Spectrum Program
Session 1
Course Title: IP Algebra I Honors

Course Description
Individually paced Algebra I Honors is a self-paced, 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. Individually paced math courses are not intended to remediate deficiencies. This course is three weeks long, with five hours of in-class work for five days a week (75 hours total class time). Daily outside homework is required. Note: A graphing calculator is required.

Essential Questions
The following questions are meant to engage the students throughout the three weeks and serve as underlying themes for the course.
- What potential relationships exist between two variables? How do you analyze these relationships using algebraic symbols and solve for unknown variables?
- In order to mathematically model a real world situation, what questions must be generated and answered? What are the steps in the problem solving process?

Outcomes
Upon successful completion of this course, students will:
- Know how to
    a. write, solve, and graph both linear equations and inequalities
    b. solve systems of equations and inequalities
    c. factor polynomials
    d. write, solve and graph quadratic equations
    e. write, solve and graph rational equations
- Understand the relationships among expressions, equations and functions
- Make connections to geometry
- Apply the properties of real numbers, exponents, and radicals
- Use mathematical models to represent relationships

Instructional Strategies
A variety of instructional strategies and techniques will be used throughout the three weeks to actively engage students and aid in their learning. The most prevalent method in the course is independent study. Students will be expected to work through the assigned material at their own pace, asking questions as needed. Although mini-lectures may be provided to students as needed, a majority of the learning will take place individually. Group work is also encouraged throughout this course; there will be many times when several students will be working on the same material, and it may be beneficial to work through some of the problems together to gain a more thorough understanding. Acceleration and compacting will also be used in this course. Due to the short time frame, students will be working through the course at a much faster pace than normally expected in a year-long course. Hence students will only be expected to work through as many problems as needed for their own understanding rather than completing repetitive assignments.

Resources and Materials

- **Textbook**
  - Larson, Boswell, Kanold and Stiff, *Algebra 1* (McDougal Littell), 2007. ISBN: 978-0-618-59402-3.
- **Materials**
  - Students are required to have a graphing calculator, however no specific manufacturer and model is favored.
  - Students are required to have a notebook or binder in which to take notes and work through homework and practice problems. The only way to learn math successfully is to actively do math.
- **Web sites**
  - Wolfram Alpha (www.wolframalpha.com) Wolfram is a computational engine (in contrast to an internet search engine). Type in an equation and the site will compute a variety of facts and information. It should be used only as a supplement to practice and the textbook.
  - Khan Academy (www.khanacademy.org) This website has a wide range of short videos, many on math topics. The videos, by themselves, are often not enough to thoroughly learn a concept but can help make difficult concepts easier.

Student Assessment

- **Pre-Assessment:** Students will be pre-assessed on the first day of class using Released Questions from the California Standards Test for Algebra I. The pre-assessment will not affect the grade of the student

- **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**

  Chapter Quizzes (6 each semester): Quizzes are worth 20% of the final semester grade
  Unit tests (2/3 each semester): Tests are worth 60% of the final semester grade
  Final Exam (*cumulative*): 20% of the final semester grade

- **Post-Assessment:** The Released Questions from the California Standards Test for Algebra I will be used to post-assess the students on the last day of class. The post-assessment will serve as a portion of the final exam for the students.

Schedule

Mathematics is an area that one cannot merely participate in from the sidelines. One must actively work through a variety of problems in order to fully understand the material. The number of problems that one must work varies for understanding from student to student, and the instructor and TA will work closely with the student to ensure full mastery is obtained before moving onto the next material.

The course content will be split into 5 units. Each unit consists of several chapter quizzes together with a unit test. Students will usually take a pretest for each chapter to determine prior knowledge. The student will begin studying the material from the book and working suggested problems until he/she is ready for the chapter quiz.

<u>Chapter Quizzes:</u>

- Each quiz will be pass/fail and students will have 3 chances to pass the quiz (there will be three versions of the quiz). There will be a time limit of either 30 or 45 minutes depending upon the material on the

quiz, and each quiz will list its time limit.

- To take the quiz for the first time, the student must have evidence of studying the chapter and he/she must obtain permission from the instructor to take the quiz. If he/she passes on the first attempt with a High Pass, he/she will receive 100% for the quiz; if he/she passes on the first attempt with a Low Pass, he/she will receive 90%; otherwise the student will be expected to study more.
- To take the quiz a second time, the student will need to submit solutions to the suggested problems for the instructor/TA to verify. The student will then receive permission upon satisfactory completion of the problems. Passing the quiz on the second try will result in either an 80% or 70% for the quiz score; if a student fails the quiz a second time, he/she will be expected to study more.
- To take the quiz a third time, the student will complete a second set of problems assigned by the instructor based off of the misunderstandings from the first and second attempts at the quiz. The solutions will be graded by the instructor/TA and permission will then be granted with satisfactory work. Passing the quiz on the third try will result in either a 60% or 50% for the quiz. Failure to pass the quiz on the third attempt will result in a 0% and the instructor will work closely with the student to ensure they are prepared to move onto the next chapter.
- Once completing the chapter quiz, the student will take the pre-test for the next chapter and then repeat the cycle, until he/she is ready for the unit test.

