

Spectrum Program

Session 1

Course Title: Algebra I

Course Description

Algebra I Honors is an instructor-led honors-level high school mathematics course covering equations and functions, properties of real numbers, solving and graphing linear equations and functions, solving and graphing linear inequalities, exponents and exponential functions, polynomials and factoring, quadratic equations and functions, radicals and geometry connections, and rational equations and functions. Students completing this course are prepared for Algebra II.

Essential Questions

- How is algebra used in everyday life?
- How are mathematical relationships useful in making predictions? Can students use correct strategies to solve problems?
- Can students read and interpret a quadrant graph?
- Can students see the patterns and relationship among data sets?
- Can the students use the graphing calculator effectively?
- Can the student see patterns and make the necessary connections among the various topics?
- Does the student know when to apply the correct concept to solve a particular problem?

Outcomes

Upon successful completion of this course, students will:

- Develop an understanding of the concepts of algebraic expressions, equations and functions
- Apply the concepts of algebraic expressions, equations, and functions
- Demonstrate a thorough understanding of the properties of real numbers
- Solve and analyze linear equations, graph linear equations and functions, and write linear equations of different forms
- Demonstrate proficiency with solving and graphing linear inequalities
- Solve systems of equations and inequalities
- Understand and apply the concepts of exponents and exponential functions
- Compute, solve, and factor polynomials
- Analyze and create graphs and solve quadratic equations and functions
- Graph square root functions, simplify radical expressions and solve radical equations
- Apply their knowledge of radical equations to geometric situations
- Model inverse variation, graph rational functions and divide polynomials
- Know how to simplify and compute rational expressions
- Solve rational equations
- Demonstrate the ability to apply concepts to problem solving situations
- Utilize the graphing calculator properly
- Synthesize complex concepts in an effort to apply mathematics to real-life situations; create new ideas by using previously learned concepts; analyze and interpret results in order to build upon their prior knowledge

Instructional Strategies

Throughout the course, students will work to gain a mastery of the material in a variety of ways. They will be presented with material through lectures, examples, and activities. In addition, students will be given daily assignments, which will be completed both in and out of class. The students will experience both individual and group assignments. Instruction will be differentiated through tiered assignments and flexible grouping. In-class assignments will focus on a key concept and be adjusted to the students' ability levels in order to ensure that students are working with appropriately challenging tasks. At times, students will be placed in groups based on readiness for the material. Other times, they will be placed based on learning style. This strategy allows students to work with a wide variety of peers.

Resources and Materials

Textbooks

- Larson, Ron, Laurie Boswell, Timothy D. Kanold, and Lee Stiff. Algebra 1. Evanston: McDougal Littell, 2011. ISBN #: 9780547315157
- Larson, Ron, Laurie Boswell, Timothy D. Kanold, and Lee Stiff. Algebra 1 Practice Workbook. Evanston: McDougal Littell, 2011. ISBN #: 9780618736942

Web sites

- Online version of the textbook: <http://www.classzone.com>

Materials

- 2 spiral bound graph paper notebooks
- A folder for graded assignments
- Pencils
- A graphing calculator preferably from the following list of Texas Instrument Calculators: TI 83+, TI 83+ Silver Edition, TI 84+, or TI 84+ Silver Edition

Student Assessment

• Pre-Assessment

A pre-test will be administered on the first day of class that will help determine what each student has already mastered and which concepts they lack proficiency. This will be a comprehensive Algebra I final exam covering chapters 1-12 of the textbook.

• CTD Grading Scale

A+	100-97%	A	96-93%	A-	92-90%
B+	89-87%	B	86-83%	B-	82-80%
C+	79-77%	C	76-73%	C-	72-70%
D+	69-67%	D	66-63%	D-	62-60%
F	below 60%				

• Breakdown of Final Grade

The student's grades will consist of homework, class participation, and test scores. The final grade will be the total points earned divided by the total possible points. Test scores are generally 75% of the grade, homework is approximately 20% and class participation is 5%.

• Post-Assessment

A post-test will be administered to show the growth that each student has made during the course. This will be a comprehensive Algebra I final exam covering chapters 1-12 of the textbook.

