

# Wallenpaupack Area School District Planned Course Curriculum Guide

**Department:**

**Mathematics**

**Course Name:**

**Algebra 2 Honors**

**Course Description:**

Algebra II Honors includes development and applications of real number properties, the study of linear open sentences, an introduction to functions, factoring polynomials, the use of rational, irrational, and complex numbers, the study of quadratic equations, and other higher-level topics. Algebra II Honors is designed to be more rigorous with the intent of developing critical thinking skills by utilizing more abstract concepts. Higher level thinking processes will be reflected on various forms of assessment.

**Initial Creation Date (if applicable) and Revision Dates:**

Initial Creation Date:

Revision Date: 2006

Revision Date: October, 2025

Curriculum Team: Lynn Cunningham

Mary Gilson

<b>Wallenpaupack Area School District Curriculum</b>	
<b>COURSE:</b> Algebra 2 CCR	<b>GRADE/S:</b> 10,11,12
<b>UNIT 1:</b> Function Recognition and Characteristics	<b>TIMEFRAME:</b> 18 blocks

**PA COMMON CORE/NATIONAL STANDARDS:**

**CC.2.2.HS.D.7** – Create and graph equations or inequalities to describe number relationships.

**CC.2.2.HS.D.8** – Apply inverse operations to solve equations or formulas for a given variable.

**CC.2.2.HS.D.9** – Use reasoning to solve equations and justify the solution method.

**CC.2.2.HS.C.1** – Use the concept and notation of functions to interpret and apply them in terms of their context.

**CC.2.2.HS.C.2** – Graph and analyze functions and use their properties to make connections between the different representations.

**CC.2.2.HS.C.3** – Write functions or sequences that model relationships between two quantities.

**CC.2.2.HS.C.6** – Interpret functions in terms of the situation they model.

**UNIT OBJECTIVES (SWBATS):**

Students will be able to:

- Recognize the function family (Linear, Absolute Value, Quadratic, Cubic, Cube Root, Square Root and Rational) by equation, graph and table of values
- Use the vertical line test to determine if a relation is a function
- Use the horizontal line test to determine if a function is one to one
- Determine domain and range of a function in the above families from their graphs or equations
- Determine x- and y-intercepts of a function in any form
- Determine the vertex of the quadratic function or the absolute value function
- Use a table of values to graph quadratics in standard form
- Determine the axis of symmetry of applicable functions
- Determine absolute maximum and minimum of functions
- Determine increasing and decreasing intervals of functions
- Evaluate functions algebraically and graphically
- Write equations of lines in slope intercept form, standard form and point-slope form
- Write equations of lines given basic characteristics
- Use knowledge of parallel and perpendicular lines to write linear equations

**INSTRUCTIONAL STRATEGIES/ACTIVITIES:**

- Direct instruction with guided examples
- Additional practice and problem-solving
- Discovery learning
- Partner and group work
- Interactive board work with class discussions
- Application to real world situations

**ASSESSMENTS (Diagnostic/Benchmark/Formative/Summative):**

- Diagnostic – Pre-unit class discussion or quiz on prior knowledge
- Formative – Class participation, classwork, homework checks, group work, partner activities, board work, teacher observation
- Summative – Quizzes, unit tests

**DIFFERENTIATED INSTRUCTION (Acceleration/Enrichment/Remediation):**

- KUTA software
- Amplify website (Formerly known as Desmos)
- Wayground website (Formerly known as Quizizz)
- Math lab opportunities
- Peer tutoring
- Small group reteaching/instruction
- Use of the gifted resource room

\*will vary based on IEP/GIEP goals

**RESOURCES (Technology Based Resources, Text Resources, etc.):**

- Teacher made worksheets and activities
- TI-30 Calculators
- TI-84 Graphing Calculators
- Amplify Website (Formerly known as Desmos)
- KUTA Software

