Chesapeake Bay Governor's School
For Marine and Environmental Science
Glenns Campus

Algebra II 2011-2012

Phillip L. Sanderson

Course Description:
This two-semester course taught over two semesters during the student's sophomore year. The curriculum addresses all of the Virginia Algebra II Standards of Learning and, upon successful completion of the class, students will be prepared to take the Algebra II End of Course test. However, it should be noted that the curriculum is more robust than the Virginia standards, covering additional material to ensure preparation for subsequent coursework. The Algebra II topics will focus on simplifying algebraic expressions, solving equations, and graphing functions.

Text:
Precalculus, 4th Ed.; Blitzer: Prentice Hall; 2010
*Please **cover** this text and keep it covered throughout the year!*

Contact Information:
Office: 804.758.6788 Home: 804.725.9026 e-mail: psanderson@cbgs.k12.va.us
Cell: 804.384.8919

I am available at CBGS from 7:30 AM to 3:30 PM by phone or email and at the home or cell number after school.

Required Materials: One 3-ring binder, pencils, a large block eraser, and a graphing calculator. Graph paper and colored pencils may be useful.

Attendance: Class attendance is, of course, required. Be reminded of the CBGS policy in the *Handbook* which you signed. Absences and tardies will be reported daily to your home school and to parents on interims and grade reports. Check for assignments you may miss by accessing the web site and clicking "courses." You may also email or call me for assistance.

Course Objectives:

The student will demonstrate the ability to:

1. simplify algebraic expressions, including polynomials and those with radicals or rational exponents.

2. simplify and operate upon rational algebraic expressions, including complex rational expressions; techniques will include rationalizing both numerators and denominators.

3. simplify and operate upon complex numbers, especially products of complex conjugates

4. solving algebraic sentences including linear equations and inequalities, polynomial equations, radical equations, rational equations, exponential equations, and logarithmic equations.

5. graph relations, to include linear, polynomial, radical, rational, exponential, logarithmic, and piecewise defined functions.

6. apply transformations (translations, reflections, dilations) to the graphs of any of the functions discussed in class.

7. determine the domain and range for the graphs of any of the functions discussed in class.

8. solve polynomial equations and identify the relationship between zeros, factors, roots, and x-intercepts.

Learning Sequence:

Ch. P Prerequisites: Fundamental Concepts of Algebra

- Radicals, operations and simplifying with radicals
- Rational exponents, simplifying with rational exponents
- Factoring polynomials (GCF, by grouping, trinomials, special cases)
- Rational expressions (simplifying, multiplying/dividing, adding/subtracting, difference quotient, rationalizing)
- Solving rational equations
- Solving absolute value equations
- Solving quadratic equations (all methods), discriminant
- Solving radical equations
- Modeling with equations (word problems, literal equations)
- Solving linear inequalities and absolute value inequalities, interval notation

Ch. 1 Functions and Graphs

- Relations, domain and range, functions, functions as equations, function notation, graphs of functions, domain and range of a function from a graph
- Increasing/decreasing functions, relative extrema, even/odd functions, symmetry, evaluating and graphing a piecewise function, functions and difference quotients
- Graphs of common functions, vertical and horizontal translations, reflections of graphs, vertical stretching and shrinking, sequencing transformations
- Domain of a function, operations with functions, composition of functions, decomposing functions
- Definition of function inverses, finding the inverse of a function, horizontal line test and one-to-one functions, graphs of inverse functions

Ch. 2 Polynomial and Rational Functions

- Complex numbers, operations with complex numbers, quadratic equations with imaginary solutions
- Graphs of quadratic functions, graphs of quadratic functions from vertex form and standard form, applications of quadratic equations, solving quadratics to maximize and minimize
- Polynomial functions, end behavior, zeros of polynomial functions, intermediate value theorem, graphing polynomial functions
- Long division of polynomials, synthetic division, remainder theorem and factor theorem
- Zeros of polynomial functions, rational zero theorem, finding roots of polynomial equations, fundamental theorem of algebra, Descartes' rule of signs
- Rational functions, domain of rational functions, graphs of rational functions and vertical asymptotes, horizontal asymptotes, graphs of rational functions
- Using direct and inverse variation to model real world applications

Ch. 3 Exponential and Logarithmic Functions

- Evaluating and graphing exponential functions, characteristics and transformations of exponential functions, natural base, and applications of exponential functions
- Defining and evaluating logarithmic functions; graphs, characteristics, and transformations of logarithmic functions; common logarithms; and natural logarithms

Ch. 7 Systems of Equations and Inequalities

- Systems with no solutions and infinite solutions; applications of systems of equations to include profit functions and break-even points.
- Solving systems of linear equations in three variables with the elimination method; applications of such systems.
- Solving systems of non-linear equations in two variables—substitution method and elimination method. Applications of systems of non-linear equations.

