**COURSE DESCRIPTION**

**Course Title:** Algebra IB

**Course Number:** 00226

**Course Prerequisites:** Completion of Algebra IA with at least 60%

**Course Description:** Algebra IB is the second of the two-year Algebra course sequence. The recommended high school math sequence to graduate would be successful competition of Algebra IA, Algebra IB, and Geometry. Algebra IB continues using practical problems to apply theory and connect algebra to the real world. This course includes the study of numbers and operations, polynomials, quadratics, statistics, linear equations, and systems of linear equations and inequalities. The Keystone Algebra Exam is required of all students who take an Algebra 1 course for graduation. Earning Proficient or Advanced on the Keystone Algebra Exam at the conclusion of Algebra IB is a possible pathway element for students to meet graduation requirements. If this state mandated test is not passed students will retake the exam. (Please Note: Changes in legislation will alter this graduation requirement pathway.) District marking period assessments are required.

**Suggested Grade Level**: Grades 10-12

**Length of Course:** Two Semesters

**Units of Credit:** 1

**PDE Certification and Staffing Policies and Guidelines (CSPG) Required Teacher Certifications:**

CSPG #50 Mathematics (7-12)

To find the CSPG information, go to [CSPG](https://www.education.pa.gov/Educators/Certification/Staffing%20Guidelines/Pages/default.aspx)

**Certification verified by the WCSD Human Resources Department:** [x] Yes [ ] No

**WCSD STUDENT DATA SYSTEM INFORMATION**

**Course Level:** Academic

**Mark Types:** Check all that apply.

[x] F – Final Average [x] MP – Marking Period [x] EXM – Final Exam

**GPA Type**: [ ]  GPAEL-GPA Elementary [ ]  GPAML-GPA for Middle Level [x]  NHS-National Honor Society

[x]  UGPA-Non-Weighted Grade Point Average [x]  GPA-Weighted Grade Point Average

**State Course Code**: 02054

To find the State Course Code, go to [State Course Code](https://nces.ed.gov/forum/sced.asp), download the Excel file for *SCED*, click on SCED 6.0 tab, and choose the correct code that corresponds with the course.

**TEXTBOOKS AND SUPPLEMENTAL MATERIALS**

**Board Approved Textbooks, Software, and Materials:**

**Title:**  *enVision Algebra 1*

**Publisher:** SAVVAS Learning Company LLC.

**ISBN #:**  978-0-328-93154-5

**Copyright Date:** 2018

**WCSD Board Approval Date:** 6/29/2020

**Supplemental Materials:** Kuta Software, Get More Math, SAS pdesas.org, Brainfuse, IXL,
 Calculator: TI-30XIIS, Online Calculator: Desmos

**Curriculum Document**

**WCSD Board Approval:**

**Date Finalized:** 5/23/2022

**Date Approved:**  6/13/2022

**Date(s) Revised:**  6/12/2023

**Implementation Year:** 2022-2023

**SPECIAL EDUCATION, 504, and GIFTED REQUIREMENTS**

The teacher shall make appropriate modifications to instruction and assessment based on a student’s Individual Education Plan (IEP), Chapter 15 Section 504 Plan (504), and/or Gifted Individual Education Plan (GIEP).

**SCOPE AND SEQUENCE OF CONTENT, AND CONCEPTS
Marking Period 1: Radicals: Expressions and Equations, Exponents and Exponential Functions**

* Order of Operations with Real Numbers
* Review: Simplification of Radicals
* Operations with Radical Expressions
* Review: Basic Square Root and Cube Root Equations
* Quadratic Equations: Square Root Property
* Rules of Exponents: Monomials
* **Marking Period 1 Review and Assessment**

**Marking Period 2: Polynomials and Factoring, and Quadratic Equations**

* Polynomials: Classification, Standard Form (Review)
* Polynomials: Addition, Subtraction, Multiplication (Review)
* Polynomial Factoring:
	+ Greatest Common Factor ( GCF)
	+ ax2 + bx + c, where a = 1
	+ ax2 + bx + c, leading coefficient always GCF
	+ ax2 + bx + c, where a ≠ 0 (Introduced, not mastered)
	+ Grouping
	+ Special Cases: Difference of Squares, Perfect Square Trinomials
* Simplification of Rational Expressions
* Polynomial Problem Solving
* Quadratic Equations: Graphs and Tables
* Quadratic Equations: Factoring
* **Marking Period 2 Review and Assessment**

