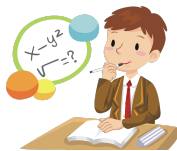


# Glen Ridge Public Schools –Mathematics Curriculum



**Course Title: Honors Algebra 2**

**Subject: Mathematics**

**Grade Level: HS**

**Duration: Full Year**

**Prerequisite: Advanced Algebra 1 and Honors Geometry with a completion of “B” or better, teacher recommendation, and completion of the summer assignment.**

**Elective or Required: Elective**

## **Mathematics Mission Statement**

Mathematics is an integral part of our lives. Students must be actively involved in their mathematics education through the use of modeling and demonstrating the ability to persevere through problem solving. The mathematics curricula will emphasize critical thinking skills through a balance of logic and reasoning, attention to precision by utilizing patterns and structure, and bridging these ideas to cross-curricular learning. Students will be engaged and challenged in a student-centered learning environment that is developmentally appropriate and will communicate mathematical ideas, both in a verbal and written form. Through effectively applying hands-on manipulatives, basic computation skills and the use of technical writing to justify their processes, students will critique the work of themselves and others.

## **Course Description:**

Honors Algebra 2 is an accelerated math course that continues the study of advanced algebraic concepts. Students entering this course are expected to have mastered the concepts taught in Advanced Algebra 1 and Honors Geometry. Topics will include quadratic functions, polynomial functions, exponential and logarithmic functions, rational and radical functions, and conic sections. Throughout this course, students will develop learning strategies, critical thinking skills and problem solving techniques to prepare them for higher level math courses.

**Author: Kaitlyn Mackay**

**Date Submitted:** Summer 2017

**Text:** *Holt McDougal Algebra 2*, 2012 by Burger, Chard, Kennedy, Leinward, Renfro, Roby, and Waits

**Course Name: Honors Algebra 2**  
**Topic/Unit: Foundations of Functions**

**Approximate # Of Weeks: 4**

**Essential Questions:**

- How can you describe parent functions symbolically and graphically?
- How does altering a function change its graph?
- Can you perform operations including composition of functions, find inverses, and describe these procedures and results verbally, numerically, symbolically, and graphically?

**Upon completion of this unit students will be able to:**

- Identify parent functions from graphs and equations
- Use parent functions to model real-world data and make estimates for unknown values
- Fit scatter plot data using linear models with and without technology
- Add, subtract, multiply, and divide functions
- Write and evaluate composite functions
- Apply functions to problem situations
- Use mathematical models to make predictions

**NJCCCS:**

CC.9-12.A.CED.2, CC.9-12.A.CED.3, CC.9-12.F.BF.3, CC.9-12.F.BF.1

**Interdisciplinary Standards (njcccs.org)**

- Standard 5.1 – Science Practices
- Standard 6.3 – Active Citizenship in the 21<sup>st</sup> Century
- Standard 8.2 – Technology Education
- Standard 9.1 – 21<sup>st</sup> - Century Life & Career Skills
- Standard 9.3 – Career Awareness, Exploration, and Preparation

**Activities – include 21<sup>st</sup> Century Technologies:**

- SmartBoard powerpoint presentations
- Lecture and class discussion
- Desmos Activities (online graphing tool)
- Algebra Lab – Chess Translations

- Textbook Activity – Introduction to Functions - Native American Art
- Data Analysis – Statistical Graphs
- TI-Calculator Activity – Introduction to Parent Functions
- TI-Calculator Activity – Modeling Real-World Data
- Online quizzes from textbook website
- Online videos from textbook website
- Google Classroom tools (Questions and assessments)
- Khan academy
- Kahoot (online quizzes)
- Quizlet (online quizzes)

**Enrichment Activities:**

- Practice C Worksheets (Holt McDougal)
- Challenge Worksheets (Holt McDougal)
- Problem Solving Worksheets (Holt McDougal)
- Operations of functions puzzle

**Methods of Assessments/Evaluation:**

- Exit Tickets
- Assessment Chart (Scales)
- Quizzes
- Test
- Google Classroom
- Lesson Checks
- Projects
- Verbal Assessment
- Open ended questions
- Classwork
- Homework
- Check it out problems (during lectures)
- Think-pair-share
- Turn and Talk
- Whiteboards
- Observation (Teacher/small/whole group)
- Error Analysis

**Resources/Including Online Resources**

- Online Textbook Information: [my.hrw.com](http://my.hrw.com)
- Teacher Webpage
- Algebra 2 Textbook (publisher: Holt McDougal)
- Graphing Calculator
- Khan Academy
- Google Classroom

**Learning Goals Scale:**

- 4 Student will be able to complete compositions of functions.
- 3 Student will be able to perform basic operations of functions.
- 2 Student will be able to match the parent function with its equations and a model.
- 1 Student will be able to identify the parent functions.

