



East Stroudsburg Area School District Mathematics – Algebra II



Description:

The East Stroudsburg Area School District's High School Mathematics Planned Course reflects the Common Core Standards, Teachers of Mathematics *Principals and Standards for Mathematics Education*, the Pennsylvania State Standards for Mathematics Education and the Pennsylvania Department of Education Assessment Anchors and Eligible Content. It provides a research-based, sequential framework of content designed to maximize successful mastery of mathematics, use and application of the Standards for Mathematical Practices, as well as the Habits of Mind.

Standards for Mathematical Practices	Habits of Mind
<ol style="list-style-type: none">1. Make sense of problems and persevere in solving them.2. Reason abstractly and quantitatively.3. Construct viable arguments and critique the reasoning of others.4. Model with mathematics.5. Use appropriate tools strategically.6. Attend to precision.7. Look for and make use of structure.8. Look for and express regularity in repeated reasoning.	<ol style="list-style-type: none">1. Persisting2. Managing Impulsivity3. Listening to Others with Empathy and Understanding4. Thinking Flexibly5. Metacognition6. Striving for Accuracy and Precision7. Questioning and Posing Problems8. Applying Past Knowledge to New Situations9. Thinking and Communicating with Clarity and Precision10. Gathering Data through all Senses11. Creating, Imagining, and Innovating12. Responding with Wonderment and Awe13. Taking Responsible Risks14. Finding Humor

The Mathematics Curriculum is designed to address the needs of a diverse population of learners. The content builds upon student learning styles and provides for differentiated instruction. Each grade level includes opportunities for enrichment and remediation of concepts, as well as activities for English Language Learners.

Resources are provided to enhance mastery of mathematics vocabulary, basic skills, and problem solving strategies. Technology and career applications of mathematical skills are infused throughout the curriculum. As a result, learners will be offered opportunities to reason, communicate and connect mathematically in the real world.



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Mathematics Standards for High School:

The Algebra II course outlined in this scope and sequence document begins with connections back to earlier work, efficiently reviewing algebraic and statistical concepts that students have already studied while at the same time moving students forward into the new ideas described in the high school Common Core Standards.

The units are sequenced in a way that connects the mathematical content described in the Common Core State Standards for Mathematics; however, the order of the standards included in any unit does not imply a sequence of content within that unit. Some standards may be revisited several times during the course; others may be only partially addressed in different units, depending on the mathematical focus of the unit.

Algebra II Overview

Description: Topics to be studied include writing, solving, graphing, and applying functions. These functions include linear, quadratic, polynomial, radical, rational, exponential, and logarithmic.

Scope & Sequence

- **Unit 1: Relations, Functions, and Transformations**
 - Graph relations and functions.
 - Identify functions, domain, and range.
 - Use scatter plots that model real-world data to write an equation and make predictions.
 - Analyze transformations of functions.
 - Apply relations and functions to real world problems.



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- **Unit 2: Linear Systems**
 - Solve linear systems by using graphs, substituting, and elimination methods.
 - Classify a system of equations.
 - Solve a system of inequalities by graphing.
 - Use linear programming to write and solve a system of equations.
 - Apply systems to real world problems.
 - Analyze and use patterns.
 - Write and use linear models to represent real-world situations.

- **Unit 3: Quadratic Functions and Equations**
 - Identify and graph quadratic equations in vertex form and standard form.
 - Write the equation of a parabola.
 - Find common and binomial factors of quadratic expressions.
 - Factor special quadratic expressions.
 - Solve quadratic equations by factoring, graphing, completing the square, and using the Quadratic Formula.
 - Determine the number of solutions by using the discriminant.
 - Identify, graph, and perform operations with complex numbers.
 - Find complex number solutions of quadratic equations.
 - Apply quadratics to real world problems.

- **Unit 4: Polynomials and Polynomial Functions**
 - Classify polynomials.
 - Graph polynomials and describe end behavior.
 - Write the equation of a polynomial in factored form and from its zeros.
 - Identify the relative maximum and minimum of a polynomial.
 - Determine the zeros of a polynomial function.
 - Solve polynomial equations by factoring and graphing.
 - Divide polynomials using long division and synthetic division.
 - Apply transformations to graphs of polynomials.



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- **Unit 5: Radical Functions and Rational Exponents**
 - Simplify rational and radical expressions.
 - Solve radical equations.
 - Graph radical functions.
 - Convert between radical and exponential forms.
 - Apply radical functions to real world problems.

- **Unit 6: Exponential and Logarithmic Functions**
 - Graph exponential and logarithmic functions.
 - Simplify exponential and logarithmic expressions.
 - Solve exponential and logarithmic equations.
 - Apply exponential and logarithmic equations to real world problems.

- **Unit 7: Rational Functions and Probability**
 - Simplify rational expressions by adding, subtracting, multiplying, and dividing.
 - Solve rational equations.
 - Use combinations, permutations, and the fundamental counting principle to solve problems
 - Find the probability of single events and multiple events.
 - Apply rational functions and probability to real world problems.

Appendices:

A: Pennsylvania Common Core Standards Mathematics

B: National Common Core Standards for Mathematics

C: Mathematics Assessment Anchors and Eligible Content: Keystone Algebra I, Keystone Algebra II, Geometry

D: Formula Sheets: Keystone Algebra I, Keystone Algebra II, Geometry

E: Keystone Eligible Content Checklists: Keystone Algebra I, Keystone Algebra II, Keystone Geometry

F: Career Education and Work Standards

G: ISTE Standards