Schedule

Date	Topic(s)	In-class Activities	Assignments/Assessments
Monday 6/27/11	Pre-test Chapter 1 <i>Expressions, Equations, and Functions</i>	<ul style="list-style-type: none"> Evaluate and write algebraic expressions Write equations and inequalities Represent functions as rules, tables and graphs Utilizing a problem solving plan 	Course Pre-Test Chapter 1 Assignment
Tuesday 6/28/11	Chapter 2 <i>Properties of Real Numbers</i>	<ul style="list-style-type: none"> Using integers and rational numbers Compute with rational numbers Apply the distributive property Square roots and comparison of real numbers 	Test Chapter 1 Chapter 2 Assignment
Wednesday 6/29/11	Chapter 3 <i>Solve Linear Equations</i>	<ul style="list-style-type: none"> -Solve single and multi-step equations -Solve equations with variables on both sides -Write ratios and proportions -Solve proportions and percent problems Rewrite equations and formulas 	Test Chapter 2 Chapter 3 Assignment
Thursday 6/30/11	Chapter 4 <i>Graphing Linear Equations and Functions</i>	<ul style="list-style-type: none"> Plot points in the coordinate plan Graph linear equations (manually and on the graphing calculator) Find slope and rate of change Graph linear equations using intercepts and slope-intercept form Model direct variation Graph linear functions 	Chapter 3 Test Chapter 4 Assignment
Friday 7/1/11	Chapter 5 <i>Writing Linear Equations</i>	<ul style="list-style-type: none"> Write linear equations in slope-intercept form, point-slope form and standard form Use linear equations in slope-intercept form Write equations of parallel and perpendicular lines 	Test Chapter 4 Chapter 5 Assignment
Monday 7/4/11	Chapter 6 <i>Solving and Graphing Linear Equations</i>	<ul style="list-style-type: none"> Solve inequalities Solve compound inequalities Solve absolute value equations and inequalities Graph linear equations in two variables (manually and with graphing calculator) 	Test Chapter 5 Chapter 6 Assignment

Date	Topic(s)	In-class Activities	Assignments/Assessments
Tuesday 7/5/11	Chapter 7 <i>Systems of Equations and Inequalities</i>	<ul style="list-style-type: none"> • Solve linear systems by graphing, by substitution, and by linear combinations • Solve special types of linear systems • Solve systems of linear inequalities (manually and on the graphing calculator) 	Test Chapter 6 Chapter 7 Assignment
Wednesday 7/6/11	Chapter 8 <i>Exponents and Exponential Functions</i>	<ul style="list-style-type: none"> • Apply exponential properties • Define and apply zero and negative exponents • Apply scientific notation • Write and graph exponential decay functions 	Test Chapter 7 Chapter 8 Assignment
Thursday 7/7/11	Chapter 9 <i>Polynomials and Factoring</i>	<ul style="list-style-type: none"> • Add, subtract, and multiply polynomials • Special products of polynomials • Solve polynomial equations in factored form • Factor polynomials • Factor special products 	Test Chapter 8 Chapter 9 Assignment
Friday 7/8/11	Chapter 10 <i>Quadratic Equations and Functions</i>	<ul style="list-style-type: none"> • Graph quadratic equations and functions (manually and with a graphing calculator) • Solve quadratic equations by graphing, using square roots, completing the square and using the quadratic formula • Interpret the discriminant • Compare linear, exponential, and quadratic models 	Test Chapter 9 Chapter 10 Assignment
Monday 7/11/11	Chapter 11 <i>Radicals and Geometry Connections</i>	<ul style="list-style-type: none"> • Graph square root functions manually and with the graphing calculator • -Simplify radical expressions • -Solve radical equations • -Apply the Pythagorean Theorem and its converse • -Apply the distance and midpoint formulas 	Test Chapter 10 Chapter 11 Assignment
Tuesday 7/12/11	Chapter 12 <i>Rational Equations and Functions</i>	<ul style="list-style-type: none"> • Model inverse variation • Graph rational functions manually and with a graphing calculator • Divide polynomials • Simplify rational expressions • Multiply and divide rational expressions • Solve rational equations 	Test Chapter 11 Chapter 12 Assignment

Date	Topic(s)	In-class Activities	Assignments/Assessments
Wednesday 7/13/11	Complete Chapter 12	<ul style="list-style-type: none"> • Review for final exam 	Test Chapter 12 Course Review Assignment
Thursday 7/14/11	Course Review	<ul style="list-style-type: none"> • Review for Final exam 	Final Exam
Friday 7/15/11	End of Course	<ul style="list-style-type: none"> • Complete Final Exam 	

CTD Statement on Third-Party Web Sites

Instructors are required to thoroughly review any third-party web sites they intend to use in their courses for inappropriate content. However, because web content continuously changes, CTD disclaims any responsibility for any of the content contained on third-party web sites used in course materials. If you become aware of anything that may be inappropriate, please notify CTD staff immediately.

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