**Course Name: Honors Algebra 2**  
**Topic/Unit: Quadratic Functions**

**Approximate # Of Weeks: 4**

**Essential Questions:**

- What can minimums and maximums tell us about equations?
- What are the roles of  $a$ ,  $h$ , and  $k$  when graphing a parabola?
- What real life relationships are best modeled by quadratic equations?
- Where do I find the solutions (if there are any) of a quadratic equation when looking at a graph?
- How can we express complex numbers?
- What does it mean if the zeros of a parabola are complex numbers?
- How do complex numbers fit with the Real number system? With imaginary numbers?

**Upon completion of this unit students will be able to:**

- Transform quadratic functions
- Describe the effects of changes in the coefficients of  $y = a(x-h)^2 + k$
- Define, identify, and graph quadratic functions
- Identify and use maximums and minimums of quadratic functions to solve problems
- Solve quadratic equations by graphing or factoring
- Determine a quadratic function and its zeros
- Solve quadratic equations by graphing or factoring
- Determine a quadratic function from its roots
- Solve quadratic equations by completing the square
- Write quadratic equations in vertex form
- Define and use imaginary and complex numbers
- Solve quadratic equations with complex roots
- Solve quadratic equations using the Quadratic Formula
- Classify roots using the discriminant
- Solve quadratic inequalities by using tables and graphs
- Solve quadratic inequalities by using algebra
- Use quadratic functions to model data
- Use quadratic models to analyze and predict
- Perform operations with complex numbers

**NJCCCS:**

CC.9-12.A.CED.1 , CC.9-12.A.CED.2, CC.9-12.A.CED.3, CC.9-12.F.IF.5,  
CC.9-12.F.IF.7, CC.9-12.F.IF.8, CC.9-12.F.BF.3, CC.9-12.A.REI.11,  
CC.9-12.N.CN.1, CC.9-12.N.CN.2, CC.9-12.N.CN.7

**Interdisciplinary Standards (njcccs.org)**

- Standard 5.1 – Science Practices
- Standard 6.3 – Active Citizenship in the 21<sup>st</sup> Century
- Standard 8.2 – Technology Education
- Standard 9.1 – 21st - Century Life & Career Skills
- Standard 9.3 – Career Awareness, Exploration, and Preparation

**Activities – include 21<sup>st</sup> Century Technologies:**

- SmartBoard powerpoint presentations
- Lecture and class discussion
- Desmos Activities (online graphing tool)
- Technology Lab – Explore Parameter Changes
- Technology Lab – Explore Graphs and Factors
- Connecting Algebra to Previous Courses – Factoring Quadratic Expressions
- Connecting Algebra to Geometry – Areas of Composite Figures
- Textbook Activity – Quadratic Functions and Complex Numbers
- Textbook Activity – Applying Quadratic Functions
- TI-Calculator Activity – Using Transformation to Graph Quadratic Functions
- TI-Calculator Activity – Properties of Quadratic Functions in Standard Form
- TI-Calculator Activity – Finding Minimum or Maximum Values
- TI-Calculator Activity – Finding Roots Using Tables and Graphs
- TI-Calculator Activity – QuadSolv
- TI-Calculator Activity – Curve Fitting with Quadratic Models
- Online quizzes from textbook website
- Online videos from textbook website
- Google Classroom tools (Questions and assessments)
- Khan academy
- Kahoot (online quizzes)
- Quizlet (online quizzes)

**Enrichment Activities:**

- Practice C Worksheets (Holt McDougal)
- Challenge Worksheets (Holt McDougal)
- Problem Solving Worksheets (Holt McDougal)

**Methods of Assessments/Evaluation:**

- Exit Tickets
- Assessment Chart (Scales)
- Quizzes
- Test
- Google Classroom
- Lesson Checks
- Projects
- Verbal Assessment
- Open ended questions
- Classwork
- Homework
- Check it out problems (during lectures)
- Think-pair-share
- Turn and Talk
- Whiteboards
- Observation (Teacher/small/whole group)
- Error Analysis

**Resources/Including Online Resources**

- Online Textbook Information: [my.hrw.com](http://my.hrw.com)
- Teacher Webpage
- Algebra 2 Textbook (publisher: Holt McDougal)
- Graphing Calculator
- Khan Academy
- Google Classroom

**Learning Goals Scale:**

- 4 Student will be able to understand the characteristics and transformations and the effects of a quadratic by looking at its equation and graph.
- 3 Student will be able to solve a quadratic using one of the methods.
- 2 Student will be able to graph a quadratic with all of its parts.
- 1 Student will be able to identify a quadratic and all of its parts.

