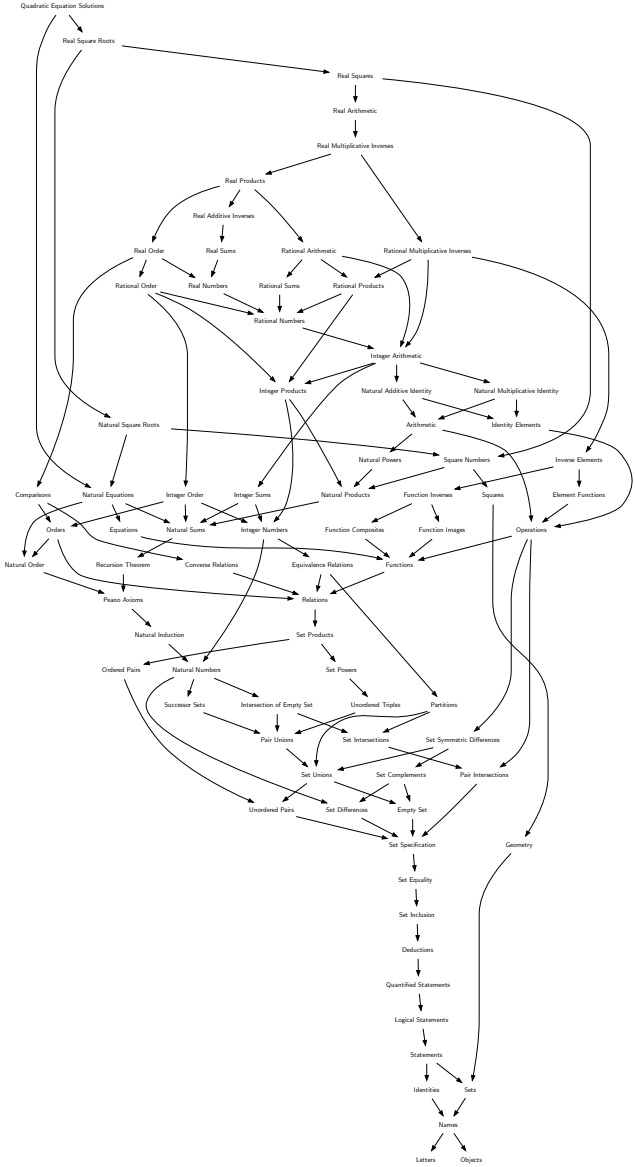
$$ax^2 + bx + c = 0.$$

We call $ax^2 + bx + c = 0$ a *quadratic equation.*[1] The solutions are often writen in short hand

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a},$$

which is called the *quadratic formula.*

[1] Future editions will prove via completing the square.


Quadratic Equation Solutions
Real Square Roots
Real Squares
Real Arithmetic
Real Multiplicative Inverses
Real Products
Real Additive Inverses
Real Order
Real Sums
Rational Arithmetic
Rational Multiplicative Inverses
Rational Order
Real Numbers
Rational Sums
Rational Products
Rational Numbers
Integer Arithmetic
Integer Products
Natural Additive Identity
Natural Multiplicative Identity
Natural Square Roots
Arithmetic
Identity Elements
Natural Powers
Square Numbers
Inverse Elements
Comparisons
Natural Equations
Integer Order
Integer Sums
Natural Products
Function Inverses
Squares
Element Functions
Orders
Equations
Natural Sums
Integer Numbers
Function Composites
Function Images
Operations
Natural Order
Recursion Theorem
Converse Relations
Equivalence Relations
Functions
Peano Axioms
Relations
Natural Induction
Set Products
Ordered Pairs
Natural Numbers
Set Powers
Successor Sets
Intersection of Empty Set
Unordered Triples
Partitions
Pair Unions
Set Intersections
Set Symmetric Differences
Set Unions
Set Complements
Pair Intersections
Unordered Pairs
Set Differences
Empty Set
Set Specification
Geometry
Set Equality
Set Inclusion
Deductions
Quantified Statements
Logical Statements
Statements
Identities
Sets
Names
Letters
Objects