Algebra II AB

A-G Subject Area Fulfillment: Meets two semesters of the (C) Mathematics graduation requirement.

Course Overview:
This is a rigorous course designed to complete a year-long Algebra II class during our five-week summer school. Thus the students are taught at an accelerated pace and should expect to have a minimum of 1 hour of homework each night. Algebra II is a five-hour class. There will be a 20-minute break (time to be determined). This course is designed to help students build their thinking and improve their problem solving skills. Students will focus on reasoning and applications of Algebra II skills. There will be emphasis on abstract thinking, the function concept, and algebraic solutions of problems in various content areas. Class attendance on a prompt and daily basis is essential. Missing one day would be the same as missing approximately one and one half weeks during the school year.

Course Goals and Objectives

Topics to be taught will include: solving equations and inequalities involving absolute value; solving systems of equations; graphing, factoring; functions; complex numbers; solving quadratic equations using various methods; operations with polynomials; rational numbers and radicals; fractional exponents; exponential functions; logarithms; series and sequences and an introduction to trigonometry. There will also be a review of selected Algebra 1 topics on the first day of class.

The course will cover six units
Unit 1: Equations, Inequalities, Functions
Unit 2: Quadratic Functions
Unit 3: Polynomials
Unit 4: Series, Exponential and Logarithmic Functions
Unit 5: Radical and Rational Functions
Unit 6: Trigonometry

This summer course is meant to provide a low-pressure environment where individual attention by the teacher and personal reflection by the student is highly promoted. The volume of content to be learned will be intense and daunting (a full year’s topics in five weeks). It is therefore the student’s responsibility to ask “well thought-out” questions, complete assignments, and seek tutoring, if need be.

Attendance is mandatory for learning to take place. Please be in class, and don’t get behind. Please give yourself extra time to get here in the mornings; being tardy is a distraction to the class’s attention.
Algebra 2
Day by Day Schedule

Week 1
Day 1 – Unit 1: Equations, Inequalities, Functions
Salutations and first day chores
Diagnostic Test
Getting Ready – Review (page 2)
One-Variable Equations (Lesson 1 – 1)
Two-Variable Equations (Lesson 1 – 2)
Absolute Value Equations and Inequalities (Lesson 1 – 3)
Homework Page 15, 1 – 28

Day 2
Review Homework
Graphing Two-Variable Equations (Lesson 2 – 1)
Graphing Systems of Inequalities (Lesson 2 – 2)
Solving Systems of Two Equations in Two Variables (Lesson 3 – 1)
Solving Systems of Three Equations in Three Variables (Lesson 3 – 2)
Homework Page 27, 1 – 29, page 53, 1 - 12

Day 3
Review Homework
Matrix Operations (Lesson 3 – 3)
Solving Matrix Equations (Lesson 3 – 4)
Introduction to Piecewise Defined Functions (Lesson 4 – 1) Step Functions and Absolute Value Functions (Lesson 4 – 2)
Transforming the Absolute Value Parent Function (Lesson 4 – 3) Homework Page 53, 13- 28, page 71, 1 - 20

Day 4
Review Homework
Embedded Assessment page 55
Operations With Functions (Lesson 5 – 1)
Function Composition (Lesson 5 – 2)
More Function Composition (Lesson 5 – 3)
Finding Inverse Functions (Lesson 6 – 1)
Graphs of Inverse Functions (Lesson 6 – 2)
Homework Page 87, 1 – 36, page 97, 1 - 26
Day 5 Unit 2: Quadratic Functions
Review Homework
Embedded Assessment - page 99
Analyzing a Quadratic Function (Lesson 7 – 1)
Factoring Quadratic Expressions (Lesson 7 – 2)
Solving Quadratic Equations by Factoring (Lesson 7 – 3)
More Uses for Factors (Lesson 7 – 4)
Homework page 119, 1 - 27

Day 6
Review Homework
The Imaginary Unit $i$ (Lesson 8 – 1)
Operations With Complex Numbers (Lesson 8 – 2)
Factoring With Complex Numbers (Lesson 8 – 3)
Completing the Square and Taking Square Roots (Lesson 9 – 1)
The Quadratic Formula (Lesson 9 – 2)
Solutions of Quadratic Equations (Lesson 9 – 3)
Homework page 135, 1 – 25, page 149, 1 - 46

Day 7
Review Homework
Embedded Assessment page 151
Parabolas and Quadratic Equations (Lesson 10 – 1)
Writing a Quadratic Function Given Three Points (Lesson 10 – 2)
Quadratic Regression (Lesson 10 – 3)
Translations of Parabolas (Lesson 11 – 1)
Shrinking Stretching and Reflecting Parabolas (Lesson 11 – 2)
Vertex Form (Lesson 11 – 3)
Homework page 171, 1 – 26, page 189 1 - 35

