

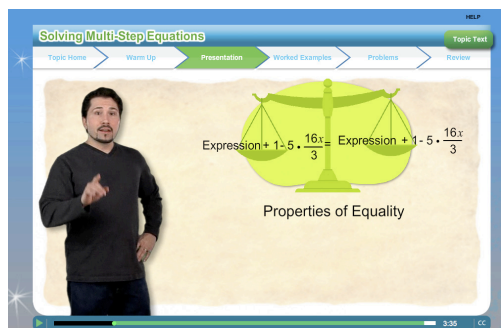
NROC Developmental Math

Developed by: The NROC Project, with generous funding from the Bill & Melinda Gates Foundation

WHY NROC?

NROC's high-quality courses are **media-rich**, **adaptable**, and **affordable**, a combination of features not readily available from commercial providers. With rich content mapped to state and federal standards, NROC courses can be used with or without a textbook to enhance online, blended, and face-to-face learning environments.

Teaching with the Power of Digital Media



PROGRAM DESCRIPTION

NROC's Developmental Math program is designed to be used with students striving to meet college entrance requirements. This multi-modal program allows learners to create their own pace and path through developmental mathematics.

Each learner may begin a unit by taking an adaptive pre-assessment that directs them to a customized path through the content needed to close their proficiency gaps. The program offers video, audio, interactive simulations, puzzles, and other instructional approaches that engage a variety of learning styles and attitudes.

Typically organized, this program offers flexible modules that address concepts and skills taught in the traditional developmental math sequence of Arithmetic, Beginning and Intermediate Algebra. In keeping with AMATYC's proposal for a new developmental mathematics, this program includes topics that provide a high-level, basic introduction to Statistics, Geometry, and Trigonometry.

MEDIA-RICH AND DIVERSE COMPONENTS HELP STUDENTS GAIN MASTERY

- **Warm-up:** a series of problems to assess prior knowledge, resulting in customized recommendations for review.
- **Presentation:** a rich, media presentation introducing the topic concept with illustrated examples and optional closed caption [CC] script.
- **Worked Examples:** narrated, step-by-step presentation of problems being solved.
- **Practice Problems:** symbolic and word problems designed in adaptive sets, offering students practice and feedback.
- **Topic Text:** integrated textbook provides comprehensive coverage of topics with additional explanations and examples.
- **Review:** self-test understanding prior to moving to the next topic.
- **Project:** collaborative assignments in the project-based learning tradition based on real-world problems.
- **Tutor Simulation:** provides students directed guidance in solving a multifaceted problem.
- **Puzzles:** simple activities offer learners an opportunity to practice what they have learned in a fun, no-fault environment.
- **Topic/Unit Assessments:** formative and summative assessments are designed to guide a learner's progress.
- **Pre-Assessments:** diagnostic pre-assessments identify a learner's mastery of particular concepts, resulting in a personalized path through each Unit.

For more details about this program and to see a spectrum of use cases, visit NROCmath.org

The NROC Project (NROC) is a community-guided, non-profit organization focused on college and career readiness. NROC member institutions represent education leaders, teachers, and learners cooperating to develop and share digital resources and tools. Should you wish to integrate this content into your institutional curriculum, please contact us for information about NROC membership at membership@theNROCproject.org.

ARITHMETIC MODULES

Unit 1: Whole Numbers

Introduction to Whole Numbers
Place Value and Names for Whole Numbers
Rounding Whole Numbers
Comparing Whole Numbers

Adding and Subtracting Whole Numbers

Adding Whole Numbers and Applications
Subtracting Whole Numbers and Applications
Estimation

Multiplying and Dividing Whole Numbers

Multiplying Whole Numbers and Applications
Dividing Whole Numbers and Applications

Properties of Whole Numbers

Properties and Laws of Whole Numbers
The Distributive Property

Exponents, Square Roots and the Order of Operations

Understanding Exponents and Square Roots
Order of Operations

Unit 2: Fractions and Mixed Numbers

Introduction to Fractions and Mixed Numbers
Introduction to Fractions and Mixed Numbers
Proper and Improper Fractions
Factors and Primes
Simplifying Fractions
Comparing Fractions

Multiplying and Dividing Fractions and Mixed Numbers

Multiplying Fractions and Mixed Numbers
Dividing Fractions and Mixed Numbers

Adding and Subtracting Fractions and Mixed Numbers

Adding Fractions and Mixed Numbers
Subtracting Fractions and Mixed Numbers

Unit 3: Decimals

Introduction to Decimals
Decimals and Fractions
Ordering and Rounding Decimals

Decimal Operations

Adding and Subtracting Decimals
Multiplying and Dividing Decimals
Estimation with Decimals

Unit 4: Ratios, Rates and Proportions

Ratio and Rates
Simplifying Ratios and Rates

Proportions

Understanding Proportions

Unit 5: Percents

Introduction to Percents
Convert Percents, Decimals, and Fractions

Solving Percent Problems

Solve Percent Problems

Unit 6: Measurement

U.S. Customary Units of Measurement
Length
Weight
Capacity

Metric Units of Measurement

The Metric System
Converting within the Metric System
Using Metric Conversions to Solve Problems