**KEY VOCABULARY:**

- |                    |  |
|--------------------|--|
| • Relation         | • Maximum/Minimum                          |
| • Function         | • Increasing/Decreasing/Constant Intervals |
| • Domain           | • Evaluate                                 |
| • Range            | • Parallel                                 |
| • Vertex           | • Perpendicular                            |
| • Axis of Symmetry |  |

<b>Wallenpaupack Area School District Curriculum</b>	
<b>COURSE:</b> Algebra 2 CCR	<b>GRADE/S:</b> 10,11,12
<b>UNIT 2:</b> Transformations	<b>TIMEFRAME:</b> 12 blocks

**PA COMMON CORE/NATIONAL STANDARDS:**

**CC.2.2.HS.D.4** – Understanding the relationship between zeros and factors of polynomials to make generalizations about functions and their graphs.

**CC.2.2.HS.C.1** – Use the concept and notation of functions to interpret and apply them in terms of their context.

**CC.2.2.HS.C.2** – Graph and analyze functions and use their properties to make connections between the different representations.

**CC.2.2.HS.C.4** – Interpret the effects transformations have on functions and find the inverses of functions.

**CC.2.2.HS.C.5** – Construct and compare linear, quadratic and exponential models to solve problems.

**UNIT OBJECTIVES (SWBATS):**

Students will be able to:

- Use transformations and patterns to graph all function families of Unit 1
- Describe transformations of a function as compared to its parent function
- Identify and analyze horizontal and vertical translations
- Identify x- and y-axis reflections
- Perform horizontal and vertical dilations
- Write the equation of the function when presented a graph
- Add, subtract, multiply and divide functions
- Calculate composition of functions
- Use the horizontal line test to determine if the inverse is a function
- Determine inverse functions and find the domain and range
- Graph functions and their inverses over the appropriate domains
- Demonstrate the connection between composition and inverse functions

**INSTRUCTIONAL STRATEGIES/ACTIVITIES:**

- Direct instruction with guided examples
- Additional practice and problem-solving
- Discovery learning
- Partner and group work
- Interactive board work with class discussions
- Application to real world situations

**ASSESSMENTS (Diagnostic/Benchmark/Formative/Summative):**

- Diagnostic – Pre-unit class discussion or quiz on prior knowledge
- Formative – Class participation, classwork, homework checks, group work, partner activities, board work, teacher observation
- Summative – Quizzes, unit tests, Transformation Project

**DIFFERENTIATED INSTRUCTION (Acceleration/Enrichment/Remediation):**

- KUTA software
- Amplify website (Formerly known as Desmos)
- Wayground website (Formerly known as Quizizz)
- Math lab opportunities
- Peer tutoring
- Small group reteaching/instruction
- Use of the gifted resource room

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**RESOURCES (Technology Based Resources, Text Resources, etc.):**

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- TI-30 Calculators
- TI-84 Graphing Calculators
- Amplify Website (Formerly known as Desmos)
- KUTA Software

**KEY VOCABULARY:**

- Transformation
- Parent Function
- Vertical Translation
- Horizontal Translation
- Reflection
- Dilation
- Inverse of a Function
- Composition

<b>Wallenpaupack Area School District Curriculum</b>	
<b>COURSE:</b> Algebra 2 CCR	<b>GRADE/S:</b> 10,11,12
<b>UNIT 3:</b> Quadratics	<b>TIMEFRAME:</b> 21 blocks

**PA COMMON CORE/NATIONAL STANDARDS:**

**CC.2.1.HS.F.6** – Extend the knowledge of arithmetic operations and apply to complex numbers.

**CC.2.2.1.HS.F.7** – Apply concepts of complex numbers in polynomial identities and quadratic equations to solve problems.

**CC.2.2.HS.D.2** – Write expressions in equivalent forms to solve problems.

**CC.2.2.HS.D.4** – Understanding the relationship between zeros and factors of polynomials to make generalizations about functions and their graphs.

