



Math Courseware

Intended for middle and high school

PLATO Foundational Mathematics **(Skill level 3-6)**

Most of the content addressed in *PLATO Foundational Mathematics* is typically taught in grades 3–6, though some content from grades 1 and 2 is included. The audience for this courseware, however, is teens and adults. This product was designed for those teens and adults who need remedial work in basic mathematics.

Understanding Whole Numbers 1

Understanding Whole Numbers: 0 through 10
Greater Than, Less Than, Equal To Ordinal Numbers: First through Tenth
Understanding Place Value: Ones and Tens
Comparing Whole Numbers: 10 through 99
Understanding Place Value: Hundreds

Understanding Addition and Subtraction 1

Understanding Addition
Understanding Addition: Number Line and Hundreds Chart
Finding the Missing Number in Addition
Understanding Subtraction
Understanding Subtraction: Number Line and Hundreds Chart
Finding the Missing Number in Subtraction

Adding and Subtracting Whole Numbers 1

Adding 0 through 2: Addition Basic Facts
Adding 3 through 9: Addition Basic Facts
Adding Two 2-Digit Numbers: Sums Less Than 100
Adding Three or Four Numbers
Subtraction Basic Facts
Subtracting a 1-Digit Number from a 2-Digit Number
Subtracting Two 2-Digit Numbers

Adding Two 2-Digit Numbers:
Sums Greater Than 99

Understanding Whole Numbers 2

Understanding Place Value: Thousands
Reading and Writing Numbers in Word Form
Understanding Place Value: Millions, Billions, and Beyond
Representing Millions and Billions

Understanding Addition and Subtraction 2

Addition and Subtraction Fact Families
Checking Subtraction by Addition
Using the Identity Property of Addition
Using the Commutative Property of Addition
Using the Associative Property of Addition

Adding and Subtracting Whole Numbers 2

Adding Multi-Digit Numbers
Subtracting Multi-Digit Numbers with Regrouping
Subtracting Multi-Digit Numbers with Consecutive Regrouping
Subtracting across Zeros
Solving Addition and Subtraction Story Problems

Understanding Multiplication

Understanding Multiplication as Repeated Addition
Understanding Multiplication as an Array
Using the Identity Property of Multiplication
Using the Commutative Property of Multiplication
Using the Associative Property of Multiplication
Using the Distributive Property of Multiplication over Addition
Finding the Missing Number in Multiplication

Multiplying Whole Numbers

Multiplying by 0 through 5:
Multiplication Basic Facts
Multiplying by 6 through 10:
Multiplication Basic Facts
Multiplying a 2-Digit Number by a 1-Digit Number

Multiplying by a Multiple of 10 or 100
Multiplying a 3-Digit Number by a 1-Digit Number
Multiplying a Multiple of 10 by a Multiple of 10
Multiplying a 2-Digit Number by a 2-Digit Number
Solving Multiplication Story Problems

Understanding Division

Understanding Division as Repeated Subtraction
Understanding Division as Fair Sharing
Multiplication and Division Fact Families

Dividing Whole Numbers

Division Basic Facts
Dividing by a 1-Digit Number
Dividing by a 2-Digit Number
Dividing by Multiples of 10 and 100
Writing a Quotient as a Mixed Number
Identifying Multiples
Finding Common Multiples and the Least Common Multiple
Solving Division Story Problems

Understanding Fractions

Understanding Fractions: Equal Parts of an Object
Understanding Fractions: Equal Parts of a Collection
Fraction Notation: Numerator and Denominator
Proper Fractions and Improper Fractions
Renaming Improper Fractions as Whole or Mixed Numbers
Finding Equivalent Fractions
Simplifying Fractions
Working with Common Denominators and the Least Common Denominator

Comparing Fractions
Ordering Fractions
Renaming Mixed Numbers as
Improper Fractions

Adding and Subtracting Fractions

Adding and Subtracting Fractions:
Like Denominators
Adding and Subtracting Fractions:
Unlike Denominators
Adding Mixed Numbers
Subtracting Mixed Numbers: Like
Denominators
Subtracting Mixed Numbers: Unlike
Denominators

Multiplying and Dividing Fractions

Multiplying Two Fractions
Multiplying Whole Numbers and
Mixed Numbers
Dividing a Fraction by a Fraction
Dividing Fractions, Whole
Numbers, and Mixed Numbers
Finding the Reciprocal
Solving Fraction Story Problems