**Course Name: Honors Algebra 2**  
**Topic/Unit: Polynomial Functions**

**Approximate # Of Weeks: 4**

**Essential Questions:**

- What are the effects of the values of  $n$ ,  $a$ ,  $h$ , and  $k$  on the graph of  $f(x)=a(x-h)^n+k$ ?
- What are the polynomial functions and how do you graph them?

- How can we find solutions for polynomial functions?
- How do you use the Binomial Theorem to expand powers of binomials?
- What is the relationship between polynomial division and the Remainder and Factor Theorems?
- How do you graph factorable polynomial functions?
- How can you find zeros of polynomial functions?
- How can you use polynomial functions to model and solve real-world problems?

**Upon completion of this unit students will be able to:**

- Identify, evaluate, add, and subtract polynomials
- Classify and graph polynomials
- Multiply polynomials
- Use binomial expansion to expand binomial expressions that are raised to positive integer powers
- Use long division and synthetic division to divide polynomials
- Use the Factor Theorem to determine factors of a polynomial
- Factor the sum and difference of two cubes
- Identify the multiplicity of roots
- Use the Rational Root Theorem to solve polynomial equations
- Use the Fundamental Theorem of Algebra and its corollary to write a polynomial equation of least degree with given roots
- Identify all roots of a polynomial equation
- Use properties of end behavior to analyze, describe, and graph polynomial functions
- Identify and use maxima and minima of polynomial functions to solve problems
- Transform polynomial functions
- Use finite differences to determine the degree of a polynomial that will fit a given set of data
- Use technology to find polynomial models for a given set of data

**NJCCCS:**

CC.9-12.A.APR.1, CC.9-12.A.APR.2, CC.9-12.A.APR.3, CC.9-12.A.APR.4, CC.9-12.A.APR.5, CC.9-12.A.APR.6, CC.9-12.CED.1, CC.9-12.CED.2, CC.9-12.CED.3, CC.9-12.F.IF.4, CC.9-12.F.IF.7, CC.9-12.F.BF.3, CC.9-12.N.CN.7, CC.9-12.N.CN.8, CC.9-12.N.CN.9, CC.9-12.A.SSE.2, CC.9-12.A.REI.11

**Interdisciplinary Standards (njcccs.org)**

- Standard 5.1 – Science Practices
- Standard 6.3 – Active Citizenship in the 21<sup>st</sup> Century
- Standard 8.2 – Technology Education
- Standard 9.1 – 21st - Century Life & Career Skills
- Standard 9.3 – Career Awareness, Exploration, and Preparation

**Activities – include 21<sup>st</sup> Century Technologies:**

- SmartBoard powerpoint presentations
- Lecture and class discussion
- Desmos Activities (online graphing tool)
- Number Theory – Pascal’s Triangle
- Algebra Lab – Explore the Sum and Difference of Two Cubes
- Textbook Activity – Operations with Polynomials
- Textbook Activity – Applying Polynomial Functions
- Connecting Algebra to Geometry - Nets
- TI-Calculator Activity – Graphing Higher Degree Polynomials
- TI-Calculator Activity – Identifying Multiplicity
- TI-Calculator Activity – Identify all Real Roots
- TI-Calculator Activity – Transforming Polynomial Functions
- TI-Calculator Activity – Curve Fitting with Polynomial Models
- Technology Lab – Explore Power Functions
- Online quizzes from textbook website
- Online videos from textbook website
- Google Classroom tools (Questions and assessments)
- Khan academy
- Kahoot (online quizzes)
- Quizlet (online quizzes)

**Enrichment Activities:**

- Practice C Worksheets (Holt McDougal)
- Challenge Worksheets (Holt McDougal)
- Problem Solving Worksheets (Holt McDougal)

**Methods of Assessments/Evaluation:**

- Exit Tickets
- Assessment Chart (Scales)
- Quizzes
- Test
- Google Classroom
- Lesson Checks
- Projects
- Verbal Assessment
- Open ended questions
- Classwork
- Homework
- Check it out problems (during lectures)
- Think-pair-share
- Turn and Talk
- Whiteboards
- Observation (Teacher/small/whole group)



- Error Analysis

### Resources/Including Online Resources

- Online Textbook Information: my.hrw.com
- Teacher Webpage
- Algebra 2 Textbook (publisher: Holt McDougal)
- Graphing Calculator
- Khan Academy
- Google Classroom

### Learning Goals Scale:

- 4 Student will be able to understand the transformations and characteristics of polynomial functions from its graph and equation.
- 3 Student will be able to identify all roots of a polynomial equation by graphing and/or factoring.
- 2 Student will be able to perform all operations of polynomial functions.
- 1 Student will be able to identify a polynomial by its degree and number of terms.