**Marking Period 3: Data Analysis, Linear Equations, and Systems of Linear Equations: Graphing**

* Data Displays: Presentations, Analysis, Comparison
* Review: Linear Equations and Graphs:
	+ Slope-Intercept Form
	+ Point-Slope Form
	+ Standard Form
* Systems of Linear Equations: Graphs
* **Marking Period 3 Review and Assessment**

**Marking Period 4: Systems of Linear Equations, Linear Inequalities and Systems of Linear Inequalities,
 Algebra Keystones Preparation and Exam, Polynomial Factoring, and Linear and
 Quadratic Equations**

* Systems of Linear Equations: Substitution, Elimination
* Systems of Linear Equations: Problem Solving
* Linear Inequalities in Two Variables
* Systems of Linear Inequalities
* **Algebra Keystone Preparation and Exam**
* Additional Polynomial Factoring
* Additional Linear and Quadratic Equations
* **Marking Period 4 Review and Assessment**

**Standards/Eligible Content and Skills**

| **Performance Indicator** | **PA Core Standard and/or Eligible Content** | **Marking Period Taught**  |
| --- | --- | --- |
| Review: Simplify expressions by using the order of operations | M07.B-E.1.1.1 | MP1 |
| Review: Evaluate square roots of perfect squares and cube roots of perfect cubes without a calculator. | M08.B-E.1.1.2 | MP1 |
| Use the Product Property of Square Roots to simplify radical expressions (Numbers only, no variable expressions) | A1.1.1.3.1 | MP1 |
| Simplify products and quotients of radical expressions (No rationalizing necessary) | A1.1.1.3.1 | MP1 |
| Review: Solving multi-step equations | A1.1.2.1.1 | MP1 |
| Review: Write multi-step equations to model and solve real-world and mathematical problems | A1.1.2.1.1 | MP1 |
| Review: Use square root and cube root symbols to represent solutions to equations of the form x2 = p and x3 = p, where p is a positive rational number. | M08.B-E.1.1.2 | MP1 |
| Solve quadratic equations using the Square Root Property (ax2 + b = c) | A1.1.1.3.1 | MP1 |
| Write square and cube equations to model and solve real-world and mathematical problems | A1.1.1.3.1CC.2.1.HS.F.1CC.2.1.HS.F.2 | MP1 |
| Simplify monomials expressions: Zero and Negative exponents | A1.1.1.1A1.1.1.3.1CC.2.1.HS.F.1 | MP1 |
| Simplify monomial expressions: Multiply powers with the same base | A1.1.1.1A1.1.1.3.1CC.2.1.HS.F.1 | MP1 |
| Simplify monomial expressions: Raise a product to a power | A1.1.1.1A1.1.1.3.1CC.2.1.HS.F.1 | MP1 |
| Simplify monomial expressions: Raise a power to a power | A1.1.1.1A1.1.1.3.1CC.2.1.HS.F.1 | MP1 |
| Simplify monomial expressions: Divide powers with the same base | A1.1.1.1A1.1.1.3.1CC.2.1.HS.F.1 | MP1 |
| Simplify monomial expressions: Raise a quotient to a power | A1.1.1.1A1.1.1.3.1CC.2.1.HS.F.1 | MP1 |
| Use exponents to solve real-world and mathematical problems (Exponents should be integers from -10 to 10) | A1.1.1.3.1CC.2.1.HS.F.1 | MP1 |
| **Marking Period 1 Review and Assessment**  |  | **MP1** |
| * Review and demonstrate knowledge of Radicals: Expressions and Equations
 |  | MP1 |
| * Review and demonstrate knowledge of Exponents and Exponential Functions
 |  | MP1 |
| Review: Classify polynomials by their degree and number of terms | CC.2.2.HS.D.1 | MP2 |
| Review: Write polynomials in standard form | CC.2.2.HS.D.1 | MP2 |
| Review: Add and subtract polynomials | A1.1.1.5.1CC.2.2.HS.D.3 | MP2 |
| Review: Multiply polynomials (No larger than first degree FOIL of binomials ) | A1.1.1.5.1CC.2.2.HS.D.3 | MP2 |
| Multiply polynomials (No larger than the product of a binomial and trinomial) | A1.1.1.5.1CC.2.2.HS.D.3 | MP2 |
| Determine the square of a binomial | A1.1.1.5.1CC.2.2.HS.D.3 | MP2 |