**CC.2.2.HS.D.5** – Use polynomial identities to solve problems.

**CC.2.2.HS.D.7** – Create and graph equations or inequalities to describe number relationships.

**CC.2.2.HS.D.8** – Apply inverse operations to solve equations or formulas for a given variable.

**CC.2.2.HS.D.9** – Use reasoning to solve equations and justify the solution method.

**CC.2.2.HS.D.10** – Represent, solve and interpret equations/inequalities and system of equations/inequalities algebraically and graphically.

**CC.2.HS.C.1** – Use the concept and notation of functions to interpret and apply them in terms of their context.

**CC.2.2.HS.C.2** – Graph and analyze functions and use their properties to make connections between the different representations.

**CC.2.2.HS.C.3** – Write functions or sequences that model relationships between two quantities.

**CC.2.2.HS.C.6** – Interpret functions in terms of the situation they model.

**UNIT OBJECTIVES (SWBATS):**

Students will be able to:

- Recognize quadratics in vertex form
- Recognize quadratics in standard form
- Recognize quadratics in intercept form
- Identify the vertex of a quadratic in any form
- Determine the axis of symmetry of a quadratic equation
- Graph a quadratic function from any form.
- Write quadratic equations when presented with a graph
- Determine extrema of quadratics
- Determine the zeros of quadratics
- Convert from vertex form to standard form
- Convert from standard form to vertex form
- Convert from standard form to intercept form
- Convert from intercept form to standard form
- Determine the equation of the quadratic given the vertex and another point on the curve
- Determine the equation of the quadratic given three points (no vertex)
- Factor quadratic expressions using greatest common factor
- Factor quadratic expressions using difference of squares factor patterns
- Factor quadratic expressions using factorable trinomial factor patterns
- Apply the zero-product property to solve quadratic equations
- Simplify radical expressions
- Apply the quadratic formula to solve quadratic equations

- Use completing the square to solve quadratic equations
- Solving real world problems involving quadratic functions
- Calculate the discriminant
- Classify the nature of the roots based on the value of the discriminant
- Simplify complex expressions
- Add, subtract, multiply and divide complex numbers
- Model data with quadratic functions
- Solve systems of linear and quadratic equations

**INSTRUCTIONAL STRATEGIES/ACTIVITIES:**

- Direct instruction with guided examples
- Additional practice and problem-solving
- Discovery learning
- Partner and group work
- Interactive board work with class discussions
- Application to real world situations

**ASSESSMENTS (Diagnostic/Benchmark/Formative/Summative):**

- Diagnostic – Pre-unit class discussion or quiz on prior knowledge
- Formative – Class participation, classwork, homework checks, group work, partner activities, board work, teacher observation
- Summative – Quizzes, unit tests

**DIFFERENTIATED INSTRUCTION (Acceleration/Enrichment/Remediation):**

- KUTA software
- Amplify website (Formerly known as Desmos)
- Wayground website (Formerly known as Quizizz)
- Math lab opportunities
- Peer tutoring
- Small group reteaching/instruction
- Use of the gifted resource room

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**RESOURCES (Technology Based Resources, Text Resources, etc.):**

- Teacher made worksheets and activities
- TI-30 Calculators
- TI-84 Graphing Calculators
- Amplify Website (Formerly known as Desmos)
- KUTA Software

**KEY VOCABULARY:**

- Transformation
- Parent Function
- Translation
- Dilation
- Quadratic
- Vertex
- Axis of Symmetry
- Maximum
- Minimum
- Vertex form
- Standard form
- Intercept form
- Greatest common factor
- Difference of squares
- Factorable trinomial
- Factor
- Zeros
- Zero Product Property
- Quadratic formula
- Discriminant
- Imaginary number
- Complex number
- Perfect square
- Nature of roots

