

Math Content in AIMS Computer Tutor

AIMS Computer Tutor contains 3 areas of content: (1) Basics Review, (2) High School—Algebra and Geometry, and (3) College/Work Readiness. The High School and College/Work Readiness standards correspond completely with the Arizona High School new 2008 High School Math Standards.

Each of the bulleted topics below contain the following 4 features that covers that topic:

- Video Tutorials
- Printable Notes
- Review Problems
- Quizzes

Below are the details of the topics covered in each area of content.

Basics Review

1. NUMBERS

a. Integers

- Adding and Subtracting Integers
- Multiplying and Dividing Integers
- Exponents
- The Coordinate Plane

b. Rational Numbers

- Greatest Common Factor and Least Common Multiple
- Adding and Subtracting Fractions
- Multiplying and Dividing Fractions
- Adding and Subtracting Decimals
- Multiplying and Dividing Decimals
- Fractions, Decimals, and Percents
- The Percent Equation

c. Irrational Numbers

- Radicals
- Adding and Subtracting Radicals
- Multiplying and Dividing Radicals
- Ordering Numbers

2. EXPRESSIONS AND EQUATIONS

a. Algebraic Expressions

- Evaluating Expressions
- Translating Words into Algebraic Expressions

- Simplifying Expressions
 - Distributive Property
 - b. Solving Equations
 - Solving One-Step Equations
 - Solving Multi-Step Equations
 - Solving Equations Involving Fractions
3. BASIC GEOMETRY
- a. Shapes
 - Undefined Terms
 - Angles
 - Polygons
 - b. Measurement
 - Length
 - Perimeter
 - Area
 - Formulas

High School: Algebra and Geometry Standards

1. NUMBER AND OPERATIONS
- a. Number Sense
 - Real Number System
 - Finite or Infinite Sets of Numbers
 - Absolute Value
 - b. Numerical Operations
 - Solving Word Problems
 - Properties of Real Number Operations
 - Calculating Powers and Roots of Numbers
 - Scientific Notation
 - c. Estimation
 - Rational Approximations of Irrational Numbers
 - Using Estimation to Determine the Reasonableness of a Solution
 - When Estimation is More Appropriate than an Exact Answer
 - Estimating the Location of Numbers on a Number Line
2. DATA ANALYSIS, PROBABILITY, and DISCRETE MATHEMATICS
- a. Data Analysis (Statistics)
 - Drawing Inferences About Data Sets
 - Organizing Data Into Appropriate Graphical Representation
 - Displaying Data and Making Predictions From Patterns
 - Making Inferences Using One or More Summary Statistics
 - Measures of Central Tendency
 - Reasonable Conclusions Drawn from Data Analysis

- Misrepresentations of Data
 - Designing Experiments and Collecting Data
 - b. Probability
 - Making Predictions Based on Theoretical Probability Models
 - Theoretical vs Experimental Probability
 - Using Simulations Involving Independent and Dependent Events
 - Law of Large Numbers
 - Geometric Probability
 - c. Systematic Listing and Counting
 - Addition and Multiplication Principles of Counting
 - Permutations vs Combinations
 - Determining the Number of Possible Outcomes of an Event
 - d. Vertex-Edge Graphs
 - Solving Network Problems Using Graphs and Matrices
3. PATTERNS, ALGEBRA, and FUNCTIONS
- a. Patterns
 - Sequences
 - Terms of a Sequence
 - Creating Sequences Using Explicit and Recursive Formulas
 - b. Functions and Relationships
 - Sketching and Interpreting Graphs
 - Is the Relation a Function?
 - Using Function Notation and Evaluating Functions
 - Expressing a Relationship Between Two Variables
 - Modeling Problems with Systems of Equations
 - Quadratic Functions
 - Domain and Range of a Function
 - c. Algebraic Relationships
 - Equivalent Forms Equations or Expressions
 - Solving Formulas for Specified Variables
 - Writing the Equation of a Line
 - Parallel, Perpendicular, Coinciding, or Intersecting Lines
 - Solving Linear Equations and Absolute Value Equations with One Variable
 - Solving Linear Inequalities in One Variable
 - Solving Systems of Two Linear Equations in Two Variables
 - Simplifying and Evaluating Polynomials and Rational Expressions
 - Multiplying and Dividing Monomial Expressions
 - Operations with Polynomial and Rational Expressions
 - Solving Square Root Equations
 - Factoring Quadratic Polynomials
 - Solving Quadratic Equations
 - Factoring Higher Order Polynomials
 - Operations with Matrices