Understanding Decimals

Understanding Decimals: Tenths
Understanding Decimal Place
Value: Tenths and Hundredths
Understanding Decimal Place
Value: Thousandths and Ten-
Thousandths
Relating Decimals, Fractions, and
Mixed Numbers
Comparing and Ordering Decimals

Performing Operations with Decimals

Adding and Subtracting Decimals
Multiplying Decimals
Multiplying Decimals by 10 or 100
Dividing Decimals
Dividing a 2-Digit Number by 10 or
100
Renaming a Fraction as a Decimal
Rounding Decimals
Solving Decimal Story Problems

Working with Percent

Understanding Percent
Relating Fractions, Decimals, and
Percents
Finding a Percent of a Whole #
Finding a Percent of a Decimal #

Understanding Ratio and Proportion

Understanding Ratio
Equivalent Ratios
Understanding Proportion
Solving Proportions
Solving Ratio, Proportion, and
Percent Story Problems

Plane and Solid Figures

Lines, Parts of Lines, and Angles
Lines in a Plane
Introduction to Triangles
Introduction to Quadrilaterals
Introduction to Circles
Exploring Congruent Figures
Exploring Similar Figures
Line Symmetry in Plane Figures
Introduction to Solid Figures

Using Geometry

Area: Counting Square Units
Calculating the Area of Rectangles
and Squares
Calculating the Area of Triangles
Calculating the Volume of a
Rectangular Prism

Measurement

Measuring Length: Metric Units
Measuring Length: Customary
Units
Telling Time to the Minute
Measuring Temperature: Fahrenheit
Measuring Temperature: Celsius
Solving Measurement Story
Problems

PLATO Math Problem Solving (Skill level 3-12)

Nineteen interactive scenarios encourage learners to explore and apply mathematical concepts from basic computation to advanced algebra as they solve multi-step problems in a real-life context.

Math Fundamentals

Building a highway
Smart shopping
Car costs
Running a business

Beginning Algebra

Plan for a fishing trip
Tunnel through Bald Mountain
Bean counting

Intermediate Algebra

Video rental
Running a race
Advanced Algebra
Car rental
Building boats
Saving the birds

Geometry and Measurement

Planning a park
Shelf space

Probability and Statistics

The fundraiser
Making the grade
Statistics for quality

Data Skills

Growing lilies
Planning a playground

PLATO Applied Math

(Skill level 6-9) (with optional assessment)

This course teaches the practical mathematics skills essential for success in the modern workplace, such as using 12-hour and 24-hour clocks, how to convert between fractions, decimals and percents, and metric and U.S. standard measurement.

Time applications
Clocks and time zones
Estimating
Math conversions
Using base, rate, and portion
Converting linear measurements
Converting weight measurements
Converting volume measurements
Using linear measurement tools

PLATO Algebra 1, Part 1

(Skill level 3-5)

This **pre-algebra** curriculum teaches students the foundation skills they need to understand and apply algebraic concepts.

Basic Number Ideas

Odd and even numbers
Prime and composite numbers
Exponents: exponential form
Exponents: expanded form

Exponents: product rule
 Exponents: power rule
 The additive inverse of integers
 Adding integers
 Subtracting integers
 Multiplying integers
 Dividing integers
 Square roots of perfect squares
 Square roots of imperfect squares
 Multiplying common fractions
 Adding and subtracting fractions
 Adding and subtracting mixed numbers
 Dividing fractions
 Multiplying and dividing mixed numbers
 Using basic number ideas
 Mental math with whole numbers and decimals
 Mental math with fractions and Percents

Math Sentences

Order of operations
 Expressions in 1 variable
 Expressions in 2 or more variables
 Determining the truth value of a statement
 Adding monomials
 Subtracting monomials
 Multiplying monomials
 Dividing monomials
 Adding binomials and monomials
 Subtracting binomials and monomials
 Multiplying binomials and monomials
 Dividing binomials by monomials
 Linear equations in 1 variable: solving by inspection
 Linear equations in 1 variable: isolating the variable
 Linear inequalities in 1 variable, #1
 Linear inequalities in 1 variable, #2
 More difficult linear inequalities in 1 variable
 Special quadratic equations, part 1
 Special quadratic equations, part 2
 Using linear equations to solve problems
 Using quadratic equations to solve problems