**Course Name: Honors Algebra 2**  
**Topic/Unit: Exponential and Logarithmic Functions**

**Approximate # Of Weeks: 4**

### Essential Questions:

- What are the characteristics of an exponential function?
- How does changing the values of  $a$ ,  $h$ , and  $k$  affect the graph of an exponential growth/decay function?
- How does the value of  $c$  in  $f(x) = b^{cx}$  affect the graph of  $f(x)$ ?
- How does the graph of  $f(x) = e^x$  compare to graphs of exponential functions with other bases?
- What methods can you use to solve exponential equations?
- What are the characteristics of logarithmic functions?
- How does changing the values of  $a$ ,  $h$ , and  $k$  affect the graph of  $f(x) = a \log_b(x-h) + k$ ?
- How do you prove properties of logarithms?
- What is the general process for solving exponential and logarithmic equations?

### Upon completion of this unit students will be able to:

- Write and evaluate exponential expressions to model growth and decay situations
- Graph and recognize inverses of relations and functions
- Find inverses of functions
- Use properties to simplify logarithmic expressions

- Translate between logarithms in any base
- Solve exponential and logarithmic equations and inequalities
- Solve problems involving exponential and logarithmic equations
- Use the number  $e$  to write and graph exponential functions representing real-world situations
- Solve equations and problems involving  $e$  or natural logarithms
- Transform exponential and logarithmic functions by changing parameters
- Describe the effects in the coefficients of exponential and logarithmic functions
- Model data by using exponential and logarithmic functions
- Use exponential and logarithmic models to analyze and predict

### **NJCCCS:**

CC.9-12.A.CED.1, CC.9-12.A.CED.2, CC.9-12.A.CED.3, CC.9-12.F.IF.5, CC.9-12.F.IF.7, CC.9-12.F.IF.8, CC.9-12.F.BF.3, CC.9-12.F.BF.4, CC.9-12.A.REI.11, CC.9-12.F.LE.4

### **Interdisciplinary Standards (njcccs.org)**

- Standard 5.1 – Science Practices
- Standard 6.3 – Active Citizenship in the 21<sup>st</sup> Century
- Standard 8.2 – Technology Education
- Standard 9.1 – 21st - Century Life & Career Skills
- Standard 9.3 – Career Awareness, Exploration, and Preparation

### **Activities – include 21<sup>st</sup> Century Technologies:**

- SmartBoard powerpoint presentations
- Lecture and class discussion
- Desmos Activities (online graphing tool)
- Technology Lab – Explore Inverses of Functions
- Technology Lab – Explore the Rule of 72
- Textbook Activity – Exponential Functions and Logarithms
- Textbook Activity – Applying Exponential and Logarithmic Functions
- Connecting Algebra to Probability – Exponents in Probability
- TI-Calculator Activity – Exponential Functions, Growth and Decay
- TI-Calculator Activity – Inverses of Relations and Functions
- TI-Calculator Activity – Logarithmic Functions
- TI-Calculator Activity – Transforming Exponential and Logarithmic Functions
- TI-Calculator Activity – Curve Fitting with Exponential and Logarithmic Models
- Video – Standard Deviants Logarithms
- Video – Standard Deviants Solving Log Equations
- Video – Standard Deviants Exponent Applications
- Online quizzes from textbook website
- Online videos from textbook website

- Google Classroom tools (Questions and assessments)
- Khan academy
- Kahoot (online quizzes)
- Quizlet (online quizzes)

**Enrichment Activities:**

- Practice C Worksheets (Holt McDougal)
- Challenge Worksheets (Holt McDougal)
- Problem Solving Worksheets (Holt McDougal)

**Methods of Assessments/Evaluation:**

- Exit Tickets
- Assessment Chart (Scales)
- Quizzes
- Test
- Google Classroom
- Lesson Checks
- Projects
- Verbal Assessment
- Open ended questions
- Classwork
- Homework
- Check it out problems (during lectures)
- Think-pair-share
- Turn and Talk
- Whiteboards
- Observation (Teacher/small/whole group)
- Error Analysis

**Resources/Including Online Resources**

- Online Textbook Information: [my.hrw.com](http://my.hrw.com)
- Teacher Webpage
- Algebra 2 Textbook (publisher: Holt McDougal)
- Graphing Calculator
- Khan Academy
- Google Classroom

**Learning Goals Scale:**

- 4 Student will be able to transform exponential and logarithmic functions by changing parameters.
- 3 Student will be able to solve exponential and logarithmic equations and inequalities.
- 2 Student will be able to solve problems involving exponential and logarithmic equations.
- 1 Student will be able to identify exponential and logarithmic functions.

**Course Name: Honors Algebra 2**  
**Topic/Unit: Rational and Radical Functions**

**Approximate # Of Weeks: 4**

**Essential Questions:**

- How does changing the values of  $a$ ,  $h$ , and  $k$  affect the graph of  $f(x)=a/(x-h) + k$ ?
- How can you graph a functions of the form  $f(x)=(bx+c)/dx+e$ ?
- What methods are there for solving rational equations?
- How can you graph transformations of the parent radical functions?
- How can you model real-life situations with radical functions?
- How do you solve equations involving radical functions?