- d. Analysis of Change
 - Determining the Slope and Intercepts of the Graph of a Linear Function
 - Solving Problems Involving Rates of Change
 - Solving Interest Problems
4. GEOMETRY and MEASUREMENT
- a. Geometric Properties
 - Basic Properties of Circles
 - 3-Dimensional Objects and Their 2-Dimensional Representations
 - Inductive and Deductive Arguments
 - Parallel Lines, Perpendicular Lines, and Angles
 - Euclid's Five Postulates
 - Angle and Side Length Relationships
 - Hierarchy of Quadrilaterals
 - Proving Similarity and Congruence of Triangles
 - Triangle Inequality Property
 - Solving Problems Using Right Triangles
 - Using the Sine, Cosine, and Tangent Ratios
 - b. Transformation of Shapes
 - Transformations of 2-Dimensional Figures that Preserve Congruency
 - Single Transformations of 2-Dimensional Figures
 - Two or More Transformations of 2-Dimensional Figures
 - Effects of Single Transformations On Linear or Area Measurements of 2-Dimensional Figures
 - c. Coordinate Geometry
 - Finding the Midpoint Between Two Points
 - The Pythagorean Theorem
 - Distance Between Two Points
 - Confirming Parallelism, Perpendicularity, and Congruence in Geometric Figures
 - Graphing Linear Equations and Inequalities in Two Variables
 - Effects of Changing the Parameters of a Linear Function
 - Solving Systems of Equations in Two Variables Graphically
 - Graphing Quadratic Functions and Interpreting the Intercepts and Zeros
 - d. Measurement
 - Using Dimensional Analysis
 - Lengths of Circular Arcs and Areas of Sectors of a Circle
 - Effects of Changing Dimensions On Perimeter, Area, and Volume of a Figure
 - Ratios and Proportions
 - Surface Area and Volume

5. STRUCTURE and LOGIC

- a. Algorithms and Algorithmic Thinking
 - Mathematical Algorithms
 - Validity and Equivalence of Algorithms
- b. Logic, Reasoning, Problem Solving, and Proof
 - Problem Solving
 - Using One or More Problem Solving Strategy
 - Reasonableness and Meaning of Solutions in Context
 - Generalizations In Inductive and Deductive Reasoning
 - Using Formal and Informal Reasoning
 - Synthesizing Mathematical Information
 - Structural Similarities Within Algebraic Expressions and Geometric Figures
 - Inductive and Deductive Reasoning and Counterexamples
 - Stating the Inverse, Converse, and Contrapositive of a Given Statement
 - Listing If...Then Statements in Order
 - Drawing Conclusions from If...Then Statements
 - Constructing a Simple Formal Deductive Proof
 - The Logical Structure of Mathematics

College/Work Readiness

1. NUMBER AND OPERATIONS

- a. Number Sense
 - Complex Number Solutions
 - Numerical Expressions in Radical and Exponential Form
- b. Numerical Operations
 - Properties of Complex Numbers and Matrices
 - Computations with Complex Numbers
 - Graphing Complex Numbers
 - Polar Coordinates
 - Trigonometric Form of Complex Numbers
 - Calculate Products, Powers, and Roots of Complex Numbers
- c. Estimation
 - Limitations of Estimation and Error

2. DATA ANALYSIS, PROBABILITY, and DISCRETE MATHEMATICS

- a. Data Analysis (Statistics)
 - Estimating and Computing with One-Variable and Two-Variable Data
 - Comparing Data Sets
 - Summary Statistics for Distributions of Data
 - Impacts of Sampling Methods, Bias, and Wording of Questions
 - Misleading Uses of Data