Graphing Basics

Coordinate plane
 Identifying points on a coordinate plane
 Ordered pairs as solutions of linear equations
 Graphing linear equations in 2 variables
 Solving and graphing systems of equations
 Solving problems with systems of

linear equations

Equations and Formulas

Literal equations
 Adapting and using formulas

Special Topics

Visualizing percents less than 1%
 Converting percents less than 1% to decimals
 Converting a decimal to a fraction of a percent
 Finding the amount with percents less than 1%
 Visualizing percents greater than 100%
 Converting percents greater than 100% to decimals
 Converting a number greater than 1 to a percent
 Mean, median, and mode
 Probability and possible outcomes
 Probability of an event
 Solving problems with percents
 Solving problems with mean, median, and mode
 Solving problems with probability
 Estimation basics
 Estimation by clustering
 Scaling and proportion, part 1
 Scaling and proportion, part 2

Introduction to Functions

Patterns and sequences
 Functions
 Describing functions with equations, tables, and graphs
 Linear patterns
 Graphs, slopes, and y-intercepts
 Equations, graphs, slopes, and y-intercepts
 Interpreting graphs to solve problems

PLATO Algebra 1, Part 2 (Skill level 6-10)

Building on the essential skills learned in PLATO Algebra 1, Part 1, students continue with instruction and practice on sets and numbers, polynomials and factoring, and equations and inequalities.

Sets and Numbers

Additive inverse of an integer
 Integer sum
 Integer difference
 Integer product
 Integer quotient
 Adding fractions

Subtracting fractions
 Multiplicative inverse of a fraction
 Product of fractions
 Quotient of fractions
 Basic set concepts: elements in a set
 Basic set concepts: finite or infinite
 Basic set concepts: subsets
 Basic set concepts: roster and set-builder forms
 Union of sets
 Intersection of sets
 Positive and negative exponents
 Integer exponents and the product rule
 Integer exponents and the quotient rule
 Integer exponents and the power rule, part 1
 Integer exponents and the power rule, part 2
 Square roots of integers
 Multiplication rule for radicals
 Division rule for radicals
 Simplifying radicals, part 1
 Simplifying radicals, part 2
 Review: fractions and sets
 Review: exponents and radicals

Polynomials and Factoring

Classifying polynomials
 Additive inverse of a monomial
 Monomial sum
 Monomial difference
 Monomial product
 Monomial quotient
 Binomial sum
 Additive inverse of a binomial
 Binomial difference
 Value of a polynomial
 Polynomial sum
 Polynomial difference
 Product of a monomial and polynomial
 Simplifying polynomial expressions
 Product of polynomials
 Quotient of a monomial and polynomial
 Quotient of a binomial and polynomial
 Greatest common factors of monomials
 Monomial factors of polynomials
 Binomial factors of polynomials, #1
 Binomial factors of polynomials, #2
 Factoring the difference of 2 squares
 Factoring perfect square trinomials
 Factoring trinomials, part 1
 Factoring trinomials, part 2
 Review: polynomials and factoring

Equations and Inequalities

Simple equations in 1 variable:
using inspection
Simple equations in 1 variable:
isolating the variable
More difficult linear equations in 1 variable
Absolute value of a number
Equations with absolute values
Graphing a solution set on a number line
Solving and graphing equations in 1 variable
Solving problems with linear equations in 1 variable
Linear inequalities in 1 variable, #1
Linear inequalities in 1 variable, #2
Linear inequalities in 1 variable, #3
Solving simple quadratic equations
Solving quadratic equations by factoring, part 1
Solving quadratic equations by factoring, part 2
Solving quadratic equations by factoring, part 3
Quadratic formula
Solving problems with quadratic equations
Review: equations and inequalities

PLATO Algebra 2, Part 1 (Skill level 6-9)

Continuing on from PLATO Algebra 1, Part 2, this curriculum provides instruction in the core algebra topics usually required to fulfill high school course requirements.

Rational Expressions

Evaluating rational expressions
Restrictions on rational expressions
Equivalent forms of rational expressions
Simplifying rational expressions
Sum of rational expressions, part 1
Difference of rational expressions, part 1
Product of rational expressions
Quotient of rational expressions
Common denominators of rational expressions
Sum of rational expressions, part 2
Difference of rational expressions, part 2
Review: rational expressions

Graphs and Linear Equations

The coordinate plane
Graphing ordered pairs
Solutions of linear equations as ordered pairs