Ch. 10 Sequences, Induction, and Probability

- Sequences, recursive formulas, factorial notation, summation notation
- Arithmetic sequences
- Geometric sequences and series
- The Fundamental Counting Principle, permutations, combinations

Supplemental

- Determine curves of best fit for polynomial, exponential, and logarithmic data
- Identify and apply the properties of a normal distribution

Make-up work policy: I will not be using class time to remind you of any work that you have missed—our time together is too brief. That will be your responsibility and yours alone. Work that is severely late will be penalized and work that is still missing at the end of the grading period will be a zero.

Honor Code: Students are expected to follow the rules and procedures as outlined in the Student Honor Code. Please refer to the Student Handbook if you need guidelines. Failure to do so may result in dismissal from the course. Tests, quizzes, and other work as requested will be pledged.

Emergency Evacuation Plan: In each classroom, laboratory or other places where students are assembled for the purpose of instruction, a fire evacuation plan will be posted indicating the direction of travel from the room in the event it becomes necessary to evacuate the building as a result of fire or other emergency. This plan will be posted in a conspicuous place near the exit from the room.

Whenever the fire alarm sounds, the building will be evacuated. The instructor will ensure the fire door is closed upon leaving the area (doors with automatic closures on them). Instructors are also responsible for assisting disabled students.

If a classroom does not have an evacuation plan posted, the student or instructor should notify the academic dean.

Course Expectations and Information:

1. **Be Prepared:** Regardless of whether homework is graded or not, it will be essential to your ***survival***. Promise. No siestas, no holidays. If you fall behind, you will have to work at least twice as hard to catch up. Always do homework, always take notes, always ask questions, always be prepared.

2. **Class Participation:** You MUST ask questions about concepts that you feel need better clarification. Do not worry about anyone's reaction, ask. Be engaged from

the beginning and stay that way. Remember, I do not start actually teaching until you start asking questions. Until that point, I might as well be working from a script.

3. **Notebook:** As mentioned earlier, you will want a 3-ring binder. All materials I give you (quizzes, tests, worksheets, handouts, …) will be three-hole punched and need to be kept in your binders. BE ORGANIZED. Very few sloppy students can be successful math students. Many of you find that if you are physically disorganized, you will also be mentally disorganized…not good for mathematics.

4. **Assessments:** Tests will be scheduled at the end of each chapter, with a great deal of notice. Since mathematics is a process, I will be grading your work as well as the final answer. Therefore, you must show your work. "Bald" incorrect answers will receive NO credit and answers with little or incorrect work will receive minimal credit. Show your work. If you tend to do your mathematics in your head, fine. Now show me what you did in your head on paper in an organized manner. Because you are being graded on the process, there will be very few multiple choice questions on tests. Quizzes will be frequent and may not be announced.

5. **Grading:** I use a "total points" system. Every assignment (quiz, test, classwork, homework) will be given a number of points it is worth (the sum of the points from all of the questions). Your grade will be the points you earned relative to the points the assignment was worth. To compute your average at any point in the semester, take the total points earned and divide by the total points available.

6. **Cell Phones:** All cell phones and other electronic devices must be silenced and are not to be used during class, unless permission is given otherwise. If used in an unauthorized manner, electronics will be confiscated and returned at the end of the class period. Repeat offenders will be referred to the CBGS director.

7. **Tips on how to survive this and other college level courses:**
   - Do not fall behind.
   - Do all homework.
   - Ask questions.
   - Form a study group or just do homework with a partner.
   - Be organized!!
   - Schedule your time and use it effectively!
   - You need to be self-motivated in college!

Inclement Weather and School Closings Policy

- Closing of the Chesapeake Bay Governor's School is determined by the site (Rappahannock Comm. College-Glenns, Rappahannock Comm. College- Warsaw, or Caroline County School Board). For example: Essex County Schools may be closed due to weather but RCC-Warsaw is open; therefore CBGS will be in session.

- If a school system is closed due to inclement weather and the CBGS is open, students from the ***closed*** school system may attend pending the safety of the roads and permission from parents.

- There may be an emergency in which the CBGS is closed and the particular school system is open. Students shall report to their respective school instead of going to CBGS.

- If there is a one-hour delay for the CBGS site (RCC- Glenns/Warsaw and Caroline), CBGS will open one hour late.

- If there is a two-hour delay for the CBGS site, CBGS will be closed and students are to report to their home high school.

- If the home high school opens one hour late, and CBGS opens on time, students from the home high school are to report to CBGS, one hour late.

- At the Glenns site (and other sites as well) we have a phone tree to notify students directly of CBGS closings.

CBGS Statement on Safety:

What to know and do to be prepared for emergencies at CBGS/RCC:
- Sign up to receive RCC text messaging alerts and keep your information up-to-date <https://alert.rappahannock.edu/index.php?CCheck=1>
- Know the safe evacuation route from each of your classrooms. Emergency evacuation routes are posted in campus classrooms.
- Listen for and follow instructions from CBGS/RCC or other designated authorities.
- Know where to go for additional emergency information.
- Report suspicious activities and object

Statement on Americans with Disabilities Act

Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act of 1990 require Schools to provide an 'academic adjustment' and/or a 'reasonable accommodation' to any qualified individual with a physical or mental disability who self-identifies as having such. Students should contact/ inform CBGS faculty for appropriate academic adjustments or accommodations.