| Find the product of a sum and difference | A1.1.1.5.1CC.2.2.HS.D.3 | MP2 |
| Factor polynomials using the Greatest Common Factor (GCF) | A1.1.1.2.1A1.1.1.5.2 | MP2 |
| Factor trinomials in the form: ax2 + bx + c, where a = 1  | A1.1.1.2.1A1.1.1.5.2 | MP2 |
| Factor trinomials in the form: ax2 + bx + c, leading coefficient is always the GCF | A1.1.1.2.1A1.1.1.5.2 | MP2 |
| Factor trinomials in the form: ax2 + bx + c, where a ≠ 0 (Introduced, not mastered)  | A1.1.1.2.1A1.1.1.5.2 | MP2 |
| Factor polynomials by grouping | A1.1.1.2.1A1.1.1.5.2 | MP2 |
| Factor special-case polynomials: Difference of Squares, Perfect Square Trinomials | A1.1.1.2.1A1.1.1.5.2 | MP2 |
| Factor polynomials completely | A1.1.1.2.1A1.1.1.5.2 | MP2 |
| Simplify rational expressions (Factorable polynomial divided by a factorable polynomial) | A1.1.1.5.3CC.2.2.HS.D.6 | MP2 |
| Use polynomials and their operations to model and solve real-world and mathematical problems | A1.1.1.4.1A1.1.1.2.1A1.1.1.5.1A1.1.1.5.2 | MP2 |
| Identify solutions of quadratic equations when provided a graph | CC.2.2.HS.D.9CC.2.2.HS.D.10 | MP2 |
| Identify solutions of quadratic equations when provided a table | CC.2.2.HS.D.9CC.2.2.HS.D.10 | MP2 |
| Solve quadratic equations by factoring using the Zero-Product Property (Introduced, not mastered) | A1.1.1.5.2A2.1.3.1.1 | MP2 |
| **Marking Period 2 Review and Assessment**  |  | **MP2** |
| * Review and demonstrate knowledge of Polynomials
 |  | MP2 |
| * Review and demonstrate knowledge of Quadratic Equations
 |  | MP2 |
| Find and make conclusions about the measures of central tendency; calculate and/or interpret the measures of dispersion to describe a set of data (range, quartiles, and interquartile range of data) | A1.2.3.2.1A1.2.3.2.2CC.2.4.HS.B.1 | MP3 |
| Use various data displays in problem solving settings: Circle, Line, Bar Graph, Stem-and-Leaf Plots, Scatter Plots, Dot Plots, Histograms, Box-and-Whisker Plots, or other representations | A1.2.3.1.1A1.2.3.2.1A1.2.3.2.2CC.2.4.HS.B.1 | MP3 |
| Estimate, calculate, analyze, make predictions, and/or answer questions based on displayed data: Circle, Line, Bar Graph, Stem-and-Leaf Plots, Scatter Plots, Dot Plots, Histograms, Box-and-Whisker Plots, or other representations | A1.2.3.1.1A1.2.3.2.1A1.2.3.2.2A1.2.3.2.3CC.2.4.HS.B.1 | MP3 |
| Compare data sets that are displayed with the same representation: Circle, Line, Bar Graph, Stem-and-Leaf Plots, Scatter Plots, Dot Plots, Histograms, Box-and-Whisker Plots, or other representations | A1.2.3.1.1A1.2.3.2.2CC.2.4.HS.B.1CC.2.4.HS.B.3 | MP3 |
| Write equations: Slope-Intercept Form, Point-Slope Form, Standard form | A1.1.2.1.1A1.2.1.2.1A1.2.1.2.2A1.2.2.1.3 | MP3 |
| Transform equations from one indicated form into another: Slope-Intercept Form, Point-Slope Form, Standard Form | A1.2.1.2.2CC.2.2.HS.D.2CC.2.2.HS.C.2 | MP3 |
| Graph linear equations: Slope-Intercept Form, Point-Slope Form, Standard Form | A1.1.2.1A1.2.1.1A1.2.1.2.1CC.2.2.HS.D.8CC.2.2.HS.D.10 | MP3 |
| Verify solutions to systems of linear equations | A1.1.2.2.2CC.2.2.HS.D.10 | MP3 |
| Solve systems of linear equations by graphing | A1.1.2.2.1A1.1.2.2.2 | MP3 |
| **Marking Period 3 Review and Assessment**  |  | **MP3** |
| * Review and demonstrate knowledge of Data Analysis
 |  | MP3 |
| * Review and demonstrate knowledge of Linear Equations
 |  | MP3 |
| * Review and demonstrate knowledge of Systems of Linear Equations: Graphs
 |  | MP3 |
| Solve systems of linear equations by substitution | A1.1.2.2.1A1.1.2.2.2 CC.2.2.HS.D.10 | MP4 |
| Solve systems of linear equations by elimination | A1.1.2.2.1A1.1.2.2.2CC.2.2.HS.D.10 | MP4 |