Day 8
Review Homework
Embedded Assessment page 191
Key Features of Quadratic Functions (Lesson 12 – 1)
More
Key Features of Quadratic Functions (Lesson 12 – 2)
Graphing Quadratic Functions (Lesson 12 – 3)
The Discriminant (Lesson 12 – 4)
Homework page 209, 1 - 38
Day 9 – Unit 3: Polynomials
Review Homework
Solving a System Graphically (Lesson 13 – 1)
Solving a System Algebraically (Lesson 13 – 2)
Polynomials (Lesson 14 – 1)
Some Attributes of Polynomial Functions (Lesson 14 – 2)
Even and Odd Functions (Lesson 14 – 3)
Homework page 221, 1 – 30, page 239, 1 - 22

Day 10
Review Homework
Adding and Subtracting Polynomials (Lesson 15 – 1)
Multiplying Polynomials (Lesson 15 – 2)
Dividing Polynomials (Lesson 15 – 3)
Introduction to Pascal’s Triangle (Lesson 16 – 1)
Applying the Binomial Theorem (Lesson 16 – 2)
Homework page 253, 1 – 26, page 263, 1 - 20

Day 11
Review Homework
Embedded Assessment page 265
How Many Roots – Algebraic Methods (Lesson 17 – 1)
Fundamental Theorem of Algebra (Lesson 17 – 2)
Graphing Polynomial Functions (Lesson 18 – 1)
Finding the Roots of a Polynomial Function (Lesson 18 – 2)
Comparing Polynomial Functions (Lesson 18 – 3)
Homework page 275, 1 – 16, page 289, 1 - 25

Day 12 – Unit 4: Series, Exponential and Logarithmic Functions
Review Homework
Embedded Assessment page 291
Arithmetic Sequences (Lesson 19 – 1)
Arithmetic Series (Lesson 19 – 2)
Sigma Notation (Lesson 19 – 3)
Homework page 305, 1 - 31

Day 13
Review Homework
Geometric Sequences (Lesson 20 – 1)
Geometric Series (Lesson 20 – 2)
Convergence of Series (Lesson 20 - 3)
Exploring Exponential Patterns (Lesson 21 - 1)
Exponential Functions (Lesson 21 - 2)
Homework page 319, 1 – 27, page 341, 1 - 10
Day 14
Review Homework
Embedded Assessment page 321
Exponential Graphs and Asymptotes (Lesson 21 – 3)
Transforming Exponential Functions (Lesson 21 – 4)
Natural Base Exponential Functions (Lesson 21 – 5)
Exponential Data (Lesson 22 – 1)
Homework page 341, 11 – 22, page 355, 1 - 4

Day 15
Review Homework
The Common Logarithmic Function (Lesson 22 – 2)
Properties of Logarithms (Lesson 22 – 3)
More Properties of Logarithms (Lesson 22 – 4)
Logarithms in Other Bases (Lesson 23 – 1)
Properties of Logarithms and the Change of Base Formula (Lesson 23 – 2)
Graphs of Logarithmic Functions (Lesson 23 – 3)
Homework page 355, 5 – 23, page 369, 1 - 49

Day 16
Review Homework
Embedded Assessment page 357
Exponential Equations (Lesson 24 – 1)
Solving Equations by Using Logarithms (Lesson 24 – 2)
Logarithmic Equations (Lesson 24 – 3)
Exponential and Logarithmic Inequalities (Lesson 24 – 4)
Homework page 381, 1 - 13

Day 17 – Unit 5: Radical and Rational Functions
Review Homework
Embedded Assessment page 383
Square Root Functions (Lesson 25 – 1)
Solving Square Root Equations (Lesson 25 – 2)
Cube Root Functions (Lesson 25 – 3)
Solving Cube Root Equations (Lesson 25 – 4)
Homework page 399, 1 - 15

Day 18
Review Homework
Square Root Functions and Regressions (Lesson 26 – 1)
Square Root and Quadratic Functions (Lesson 26 – 2)
Cube Root and Cubic Functions (Lesson 26 – 3)
Formulating and Graphing a Rational Function (Lesson 27 – 1)
Formulating and Graphing More Rational Functions (Lesson 27 – 2)
Identifying Asymptotes (Lesson 27 – 3)
Homework page 413, 1 – 16, page 429, 1 - 18

**Day 19**
Review Homework
Embedded Assessment page 415
Inverse Variation and Combined Variation (Lesson 28 – 1)
Transformations of the Parent Rational Function (Lesson 28 – 2)
Multiplying and Dividing Rational Expressions (Lesson 29 – 1)
Adding and Subtracting Rational Expressions (Lesson 29 – 2)
Homework page 441, 1 – 16, page 461, 1 - 10