**Upon completion of this unit students will be able to:**

- Solve problems involving, direct, inverse, joint, and combined variation
- Simplify rational expressions
- Multiply and divide rational expressions
- Add and subtract rational expressions
- Simplify complex fractions
- Graph rational functions
- Transform rational functions by changing parameters
- Solve rational equations and inequalities
- Rewrite radical expressions by using rational exponents
- Simplify and evaluate radical expressions and expressions containing rational exponents
- Graph radical functions and inequalities
- Transform radical functions by changing parameters
- Solve radical equations and inequalities
- Solve equations graphically

**NJCCCS:**

CC.9-12.A.CED.1, CC.9-12.A.CED.2, CC.9-12.A.CED.3, CC.9-12.A.APR.7,  
CC.9-12.A.REI.11, CC.9-12.F.IF.5, CC.9-12.F.IF.7

**Interdisciplinary Standards (njcccs.org)**

- Standard 5.1 – Science Practices
- Standard 6.3 – Active Citizenship in the 21<sup>st</sup> Century
- Standard 8.2 – Technology Education
- Standard 9.1 – 21<sup>st</sup> - Century Life & Career Skills
- Standard 9.3 – Career Awareness, Exploration, and Preparation

**Activities – include 21<sup>st</sup> Century Technologies:**

- SmartBoard powerpoint presentations
- Lecture and class discussion

- Desmos Activities (online graphing tool)
- Algebra Lab – Model Inverse Variation
- Technology Lab – Explore Holes in Graphs
- Textbook Activity – Rational Functions
- Textbook Activity – Radical Functions
- Connecting Algebra to Geometry – Area and Volume Relationships
- TI-Calculator Activity – Rational Functions
- TI-Calculator Activity – Radical Functions
- TI-Calculator Activity – Variation Functions
- Video – Standard Deviants Rational Functions
- Video – Standard Deviants Graphing Functions
- Video – Standard Deviants Exponential Functions
- Online quizzes from textbook website
- Online videos from textbook website
- Google Classroom tools (Questions and assessments)
- Khan academy
- Kahoot (online quizzes)
- Quizlet (online quizzes)

**Enrichment Activities:**

- Practice C Worksheets (Holt McDougal)
- Challenge Worksheets (Holt McDougal)
- Problem Solving Worksheets (Holt McDougal)
- Extension – Polynomials, Rational Expressions, and Closure
- Extension – Solving Equations Graphically

**Methods of Assessments/Evaluation:**

- Exit Tickets
- Assessment Chart (Scales)
- Quizzes
- Test
- Google Classroom
- Lesson Checks
- Projects
- Verbal Assessment
- Open ended questions
- Classwork
- Homework
- Check it out problems (during lectures)
- Think-pair-share
- Turn and Talk
- Whiteboards
- Observation (Teacher/small/whole group)
- Error Analysis

### **Resources/Including Online Resources**

- Online Textbook Information: my.hrw.com
- Teacher Webpage
- Algebra 2 Textbook (publisher: Holt McDougal)
- Graphing Calculator
- Khan Academy
- Google Classroom

### **Learning Goals Scale:**

- 4 Student will be able to solve radical equations and inequalities.
- 3 Student will be able to transform rational functions by changing parameters.
- 2 Student will be able to simplify and evaluate radical expressions and expressions containing rational exponents.
- 1 Student will be able to rewrite radical expressions by using rational exponents.

## **Course Name: Honors Algebra 2** **Topic/Unit: Properties and Attributes of Functions**

**Approximate # Of Weeks: 3**

### **Essential Questions:**

- Why is it important to explore real world situations in which many conditions must be met?
- What problems can be solved using piecewise-defined functions?
- What does it mean for functions to be inverses of one another? How can I define the inverse of a given function?
- Can you perform operations including composition of functions, find inverses, and describe these procedures and results verbally, numerically, symbolically, and graphically?

### **Upon completion of this unit students will be able to:**

- Translate between the various representations of functions
- Solve problems by using the various representations of functions
- Compare properties of two functions
- Estimate and compare rates of change
- Write and graph piecewise functions
- Use piecewise functions to describe real-world situations
- Transform functions
- Recognize transformations of functions
- Add, subtract, multiply, and divide functions
- Write and evaluate composite functions
- Determine whether the inverse of a functions is a function

- Write rules for the inverses of functions
- Apply functions to problem situations
- Use mathematical models to make predictions