| Identify linear systems with infinitely more or no solutions using any method: Graphing, Substitution, Elimination | A1.1.2.2.1A1.1.2.2.2CC.2.2.HS.D.10 | MP4 |
| Write systems of linear equations to model and solve real-world and mathematical problems | A1.1.2.2.1A1.1.2.2.2CC.2.2.HS.D.10 | MP4 |
| Graph a linear inequality in two variables | A1.1.3.2.1A1.2.2.1.1CC.2.2.HS.D.10 | MP4 |
| Write a two-variable inequality to model a graph | A1.1.3.2.1A1.2.2.1.1CC.2.2.HS.D.10 | MP4 |
| Graph a system of linear inequalities in two variables | A1.1.3.2.1A1.2.2.1.1CC.2.2.HS.D.7CC.2.2.HS.D.10 | MP4 |
| Write a system of linear inequalities in two variables to model a graph | A1.1.3.2.1A1.2.2.1.1CC.2.2.HS.D.7CC.2.2.HS.D.10 | MP4 |
| **Algebra Keystone Preparation and Exam** |  | **MP4** |
| * Review and demonstrate knowledge of Operations with Real Numbers and Expressions
 | A1.1.1 | MP4 |
| * Review and demonstrate knowledge of Equations and Inequalities
 | A1.1.2A1.1.3 | MP4 |
| * Review and demonstrate knowledge of Functions
 | A1.2.1 | MP4 |
| * Review and demonstrate knowledge of Coordinate Geometry
 | A1.2.2 | MP4 |
| * Review and demonstrate knowledge of Data Analysis
 | A1.2.3 | MP4 |
| * Review and demonstrate knowledge of Probability
 | A1.2.3 | MP4 |
| Review and Enrichment: Polynomial Factoring:  Greatest Common Factor (GCF)  ax2 + bx + c, where a = 1  ax2 + bx + c, leading coefficient always the GCF  ax2 + bx + c, where a ≠ 0  Grouping  Special Cases: Difference of Squares, Perfect Square Trinomials Completely | A1.1.1.2.1A1.1.1.5.2 | MP4 |
| Review and Enrichment: Solving Equations:  Multi-step equations Square root and cube root equations of the forms: x2 = p and x3 = p (where p is a positive rational number Quadratic equations using the Square Root Property  ax2 + b = c Quadratic equations by factoring using the Zero-Product  Property (Introduced, not mastered) | A1.1.2.1.1M08.B-E.1.1.2A1.1.1.3.1A1.1.1.5.2A2.1.3.1.1 | MP4 |
| **Marking Period 4 Review and Assessment** |  | **MP4** |
| * Review and demonstrate knowledge of Systems of Linear Equations
 |  | MP4 |
| * Review and demonstrate knowledge of Linear Inequalities and Systems of Linear Inequalities
 |  | MP4 |
| * Review and demonstrate knowledge of Polynomial Factoring
 |  | MP4 |
| * Review and demonstrate knowledge Linear and Quadratic Equations
 |  | MP4 |

**ASSESSMENTS**

**PDE Academic Standards, Assessment Anchors, and Eligible Content:** The teacher must be knowledgeable of the PDE Academic Standards, Assessment Anchors, and Eligible Content and incorporate them regularly into planned instruction.

**Formative Assessments:** The teacher will utilize a variety of assessment methods to conduct in-process evaluations of student learning.

**Effective formative assessments for this course include:
Suggested but not limited to:**

* Pre-assessments of prior knowledge (e.g., Entrance cards or KWL chart)
* Bellringers/Problems of the Day (PODs)
* Discussions
* Exit ticket
* Teacher observations/Questioning
* Graphic organizers (e.g., Venn Diagrams, word mapping, webbing, KWL chart, etc.)
* Outlining
* Cooperative learning
* Written work
* Quizzes
* Oral response
* Self-evaluation
* Homework
* Summarizing
* Note-taking

**Summative Assessments:** The teacher will utilize a variety of assessment methods to evaluate student learning at the end of an instructional task, lesson, and/or unit.

**Effective summative assessments for this course include:
Suggested but not limited to:**

* Performance assessment
* Chapter/unit tests
* Quizzes
* Marking period assessments
* Projects
* Student presentations