**Day 20**
Review Homework
Embedded Assessment page 443
Finding Horizontal and Vertical Asymptotes (Lesson 29 – 3)
Graphing Rational Functions (Lesson 29 – 4)
Solving Rational Equations (Lesson 30 – 1)
Solving Rational Inequalities (Lesson 30 – 2)
Homework page 462, 11 – 22, page 471, 1 - 16

**Day 21 – Unit 6: Trigonometry**
Review Homework
Embedded Assessment page 473 Radian Measure (Lesson 31 – 1) Applying Radian Measure (Lesson 31 – 2)
Placing the Unit Circle on the Coordinate Plane (Lesson 32 – 1)
Special Right Triangles and the Unit Circle (Lesson 32 – 2)
Homework page 485, 1 – 20, page 499, 1 - 23

**Day 22**
Review Homework
The Pythagorean Identity (Lesson 33 – 1)
Other Trigonometric Identities (Lesson 33 - 2)
Periodic Functions (Lesson 34 – 1)
The Sine Function (Lesson 34 - 2)
The Cosine Function (Lesson 34 - 3)
Homework page 507, 1 – 19, 539, 1 - 24

**Day 23**
Review Homework
Embedded Assessment page 509 The Tangent Function (Lesson 34 - 4)
Translating Trigonometric Functions (Lesson 34 - 5) Modeling Periodic Phenomena
Homework page 540, 25 – 49, page 547, 1 – 15,
Day 24
Final Review Questions
Final Exam
Final Exam Questions
Diagnostic Test

Standards of Practice
MP1. Make sense of problems and persevere in solving them
MP2. Reason abstractly and quantitatively.
MP3. Construct viable arguments and critique the reasoning of others
MP5. Use appropriate tools strategically.
MP6. Attend to precision.
MP7. Look for and make use of structure.
MP8. Look for and express regularity in repeated reasoning.

Course Materials:
Textbook: Springboard Algebra 2

Textbook will be purchased first day of class. Students will keep textbook and will be able to write and take notes in it.

Each student is to have the following materials daily:

1. Three-ring binder with appropriate pages from text inserted.
2. 3-hole punched lined, college-rule paper.
3. Stationery, such as pencils, red pens, etc.
4. Graphing calculator (Preferably the TI-84)
5. Graph paper

Course Grading

Homework, Embedded Assessments and Tests

- **Homework** is assigned daily and is due the following school day. Each assignment is worth 10 points.
- **Embedded Assessments** – After each section (as outlined in schedule) an Embedded Assessment will be given. Each assessment will be worth 25 points.
- A **Final** will be given after each 2 ½ week session. It will only cover the topics in that session and will be worth 100 points each.
Homework 20%
Embedded Assessments 30%
Final Exam 20%
Quizzes 20%
Class Participation 10%

Total 100%

Classroom Behavior:
The student is expected to demonstrate mature, polite behavior and extend courtesy to everyone at all times:

1. Actively participate, and respectful verbal and nonverbal interaction with all opinions must be shown at all times.
2. Since differing views will be expressed, the teacher and the student(s) will mutually maintain a safe environment for courteous dialogue.
3. Respect is to be shown for all CSUN property.
4. No food or beverages will be permitted in the classroom. Snacks must be eaten outside between the designated breaks.
5. Warnings for behavior / discipline problems will be given once. Any further problems will result in a phone call to the parent(s) or guardian(s) and possible dismissal from the program.

SAEP Electronics Policy

**Cell phones, music players and headphones are not permitted to be used during class hours.**

a. Please put your cell phone on silent (NOT vibrate).
b. No texting is allowed during class.

You will be given one verbal warning if the above is not followed. Should a second warning be necessary, your cell phone, music player and/or headphones will be confiscated and held by the teacher until after class. If a third time occurs, your cell phone, music player and/or headphones will be confiscated and held in the SAEP office and MUST BE PICKED UP BY A PARENT.
Algebra II AB

After reading through the syllabus, please sign and date and have your student return it to class. The signature constitutes your commitment to the class as we partner to make the next five weeks a life-long educational experience for your student.

**Student/Parent Agreement:**
Please bring this signed and dated Algebra IIAB syllabus agreement to class tomorrow.

If you do not understand any portion of this syllabus, or if you have any questions regarding this class, please do not hesitate to email the teacher.

We have read and understand the contents of this syllabus.

Student name ______________________________________________________

Student signature____________________________________________________

Date_________________

Parent/Guardian name _______________________________________________

Parent/Guardian signature_____________________________________________

Date_________________

Phone _____________________________________________________________

E-mail_____________________________________________________________