**NJCCCS:**

CC.9-12.A.CED.2, CC.9-12.A.CED.3, CC.9-12.F.BF.1, CC.9-12.F.BF.3, CC.9-12.F.IF.7

**Interdisciplinary Standards (njcccs.org)**

- Standard 5.1 – Science Practices
- Standard 6.3 – Active Citizenship in the 21<sup>st</sup> Century
- Standard 8.2 – Technology Education
- Standard 9.1 – 21st - Century Life & Career Skills
- Standard 9.3 – Career Awareness, Exploration, and Preparation

**Activities – include 21<sup>st</sup> Century Technologies:**

- SmartBoard powerpoint presentations
- Lecture and class discussion
- Desmos Activities (online graphing tool)
- Technology Lab – Graph Piecewise Functions
- Technology Lab – Explore Symmetry
- Textbook Activity – Functions and Their Graphs
- Textbook Activity – Functional Relationships
- Connecting Algebra to Geometry – Using Geometric Formulas
- TI-Calculator Activity – Multiple Representations of Functions
- TI-Calculator Activity – Comparing Functions
- TI-Calculator Activity – Piecewise Functions
- TI-Calculator Activity – Transforming Functions
- TI-Calculator Activity – Functions and Their Inverses
- TI-Calculator Activity – Modeling Real-World Data
- Online quizzes from textbook website
- Online videos from textbook website
- Google Classroom tools (Questions and assessments)
- Khan academy
- Kahoot (online quizzes)
- Quizlet (online quizzes)

**Enrichment Activities:**

- Practice C Worksheets (Holt McDougal)
- Challenge Worksheets (Holt McDougal)
- Problem Solving Worksheets (Holt McDougal)

**Methods of Assessments/Evaluation:**

- Exit Tickets
- Assessment Chart (Scales)

- Quizzes
- Test
- Google Classroom
- Lesson Checks
- Projects
- Verbal Assessment
- Open ended questions
- Classwork
- Homework
- Check it out problems (during lectures)
- Think-pair-share
- Turn and Talk
- Whiteboards
- Observation (Teacher/small/whole group)
- Error Analysis

### **Resources/Including Online Resources**

- Online Textbook Information: [my.hrw.com](http://my.hrw.com)
- Teacher Webpage
- Algebra 2 Textbook (publisher: Holt McDougal)
- Graphing Calculator
- Khan Academy
- Google Classroom

### **Learning Goals Scale:**

- 4 Student will be able to write rules for inverses of functions and determine if something is an inverse.
- 3 Student will be able to graph and model piecewise functions with real-world situations.
- 2 Student will be able to identify and match piecewise functions.
- 1 Student will be able to translate between various representations of functions.

**Course Name: Honors Algebra 2**  
**Topic/Unit: Trigonometric Functions**

**Approximate # Of Weeks: 4**

### **Essential Questions:**

- What is the definition of the six basic trig functions in terms of the sides of a right triangle?
- How can the six basic trig functions be used to solve right triangles?
- What is the main difference between a trig function and its inverse?
- How can inverse trig functions be used to calculate unknown angles in a



- right triangle?
- What is the definition of a radian?
  - How can you convert from radians to degrees and vice versa?
  - How can the unit circle help us evaluate trig functions quickly?
  - How can the unit circle be used to help us identify angles for which certain trig functions are not defined?

**Upon completion of this unit students will be able to:**

- Understand and use trigonometric relationships of acute angles in triangles.
- Determine side lengths of right triangles by using trigonometric functions.
- Draw angles in standard position.
- Determine the values of the trigonometric functions for an angle in standard position.
- Convert angle measures between degrees and radians.
- Find the values of the trigonometric functions on the unit circle.

**NJCCCS:**

CC.9-12.F.TF.3, CC.9-12.F.TF.5, CC.9-12.F.TF.2,  
CC.9-12.F.TF.1,CC.9-12.F.TF.4

**Interdisciplinary Standards (njcccs.org)**

- Standard 5.1 – Science Practices
- Standard 6.3 – Active Citizenship in the 21<sup>st</sup> Century
- Standard 8.2 – Technology Education
- Standard 9.1 – 21st - Century Life & Career Skills
- Standard 9.3 – Career Awareness, Exploration, and Preparation

**Activities – include 21<sup>st</sup> Century Technologies:**

- SmartBoard powerpoint presentations
- Lecture and class discussion
- Desmos Activities (online graphing tool)
- Activity- Construction of the Unit Circle
- Project- Unit Circle (aid in the memorization)
- Google Classroom tools (Questions and assessments)
- Khan academy
- Kahoot (online quizzes)
- Quizlet (online quizzes)

**Enrichment Activities:**

- Practice C Worksheets (Holt McDougal)
- Challenge Worksheets (Holt McDougal)
- Problem Solving Worksheets (Holt McDougal)

