

Spectrum Program

Session 1

Course Title: Algebra II & Trigonometry Honors

Course Description

Algebra II & Trigonometry Honors is an advanced instructor-led algebra course focusing on topics of systems, equations, polynomial arithmetic, complex numbers, solutions of quadratic equations, exponential and logarithmic functions, sequences, series, graphs of polynomial functions, conic sections, and concepts in trigonometry including trigonometric identities. Students completing this accelerated course are prepared for future coursework in math, physics and engineering.

Essential Questions

The content of Algebra II/Trigonometry Honors is organized around families of functions, including linear, quadratic, exponential, logarithmic, radical, rational, and trigonometric.

- How can these families of functions be represented algebraically, graphically, numerically, and verbally?
- How can real-world situations be modeled using functions in order to solve problems arising from these situations?

Outcomes

Algebra II and Trigonometry Honors is a complete second year course at the honors level. It meets the latest Nation Council Of Teachers of Mathematics (NCTM) standards. Successful completion of this course prepares students for a full year of Precalculus mathematics leading to Advanced Placement Calculus. A pre and post test will be given to measure learning and mastery of the concepts.

Upon successful completion of this course, students will:

- know how to solve and evaluate the families of functions algebraically, graphically, numerically, and verbally.
- apply concepts to multi-step, higher-level thinking problems
- synthesize complex concepts in an effort to appropriately 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
- understand the concepts of algebraic expressions, equations, and functions; understand how to graph the families of functions; understand trigonometric equations, graphs, and ratios; understand sequences and series.

Instructional Strategies

Tiered Assignments will be used to differentiate the Algebra II & Trigonometry curriculum. Tiered assignments are designed to instruct students on essential skills that are provided at different levels of complexity. The curricular content and objectives are the same, but the process and/or product are varied according to the student's level of readiness. Some students will start a unit learning and mastering the fundamental skills. Other students may move forward and apply these skills to analytical, critical thinking problems. The more advanced students will not be given more work but will be given more of a challenge to complete the same task.

Flexible grouping will also be used to differentiate the Algebra II & Trig curriculum. Students will work as part of many different groups depending on the task and/or content. Sometimes students are placed in groups based on readiness; other times they are placed based on interest and/or learning profile. Groups can either be assigned by me or chosen by the students. Students can be assigned purposefully to a group or assigned randomly. This strategy allows students to work with a wide variety of peers.

Resources and Materials

- **Books**
 - a. *Algebra 2*, Larson, Boswell, Kanold, and Stiff (McDougal Littell), 2007.
ISBN: 9780618595419

Student Assessment

- **Pre-Assessment**
The pre-assessment will be a comprehensive Algebra II & Trigonometry final exam covering the chapters examined during the course. This test is from the assessment book that accompanies the Algebra 2 textbook used in this course.
- **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**
 - Graded Homework - 15%
 - Daily Tests - 70%
 - Final Exam - 15%
- **Post-Assessment**
The post-assessment will be a comprehensive Algebra II & Trigonometry final exam covering the chapters examined during the course. This test is from the assessment book that accompanies the Algebra 2 textbook used in this course.

Schedule

Every day (after the first) will begin with answering questions from the previous night's homework, followed by a test on the chapter covered the previous day. Following that will be the presentation/discussion/exploration of the material in the next chapter. There will be daily use of graphing calculators and students working in "quads" or with "partners" either exploring the new material or working together on problem sets. Groupings and pairings will vary depending on difficulty of material and ability levels of students. Every day there will be assigned problems that students will need to do in order to understand and internalize the material. It is our hope that there will be some class time available for them to work on these assignments.

Date(s)	Topic(s)	In-class Activities	Graded Assignments and/or Assessment
Monday, June 27	Chapter 1: Equations	Apply properties of real	*pre-test assessment