Graphing a linear equation in 2 variables
Graphing a linear inequality in 2 variables
Slope of a line from 2 points
The y-intercept of a line
Using the slope and y-intercept to graph a line
Finding the slope and y-intercept from an equation
Writing equations in slope-intercept form
Identifying graphs from their equations
Parallel lines and their slopes
Perpendicular lines and their slopes
Equations of parallel or perpendicular lines
Review: graphs

Linear Systems of Equations and Inequalities

Solving linear systems of equations: graphs
Classifying linear systems
Solving linear systems of inequalities: graphs
Solving linear systems of equations: substitution
Solving linear systems of equations: addition
Solving linear systems of equations: matrices 1
Solving linear systems of equations: matrices 2
Solving problems with linear systems
Review: linear systems

Probability

Chance experiments and probability
Determining the probability of an event
Multiplication principle of counting
Review: probability

Vectors

Introduction to vectors
Vector addition

PLATO Algebra 2, Part 2 (Skill level 9-14)

This high school and beginning college-level course extends students' mathematical literacy, providing them with the background for trigonometry and calculus and preparing them for today's high-tech jobs.

Numbers and Their Properties

Rules for exponents and radicals
Rationalizing the denominator in rational expressions
Applying rules for exponents and radicals
Scientific notation
Simplifying algebraic expressions
Multiplying algebraic expressions
Factoring algebraic expressions
Factoring sums and differences of perfect cubes
Factoring or using the quadratic formula
Rational expressions: simplify
Rational expressions: add and subtract
Rational expressions: multiply and divide

Special Equations and Inequalities

Evaluating expressions with absolute value
Absolute value, inequalities, and interval notation
Graphing linear inequalities in 1 variable
Graphing with restrictions on the variable
Graphing solution sets of associated inequalities

Coordinates and Curves

Calculating the slope of a line
Point-slope and slope-intercept forms
of equations
Equation of a line given a point and parallel line
Equation of a line given a point and perpendicular line
Perpendicular bisector of a line segment
Distance between 2 points
Distance between a point and a line
Distance and circles
Parabola and its intercepts
Parabola and its vertex
Ellipse
Hyperbola
Equations of ellipses and hyperbolas

Functions and Their Graphs

Defining a function with its rule
Finding values of a function using its rule
Equations and graphs of functions,1
Equations and graphs of functions,2
Translations and transformations
Functional values

Composite functions
Domain values of composite functions
Inverse of a function
Determining if a function has an inverse
Solving problems with linear functions
Solving problems with quadratic functions

Exponential and Logarithmic Functions

Properties of exponential functions
Properties of logarithmic functions
Recognizing graphs of types of functions
Solving problems: exponential and logarithmic
Exponential growth
Exponential decay

PLATO Geometry and Measurement 1 **(Skill level 6-12)**

This curriculum offers an introduction to basic geometric and measurement concepts, relationships and theorems.

Geometry **(with optional assessment test)**

Special angles, part 1
Special angles, part 2
Circles/arcs/circumferences
The Pythagorean theorem 1
Using geometry

Measurement **(with optional assessment test)**

Metric measurement
Area, Part 1
Area, Part 2
Volume
Using measurement

PLATO Geometry and Measurement 2 **(Skill level 9-14)**

This curriculum provides the instruction required in most high school-level geometry courses.

Introduction to Geometry **(with optional assessment test)**

Postulates and theorems
Points, lines and planes
Intersecting lines and planes
Congruent angles
Supplementary and complementary

angles
Two of a kind

Triangles and Lines **(with optional assessment test)**

Congruent triangles, part 1
Congruent triangles, part 2
Congruent triangle problems
Angles in pairs
Transitive properties of lines
The sum of the angles in a triangle
The Pythagorean theorem 2
Solving right triangle problems
30°-60° right triangles
Proportionality
A sense of proportion
Not everything is created equal

Polygons **(with optional assessment test)**

Introduction to polygons
Summing up angles
Angles in regular polygons
Parallelograms: part 1
Parallelograms: part 2
Rhombuses and trapezoids

Transformations, Symmetry, and Area **(with optional assessment test)**

Symmetry
Translations
Rotations
Area of right triangles and parallelograms
Area of any triangle
Area of trapezoids and rhombuses

Circles **(with optional assessment test)**

Introduction to circles
Tangents
Arcs and chords
Inscribed angles
Circles and angles
Circles and segments
Measuring circumference
The length of arcs
The area of circles

Solids and Coordinate Geometry **(with optional assessment test)**

Prisms
Area and volume of cylinders
Area and volume of cones
The distance formula
Slope
Coordinates in three dimensions