**Methods of Assessments/Evaluation:**

- Exit Tickets
- Assessment Chart (Scales)
- Quizzes
- Test
- Google Classroom
- Lesson Checks
- Projects
- Verbal Assessment
- Open ended questions
- Classwork
- Homework
- Check it out problems (during lectures)
- Think-pair-share
- Turn and Talk
- Whiteboards
- Observation (Teacher/small/whole group)
- Error Analysis

#### **Resources/Including Online Resources**

- Online Textbook Information: [my.hrw.com](http://my.hrw.com)
- Teacher Webpage
- Algebra 2 Textbook (publisher: Holt McDougal)
- Graphing Calculator
- Khan Academy
- Google Classroom

#### **Learning Goals Scale:**

- 4 Student will be able to construct the unit circle and use it to solve problems.
- 3 Student will be able to solve a problem involving trigonometric ratios.
- 2 Student will be able to convert from radians to degree and vice versa.
- 1 Student will be able to identify the trigonometric ratios.

**Course Name: Honors Algebra 2**  
**Topic/Unit: Trigonometric Graphs**

**Approximate # Of Weeks: 3**

#### **Essential Questions:**

- How does the unit circle and the concept of coterminal angles help us to generate graphs of trig functions where the y-axis represents the value of the function and the x-axis represents the angle?

- What are the domain and range of the trigonometric functions?
- How can you identify the characteristics of a trigonometric functions including the period, amplitude, phase shift, vertical shift and cycle?

**Upon completion of this unit students will be able to:**

- Recognize and graph periodic and trigonometric functions.
- Identify elements of a trigonometric function with its equation and graph.
- Transform trigonometric functions.
- Identify between graphs and equations of trigonometric functions and vice versa.

**NJCCCS:**

CC.9-12.F.IF.7, CC.9-12.F.TF.5, CC.9-12.F.BF.3, CC.9-12.A.CED.2, CC.9-12.A.CED.3

**Interdisciplinary Standards (njcccs.org)**

- Standard 5.1 – Science Practices
- Standard 6.3 – Active Citizenship in the 21<sup>st</sup> Century
- Standard 8.2 – Technology Education
- Standard 9.1 – 21st - Century Life & Career Skills
- Standard 9.3 – Career Awareness, Exploration, and Preparation

**Activities – include 21<sup>st</sup> Century Technologies:**

- SmartBoard powerpoint presentations
- Lecture and class discussion
- Desmos Activities (online graphing tool)
- Google Classroom tools (Questions and assessments)
- Khan academy
- Kahoot (online quizzes)
- Quizlet (online quizzes)

**Enrichment Activities:**

- Practice C Worksheets (Holt McDougal)
- Challenge Worksheets (Holt McDougal)
- Problem Solving Worksheets (Holt McDougal)

**Methods of Assessments/Evaluation:**

- Exit Tickets
- Assessment Chart (Scales)
- Quizzes
- Test
- Google Classroom
- Lesson Checks
- Projects
- Verbal Assessment

- Open ended questions
- Classwork
- Homework
- Check it out problems (during lectures)
- Think-pair-share
- Turn and Talk
- Whiteboards
- Observation (Teacher/small/whole group)
- Error Analysis

### **Resources/Including Online Resources**

- Online Textbook Information: my.hrw.com
- Teacher Webpage
- Algebra 2 Textbook (publisher: Holt McDougal)
- Graphing Calculator
- Khan Academy
- Google Classroom

### **Learning Goals Scale:**

- 4 Student will be able to transform and identify all characteristics of a trigonometric function.
- 3 Student will be able to locate all characteristics of a trigonometric functions including amplitude, period, phase shift and vertical shift.
- 2 Student will be able to graph basic trigonometric functions.
- 1 Student will be able to identify trigonometric functions from graphs.

## **Course Name: Honors Algebra 2**

### **Topic/Unit: Probability**

**Approximate # Of Weeks: 3**

### **Essential Questions:**

- What influences the probability that a given event will occur?
- What is the difference between experimental and theoretical probability?
- What determines whether an event is dependent or independent?
- How can we use modeling to form a prediction?
- What is a simulation? How can it be useful?
- How can diagrams or pictorial representations be used to evaluate?

### **Upon completion of this unit students will be able to:**

- Solve problems involving the Fundamental Counting Principle.
- Solve problems involving permutations and combinations.
- Find the theoretical probability of an event.
- Find the experimental probability of an event.

- Determine whether events are independent or dependent.
- Find the probability of independent and dependent events.
- Construct and interpret two-way frequency tables of data when two categories are associated with each object being classified.
- Find the probability of mutually exclusive events.
- Find the probability of inclusive events.