Temperature

Temperature Scales

BEGINNING ALGEBRA MODULES

Unit 9: Real Numbers

Introduction to Real Numbers
Variables and Expressions
Integers
Rational Real Numbers

Operations with Real Numbers

Adding Integers
Adding Real Numbers
Subtracting Real Numbers
Multiplying and Dividing Real Numbers

Properties of Real Numbers

Associative, Commutative, and Distributive Properties

Simplifying Expressions

Order of Operations

Unit 10: Solving Equations and Inequalities

Solving Equations
Solving One-Step Equations Using Properties of Equality
Solving Multi-Step Equations
Special Cases and Applications
Formulas

Solving Inequalities

Solving One-Step Inequalities
Multi-Step Inequalities

Compound Inequalities and Absolute Value

Compound Inequalities
Equations and Inequalities and Absolute Value

Unit 11: Exponents and Polynomials

Integer Exponents
Exponential Notation
Simplify by Using the Product, Quotient and Power Rules
Products and Quotients Raised to Powers
Scientific Notation

Polynomials with Single Variables

Introduction to Single Variable Polynomials
Adding and Subtracting Polynomials
Multiplying Polynomials
Multiplying Special Cases
Dividing by a Monomial
Dividing by Binomials and Polynomials

Polynomials with Several Variables

Simplifying and Evaluating Polynomials with More than One Term
Operations with Polynomials

Unit 12: Factoring

Introduction to Factoring
Greatest Common Factor

Factoring Polynomials

Factoring Trinomials
Factoring: Special Cases
Special Cases: Cubes

Solving Quadratic Equations

Solve Quadratic Equations by Factoring

Unit 13: Graphing

Graphs and Applications
The Coordinate Plane
Graphing Linear Equations

Slope and Writing the Equation of a Line

Finding the Slope of a Line
Writing the Equation of a Line
Parallel and Perpendicular Lines
Graphing Linear Inequalities

Unit 14: Systems of Equations and Inequalities

Graphing Systems of Equations and Inequalities
Graphing Systems of Linear Equations
Graphing Systems of Inequalities

Algebraic Methods to Solve Systems of Equations

The Substitution Method
The Elimination Method

Systems of Equations in Three or More Variables

Solving Systems of Three Variables

INTERMEDIATE ALGEBRA MODULES

Unit 15: Rational Expressions Operations with Rational Expressions

Introduction to Rational Expressions
Multiplying and Dividing Rational Expressions
Adding and Subtracting Rational Expressions
Complex Rational Expressions

Rational Equations

Solving Rational Equations and Applications

Formulas and Variation

Rational Formulas and Variation

Unit 16: Radical Expressions and Quadratic Equations

Introduction to Roots and Rational Exponents
Roots
Squares, Cubes, and Beyond
Rational Exponents

Operations with Radicals

Multiplying and Dividing Radical Expressions
Adding and Subtracting Radicals
Multiplication of Multiple Term Radicals
Rationalizing Denominators

Radical Equations

Solving Radical Equations

Complex Numbers

Complex Numbers
Operations with Complex Numbers

Solving Quadratic Equations

Square Roots and Completing the Square
The Quadratic Formula

Unit 17: Functions

Introduction to Functions
Identifying Functions

Using Functions

Evaluating Functions
Graphing Types of Functions
Finding Domain and Range

Operations with Functions

Arithmetic Operations with Functions

Unit 18: Exponential and Logarithmic Functions

Exponential Functions
Introduction to Exponential Functions

Logarithmic Functions

Introduction to Logarithmic Functions
Properties of Logarithmic Functions

Natural Logarithms

Introduction to Natural and Common Logarithms

Logarithmic and Exponential Equations

Solving Exponential and Logarithmic Equations
Mathematical Modeling with Exponential and Logarithmic Functions

GEOMETRY, STATISTICS, & TRIGONOMETRY TOPICS

Unit 7: Geometry

Basic Geometric Concepts and Figures

Figures in 1 and 2 Dimensions
Properties of Angles
Triangles
The Pythagorean Theorem

Perimeter, Circumference, and Area

Quadrilaterals
Perimeter and Area
Circles

Volume of Geometric Solids

Solids

Unit 8: Concepts in Statistics

Statistical Graphs and Tables
Graphing Data
Other Types of Graphs

Measures of Center

Measures of Center

Graphical Representations

Use and Misuse of Graphical Representations

Probability

Probability

Unit 19: Trigonometry

Introduction to Trigonometric Functions

Identifying the Six Trigonometric Functions
Right Triangle Trigonometry
Unit Circle Trigonometry

Graphing Trigonometric Functions

Degree and Radian Measure
Graphing the Sine and Cosine Function
Amplitude and Period