Unit Tests:

- Each unit test will consist of 2-3 chapters depending upon the content. Each test will range from 90-120 minutes and the time limit will be listed on the test.
- Students will be expected to have completed all the chapter quizzes, recommended problems, and additional review problems before taking the unit test.
- There will be only one opportunity to take each unit test, and the selected problems will require a higher level understanding of the material. This will include more word problems and advanced applications.

The goal is to challenge every student and provide a rigorous yet comfortable environment.

This is a *suggested* schedule for pacing. Please note that some sections may require less time than suggested, and some may require more time; this will vary by student.

Date(s)	Topic(s)	In-class Activities	Graded Assignments and/or Assessment
Monday, June 27, 2011	**Connections to Algebra** • Variables • Exponents and Powers • Order of Operations • Equations and Inequalities • Problem Solving Using Models • Introduction to Functions	Pre-test Self-study Skills Read and Work on Chapter 1	
Tuesday, June 28, 2011	**Properties of Real Numbers** • Real Number Line • Addition and Subtraction of Real Numbers • Multiplication and Division of Real Numbers • The Distributive Property	Read and Work on Chapter 2	Chapter 1 Quiz
Wednesday, June 29, 2011	**Solving Linear Equations** • Solving Equations • Solving Multi-step Equations • Solving Equations with Variables on Both Sides • Linear Equations and Problem Solving • Formulas and Functions	Read and Work on Chapter 3	Chapter 2 Quiz

Thursday, June 30, 2011	**Graphing Linear Equations and Functions** • Coordinates and Scatterplots • Graphing Linear Equations • Slope of a Line • Direct Variation • Solving Linear Equations Using Graphs • Functions and Relations	Read and Work on Chapter 4	Chapter 3 Quiz
Friday, July 1, 2011	**Writing Linear Equations** • Slope-Intercept Form • Point-Slope Form • Standard Form • Writing Equations Given Two Points • Fitting a Line to Data • Predicting with Linear Models	Read and Work on Chapter 5	**Unit 1 Test** Chapter 4 Quiz
Monday, July 4, 2011	**Solving and Graphing Linear Inequalities** • Solving One-Step Linear Inequalities • Solving Multi-Step Linear Inequalities • Solving Compound Inequalities • Solving Absolute-Valoue Equations and Inequalities • Graphing Linear Inequalities in Two Variables	Read and Work on Chapter 6	Chapter 5 Quiz
Tuesday, July 5, 2011	**Systems of Linear Equations and Inequalities** • Solving Linear Systems by Graphing • Solving Linear Systems by Substitution • Solving Linear Systems by Elimination • Applications of Linear Systems • Special Types of Linear Systems • Solving Systems of Linear Inequalities	Read and Work on Chapter 7	Chapter 6 Quiz **Unit 2 Test**
Wednesday, July 6, 2011	**Exponents and Exponential Functions** • Properties of Exponents • Zero and Negative Exponents • Scientific Notation • Exponential Growth Functions • Exponential Decay Functions	Read and Work on Chapter 8	Chapter 7 Quiz
Thursday, July 7, 2011	**Polynomials and Factoring** • Adding, Subtracting, and Multiplying Polynomials • Special Products of Polynomials • Solving Polynomial Equations in Factored Form • Factoring Trinomials with Leading Coefficient 1 • Factoring Trinomials with Leading Coefficient $\neq 1$ • Factoring Special Products • Factoring by Grouping (Distributive Property)	Read and Start Working on Chapter 9	Chapter 8 Quiz **Unit 3 Test**
Friday, July 8, 2011		Finish Working on Chapter 9	Chapter 9 Quiz
Monday, July 11, 2011	**Quadratic Equations and Functions** • Solving Quadratic Equations with Square Roots • Simplifying Radicals • Graphing Quadratic Functions • Solving Quadratic Equations by Graphing • Completing the Square • Solving Quadratic Equations with Quadratic Formula • Applications of the Discriminant • Comparing Linear, Exponential, and Quadratic Models	Read and Work on Chapter 10	
Tuesday, July 12, 2011	**Radicals and Connections to Geometry** • Functions Involving Square Roots • Operations with Radical Expressions • Solving Radical Equations • Pythagorean Theorem and Its Converse • Distance and Midpoint Formulas	Read and Work on Chapter 11	Chapter 10 Quiz **Unit 4 Test**

Wednesday, July 13, 2011	**Rational Equations and Functions** • Ratio and Proportion • Direct and Inverse Variation • Simplifying Rational Expressions • Multiplying and Dividing Rational Expressions • Adding and Subtracting Rational Expressions • Dividing Polynomials • Rational Equations and Functions	Read and Work on Chapter 12	Chapter 11 Quiz
Thursday, July 14, 2011	**Optional: Probability and Data Analysis** **Optional: Reading *Conned Again, Watson! Cautionary Tales of Logic, Math, and Probability***	Study for Final Exam	Chapter 12 Quiz **Unit 5 Test**
Friday, July 15, 2011		Post Test: Final Exam	**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.