<b>Wallenpaupack Area School District Curriculum</b>	
<b>COURSE:</b> Algebra 2 CCR	<b>GRADE/S:</b> 10,11,12
<b>UNIT 4:</b> Polynomials	<b>TIMEFRAME:</b> 13 blocks

**PA COMMON CORE/NATIONAL STANDARDS:**

**CC.2.2.HS.D.1** – Interpret the structure of expressions to represent a quantity in terms of its context.

**CC.2.2.HS.D.2** – Write expressions in equivalent forms to solve problems.

**CC.2.2.HS.D.3** – Extend the knowledge of arithmetic operations and apply to polynomials.

**CC.2.2.HS.D.4** – Understanding the relationship between zeros and factors of polynomials to make generalizations about functions and their graphs.

**CC.2.2.HS.D.5** – Use polynomial identities to solve problems.

**CC.2.2.HS.C.1** – Use the concept and notation of functions to interpret and apply them in terms of their context.

**CC.2.2.HS.C.2** – Graph and analyze functions and use their properties to make connections between the different representations

**UNIT OBJECTIVES (SWBATS):**

Students will be able to:

- Classify polynomials by the number of terms
- Classify polynomials by degree
- Add, subtract and multiply polynomials
- Determine end behavior of a polynomial function
- Identify the basic shape of a polynomial graph
- Analyze the factored form of a polynomial
- Determine the nature of the zeros of a polynomial function
- Determine the zeros of a factorable polynomial function
- Write a polynomial function given its zeros in standard form
- Apply the Irrational Roots Theorem
- Apply the Complex Roots Theorem
- Divide polynomials using long polynomial division
- Divide polynomials using synthetic division
- Factor polynomials using the sum and difference of cubes factor patterns
- Solve polynomial equations by factoring

**INSTRUCTIONAL STRATEGIES/ACTIVITIES:**

- Direct instruction with guided examples
- Additional practice and problem-solving
- Discovery learning
- Partner and group work
- Interactive board work with class discussions
- Application to real world situations

**ASSESSMENTS (Diagnostic/Benchmark/Formative/Summative):**

- Diagnostic – Pre-unit class discussion or quiz on prior knowledge
- Formative – Class participation, classwork, homework checks, group work, partner activities, board work, teacher observation
- Summative – Quizzes, unit tests

**DIFFERENTIATED INSTRUCTION (Acceleration/Enrichment/Remediation):**

- KUTA software
- Amplify website (Formerly known as Desmos)
- Wayground website (Formerly known as Quizizz)
- Math lab opportunities
- Peer tutoring
- Small group reteaching/instruction
- Use of the gifted resource room

\*will vary based on IEP/GIEP goals

**RESOURCES (Technology Based Resources, Text Resources, etc.):**

- Teacher made worksheets and activities
- TI-30 Calculators
- TI-84 Graphing Calculators
- Amplify Website (Formerly known as Desmos)
- KUTA Software

**KEY VOCABULARY:**

- |                          |                            |
|--------------------------|----------------------------|
| • Monomial               | • Quintic                  |
| • Binomial               | • Nth degree               |
| • Trinomial              | • End behavior             |
| • Polynomial             | • Basic shape              |
| • Degree of a Monomial   | • Zeros                    |
| • Degree of a Polynomial | • Irrational Roots Theorem |
| • Linear                 | • Complex Roots Theorem    |
| • Quadratic              | • Conjugate                |
| • Cubic                  | • Long polynomial division |
| • Quartic                | • Synthetic division       |

<b>Wallenpaupack Area School District Curriculum</b>	
<b>COURSE:</b> Algebra 2 CCR	<b>GRADE/S:</b> 10,11,12
<b>UNIT 5: The Exponent – Radical Connection</b>	<b>TIMEFRAME:</b> 10 blocks

**PA COMMON CORE/NATIONAL STANDARDS:**

**CC.2.1.HS.F.1** – Apply and extend the properties of exponents to solve problems with rational exponents.

**CC.2.2.HS.D.2** – Write expressions in equivalent forms to solve problems.

**CC.2.2.HS.D.8** – Apply inverse operations to solve equations or formulas for a given variable.

**CC.2.2.HS.D.10** – Represent, solve and interpret equations/inequalities and system of equations/inequalities algebraically and graphically.