- Randomized Experiments and Observational Studies
 - Correlation and Causation
 - Line of Best Fit
 - Using Matrices to Organize and Represent Data
- b. Probability
- Probability Concepts
 - Normal Distribution
 - Predicting Outcomes Using One-Variable and Two-Variable Data
 - Dependent vs Independent Events
- c. Systematic Listing and Counting
- Using the Binomial Theorem
 - Connections Between Binomial Coefficients, Pascal's Triangle, and Combinations
- d. Vertex-Edge Graphs
- Types of Vertex-Edge Graphs
 - Understanding, Analyzing, and Applying Vertex-Edge Graphs
 - Solving Vertex-Edge Graph Problems
 - Using Adjacency Matrices for Graphs
3. PATTERNS, ALGEBRA, and FUNCTIONS
- a. Patterns
- Sequences and Series
 - Applying Recursive Formulas
 - Explicit and Recursive Formulas
 - Recursion
 - Using Sigma Notation
- b. Functions and Relationships
- Solving Problems Modeled by Functions
 - Using Function Notation
 - Graphing Absolute Value, Step, and Piecewise-Defined Functions
 - Graphing Exponential Functions
 - Graphing Power Functions
 - Graphing Polynomial Functions
 - Analyzing Functions
 - Conic Sections
 - Trigonometric Functions
 - Finding the Inverse of a Function
 - Approximating Solutions for Polynomial Equations
 - Using Theorems of Polynomial Behavior to Find the Zeros of a Polynomial Function
 - Properties of Logarithms
 - Performing Operations on Functions
 - Even and Odd Functions
 - Degrees of a Polynomial
 - Informal Notion of Limits

- c. Algebraic Representations
 - Equivalent Algebraic Expressions
 - Laws of Exponents
 - Solving Systems of Three Linear Equations in Three Variables
 - Using Matrices to Represent Systems of Linear Equations
 - Simplifying Radical Expressions
 - Dividing Polynomials
 - Finding Complex Solutions of Quadratic Equations
 - Solutions, Zeros, X-Intercepts, and Factors
 - Using Matrix Operations
 - Representing Vectors as Matrices
 - Operations with Vectors
 - d. Analysis of Change
 - Independent and Dependent Variables
 - The Rate of Change of a Function
 - Modeling and Solving Word Problems
 - Comparing Relative Magnitudes of Functions
 - Solving Problems Involving Compound Interest
 - Relationship between Simple and Compound Interest
 - Determining Total Costs of Purchases
 - Calculating Income Tax
 - Developing a Budget
 - Creating a Retirement Savings Plan
 - Compare and Contrast Different Insurances
4. GEOMETRY and MEASUREMENT
- a. Geometric Properties
 - Basic Geometric Constructions
 - Non-Euclidean Geometry
 - Law of Cosines and Law of Sines
 - Using Trigonometric Identities
 - b. Transformation of Shapes
 - Changing the Parameters of a Quadratic Function
 - Changing the Parameters of an Exponential Function
 - Changing the Parameters of a Trigonometric Function
 - c. Coordinate Geometry
 - Solving Systems of Linear Inequalities Graphically
 - Equations of Circles
 - Graphing Conic Sections
 - Graphing Trigonometric Functions
 - Evaluating Trigonometric Functions Using the Unit Circle
 - Rectangular and Polar Coordinates
 - Graphing Polar Equations
 - d. Measurement
 - Degree and Radian Measures

5. STRUCTURE and LOGIC

- a. Algorithms and Algorithmic Thinking
 - Analyzing Algorithms
- b. Logic, Reasoning, Problem Solving, and Proof
 - Steps to Problem Solving
 - Problem Solving Strategies
 - Reasonableness and Meaning of a Solution
 - Generalize a Solution Strategy
 - Formal and Informal Reasoning
 - Drawing Conclusions
 - Analyze and Explain General Properties and Behavior of Functions or Relations Using Algebraic and Graphing Techniques
 - Inductive and Deductive Reasoning
 - Using Mathematical Models to Represent Personal and Professional Situations
 - Differentiate, Interpret, Apply and Develop Concepts in the Context of Situations
 - Determine Under What Conditions a Given Statement is True

Also included, a dedicated section with videos and notes on strategies students can use before taking tests.

Test-Taking Strategies Section

1. Before the Test
 - Mental and Physical Strategies
2. Test Day
 - Mental and Physical Strategies
3. After the Test
 - Mental and Physical Strategies