**NJCCCS:**

CC.9-12.S.CP.9, CC.9-12.S.CP.1, CC.9-12.S.MD.7, CC.9-12.S.CP.3, CC.9-12.S.CP.2, CC.9-12.S.CP.4, CC.9-12.S.CP.6, CC.9-12.S.CP.8, CC.9-12.S.IC.2, CC.9-12.S.ID.5, CC.9-12.S.CP.5, CC.9-12.S.CP.7

**Interdisciplinary Standards (njcccs.org)**

- Standard 5.1 – Science Practices
- Standard 6.3 – Active Citizenship in the 21<sup>st</sup> Century
- Standard 8.2 – Technology Education
- Standard 9.1 – 21st - Century Life & Career Skills
- Standard 9.3 – Career Awareness, Exploration, and Preparation

**Activities – include 21<sup>st</sup> Century Technologies:**

- SmartBoard powerpoint presentations
- Lecture and class discussion
- Desmos Activities (online graphing tool)
- Google Classroom tools (Questions and assessments)
- Khan academy
- Kahoot (online quizzes)
- Quizlet (online quizzes)

**Enrichment Activities:**

- Practice C Worksheets (Holt McDougal)
- Challenge Worksheets (Holt McDougal)
- Problem Solving Worksheets (Holt McDougal)

**Methods of Assessments/Evaluation:**

- Exit Tickets
- Assessment Chart (Scales)
- Quizzes
- Test
- Google Classroom
- Lesson Checks
- Projects
- Verbal Assessment
- Open ended questions
- Classwork
- Homework

- Check it out problems (during lectures)
- Think-pair-share
- Turn and Talk
- Whiteboards
- Observation (Teacher/small/whole group)
- Error Analysis

### **Resources/Including Online Resources**

- Online Textbook Information: my.hrw.com
- Teacher Webpage
- Algebra 2 Textbook (publisher: Holt McDougal)
- Graphing Calculator
- Khan Academy
- Google Classroom

### **Learning Goals Scale:**

- 4** Student will be able to solve real world probability problems.
- 3** Student will be able to find probability of various events.
- 2** Student will be able to organize and arrange data in a way to understand what the given situation is.
- 1** Student will be able to determine between independent and dependent events.

## **Course Name: Honors Algebra 2** **Topic/Unit: Data Analysis and Statistics**

**Approximate # Of Weeks: 3**

### **Essential Questions:**

- Why is data collected and analyzed?
- How do people use data to influence others?
- How can predictions be made based on data?
- What is a normal curve?
- Why is an understanding of the normal curve essential to statistics?
- In what situations can the normal curve be applied to data?

### **Upon completion of this unit students will be able to:**

- Find the measures of central tendency and measures of variation for statistical data.
- Examine the effects of outliers on statistical data.
- Explain how random samples can be used to make inferences about a population.
- Use probability to analyze decisions and strategies.
- Use tables to estimate areas under normal curves.

- Recognize data sets that are not normal.
- Explain that probability can be used to help determine if good decisions are made.
- Use probability to analyze decisions and strategies.

**NJCCCS:**

CC.9-12.S.ID.2, CC.9-12.S.ID.1, CC.9-12.S.MD.5, CC.9-12.S.ID.3, CC.9-12.S.IC.1, CC.9-12.S.MD.6, CC.9-12.S.MD.7, CC.9-12.S.ID.4

**Interdisciplinary Standards (njcccs.org)**

- Standard 5.1 – Science Practices
- Standard 6.3 – Active Citizenship in the 21<sup>st</sup> Century
- Standard 8.2 – Technology Education
- Standard 9.1 – 21st - Century Life & Career Skills
- Standard 9.3 – Career Awareness, Exploration, and Preparation

**Activities – include 21<sup>st</sup> Century Technologies:**

- SmartBoard powerpoint presentations
- Lecture and class discussion
- Desmos Activities (online graphing tool)
- Google Classroom tools (Questions and assessments)
- Khan academy
- Kahoot (online quizzes)
- Quizlet (online quizzes)

**Enrichment Activities:**

- Practice C Worksheets (Holt McDougal)
- Challenge Worksheets (Holt McDougal)
- Problem Solving Worksheets (Holt McDougal)

**Methods of Assessments/Evaluation:**

- Exit Tickets
- Assessment Chart (Scales)
- Quizzes
- Test
- Google Classroom
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- Check it out problems (during lectures)
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- Whiteboards
- Observation (Teacher/small/whole group)
- Error Analysis

### **Resources/Including Online Resources**

- Online Textbook Information: [my.hrw.com](http://my.hrw.com)
- Teacher Webpage
- Algebra 2 Textbook (publisher: Holt McDougal)
- Graphing Calculator
- Khan Academy
- Google Classroom

### **Learning Goals Scale:**

- 4** Student will be able to analyze a real world situation and determine if it is a good decision.
- 3** Student will be able to use the normal distribution curve to estimate areas under the curve.
- 2** Student will be able to find the measures of central tendency and measures of variation for statistical data.
- 1** Student will be able to identify the normal distribution curve.