**CC.2.HS.C.1** – Use the concept and notation of functions to interpret and apply them in terms of their context.

**UNIT OBJECTIVES (SWBATS):**

Students will be able to:

- Demonstrate knowledge of integer exponents
- Demonstrate knowledge of exponent properties
- Apply the exponent properties to rational exponents
- Rewrite rational exponents as radical expressions
- Rewrite radical expressions with rational exponents
- Simplify nth roots
- Multiply radical expressions
- Add and subtract radical expressions
- Multiply and divide binomial radical expressions
- Solve radical equations
- Graph radical equations

**INSTRUCTIONAL STRATEGIES/ACTIVITIES:**

- Direct instruction with guided examples
- Additional practice and problem-solving
- Discovery learning
- Partner and group work
- Interactive board work with class discussions
- Application to real world situations

**ASSESSMENTS (Diagnostic/Benchmark/Formative/Summative):**

- Diagnostic – Pre-unit class discussion or quiz on prior knowledge
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- Summative – Quizzes, unit tests

**DIFFERENTIATED INSTRUCTION (Acceleration/Enrichment/Remediation):**

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- TI-84 Graphing Calculators
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- KUTA Software

**KEY VOCABULARY:**

- |                     |                       |
|---------------------|-----------------------|
| • Integer exponent  | • Cube root           |
| • Rational exponent | • nth root            |
| • Simplify radicals | • Conjugate           |
| • Square root       | • Extraneous solution |

<b>Wallenpaupack Area School District Curriculum</b>	
<b>COURSE:</b> Algebra 2 CCR	<b>GRADE/S:</b> 10,11,12
<b>UNIT 6:</b> Rational Functions	<b>TIMEFRAME:</b> 12 blocks

**PA COMMON CORE/NATIONAL STANDARDS:**

- CC.2.2.HS.D.6** – Extend the knowledge of rational functions to rewrite in equivalent forms.  
**CC.2.2.HS.D.8** – Apply inverse operations to solve equations or formulas for a given variable.  
**CC.2.2.HS.D.10** – Represent, solve and interpret equations/inequalities and system of equations/inequalities algebraically and graphically.  
**CC2.2.HS.C.1** – Use the concept and notation of functions to interpret and apply them in terms of their context.

**UNIT OBJECTIVES (SWBATS):**

Students will be able to:

- Simplify rational expressions
- Multiply and divide rational expressions
- Add and subtract rational expressions (if time permits)
- Identify vertical asymptotes of rational functions
- Identify holes in the graph of a rational function
- Identify horizontal asymptotes of rational functions
- Graph rational functions
- Solve rational equations

**INSTRUCTIONAL STRATEGIES/ACTIVITIES:**

- Direct instruction with guided examples
- Additional practice and problem-solving
- Discovery learning
- Partner and group work
- Interactive board work with class discussions
- Application to real world situations

**ASSESSMENTS (Diagnostic/Benchmark/Formative/Summative):**

- Diagnostic – Pre-unit class discussion or quiz on prior knowledge
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- Math lab opportunities
- Peer tutoring
- Small group reteaching/instruction
- Use of the gifted resource room

\*will vary based on IEP/GIEP goals

**RESOURCES (Technology Based Resources, Text Resources, etc.):**

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- TI-84 Graphing Calculators
- Amplify Website (Formerly known as Desmos)
- KUTA Software

**KEY VOCABULARY:**

- |                     |                        |
|---------------------|------------------------|
| • Rational function | • Numerator            |
| • Asymptote         | • Denominator          |
| • Hole              | • Zeros                |
| • Domain            | • Extraneous solutions |
| • Range             |                        |