	and Inequalities	numbers, evaluate and simplify algebraic expressions, solve linear equations, rewrite formulas and equations, use problem solving strategies and models, solve linear inequalities, solve absolute value equations and inequalities.	*chapter 1 homework
Tuesday, June 28	Chapter 2: linear Equations and Functions	Represent relations and functions, find slope and rate of change, graph equations of lines, write equations of lines, model direct variation, draw scatter plots and best-fitting lines, use absolute value functions and transformations, graph linear inequalities in two variables.	*chapter 1 test *chapter 2 homework
Wednesday, June 29	Chapter 3: Linear Systems and Matrices	Solve Linear systems by graphing, solve linear systems algebraically, graph systems of linear inequalities, solve systems of linear equations in three variables, perform basic matrix operations, multiply matrices, evaluate determinants and apply Cramer's Rule, use inverse matrices to solve linear systems.	*chapter 2 test *chapter 3 homework
Thursday, June 30	Chapter 4: Quadratic Functions and Factoring	Graph quadratic functions in standard form, graph quadratic functions in vertex or intercept form, solve $x^2 + bx + c = 0$ by factoring, solve $ax^2 + bx + c = 0$ by factoring, solve quadratic equations by finding square roots, perform operations with complex numbers, complete the square, use the quadratic formula and the discriminant, graph and solve quadratic inequalities, write quadratic functions and models.	*chapter3 test *chapter 4 homework
Friday, July 1	Chapter 5: Polynomials and Polynomial Functions	Use properties of exponents, evaluate and graph polynomial functions, add, subtract, and multiply polynomials, factor and solve polynomial	*chapter 4 test *chapter 5 homework

		equations, apply the remainder and factor theorems, find rational zeros, apply the fundamental theorem of algebra, analyze graphs of polynomial functions, write polynomial functions and models.	
Monday, July 4	Chapter 6: Rational Exponents and Radical Functions	Evaluate nth roots and use rational exponents, apply properties of rational exponents, perform function operations and composition, use inverse functions, graph square root and cube root functions, solve radical equations.	*chapter 5 test *chapter 6 homework
Tuesday, July 5	Chapter 7: Exponential and Logarithmic Functions	Graph exponential growth functions, graph exponential decay functions, use functions involving e , evaluate logarithms and graph logarithmic functions, apply properties of logarithms, solve exponential and logarithmic equations, write and apply exponential and logarithmic functions.	*chapter 6 test *chapter 7 homework
Wednesday, July 6	Chapter 8: Rational Functions	Model inverse and joint variation, graph simple rational functions, graph general rational functions, multiply and divide rational expressions, add and subtract rational expressions, solve rational equations.	*Chapter 7 Test *chapter 8 homework
Thursday, July 7 &	Chapter 9: Quadratic Relations and Conic Sections	Apply the distance and midpoint formulas, graph and write equations of parabolas, graph and write equations of circles, graph and write equations of ellipses, graph and write equations of hyperbolas, translate and classify conic sections, solve quadratic systems.	*chapter 8 test *chapter 9 homework (first half of chapter)
Friday, July 8	Chapter 9: Quadratic Relations and Conic Sections (Continued)	Apply the distance and midpoint formulas, graph and write equations of parabolas, graph and write equations of	*chapter 9 test (first half of chapter) *chapter 9 homework (second half of chapter)

		circles, graph and write equations of ellipses, graph and write equations of hyperbolas, translate and classify conic sections, solve quadratic systems.	
Monday, July 11	Chapter 12: Sequences and Series	Define and use sequences and series, analyze arithmetic sequences and series, analyze geometric sequences and series, find sums of infinite geometric series, use recursive rules with sequences and series.	*chapter 9 test (second half of chapter) *chapter 12 homework
Tuesday, July 12	Chapter 13: Trigonometric Ratios and Functions	Use trigonometry with right triangles, define general angles and use radian measure, evaluate trigonometric functions of any angle, evaluate inverse trigonometric functions, apply the law of sines, apply the law of cosines.	*chapter 12 test *chapter 13 homework
Wednesday, July 13	Chapter 14: Trigonometric Graphs, Identities, and Equations	Graph sine, cosine, and tangent functions, translate and reflect trigonometric graphs, verify trigonometric identities, solve trigonometric equations, write trigonometric models, apply sum and difference formulas, apply double-angle and half-angle formulas.	*chapter 13 test *chapter 14 homework (first half of chapter)
Thursday, July 14	Chapter 14: Trigonometric Graphs, Identities, and Equations	Graph sine, cosine, and tangent functions, translate and reflect trigonometric graphs, verify trigonometric identities, solve trigonometric equations, write trigonometric models, apply sum and difference formulas, apply double-angle and half-angle formulas.	*chapter 14 test (first half of chapter) *chapter 14 homework (second half of chapter)
Friday, July 15			*post-test assessment *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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