



Grady High School
2019-2020 COURSE SYLLABUS
Algebra 2 Honors

Teacher: Dr. Ogden
Room Number: C303
Semester: *Fall 2019*
Textbook: Algebra 2 Houghton, Mifflin,
Harcourt

Email: ghsceogden@gmail.com
Tutorial Days: *Mondays*

Tutorial Hours: *3:45 p.m. - 4:45 p.m.*

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Tutorial Location: C303

Course Description:

It is in Algebra II/Advanced Algebra that students pull together and apply the accumulation of learning that they have from their previous courses, with content grouped into six critical areas, organized into units. They apply methods from probability and statistics to draw inferences and conclusions from data. Students expand their repertoire of functions to include quadratic (with complex solutions), polynomial, rational, and radical functions. And, finally, students bring together all of their experience with functions to create models and solve contextual problems.

Prerequisite:

Successful completion of Algebra I & Coordinate Algebra

Course Content Standards and Course outline

Curriculum: <https://www.georgiastandards.org/Georgia-Standards/Pages/Math-9-12.aspx>

Gifted and High Ability Learners Standards:

- *Advanced Communication Skills:* Learners will engage in diverse and authentic learning experiences which will allow them to develop and apply innovative oral, written, visual, and nonverbal communication skills across disciplines.
- *Advanced Research Skills:* Learners will gather, decipher, and determine credibility of information from a variety of sources and integrate information through analysis of content.
- *Creative Thinking & Problem Solving:* Learners will insightfully evaluate a variety of problems and arrive at innovative conclusions.
- *Higher Order & Critical Thinking Skills:* Learners will analytically critique a system or set of complex ideas, utilizing logic and reasoning skills in novel ways, to create and/or modify knowledge.

Unit 1 – Quadratics Revisted Weeks (4 weeks total)

In this unit students will learn to define rational exponents; rewrite expression involving radicals and rational exponents; define the imaginary number i ; define complex numbers; operate with complex numbers; and understand that the basic properties of numbers continue to hold with expressions involving exponents.

Perform arithmetic operations with complex numbers

MGSE9-12.N.CN.1 Understand there is a complex number i such that $i^2 = -1$, and every complex number has the form $a + bi$ where a and b are real numbers.

MGSE9-12.N.CN.2 Use the relation $i^2 = -1$ and the commutative, associative, and distributive properties to add, subtract, and multiply complex numbers.

MGSE9-12.N.CN.3 Find the conjugate of a complex number; use the conjugate to find the absolute value (modulus) and quotient of complex numbers.

Use complex numbers in polynomial identities and equations.

MGSE9-12.N.CN.7 Solve quadratic equations with real coefficients that have complex solutions by (but not limited to) square roots, completing the square, and the quadratic formula.

MGSE9-12.N.CN.8 Extend polynomial identities to include factoring with complex numbers. *For example, rewrite $x^2 + 4$ as $(x + 2i)(x - 2i)$.*

Solve equations and inequalities in one variable

MGSE9-12.A.REI.4 Solve quadratic equations in one variable.

MGSE9-12.A.REI.4b Solve quadratic equations by inspection (e.g., for $x^2 = 49$), taking square roots, factoring, completing the square, and the quadratic formula, as appropriate to the initial form of the equation (limit to real number solutions).

Unit 2 – Operations with Polynomials Weeks (3 weeks total)

This unit develops the structural similarities between the system of polynomials and the system of integers.

Perform arithmetic operations on polynomials

MGSE9-12.A.APR.1 Add, subtract, and multiply polynomials; understand that polynomials form a system analogous to the integers in that they are closed under these operations.

Use polynomial identities to solve problems

MGSE9-12.A.APR.5 Know and apply that the Binomial Theorem gives the expansion of $(x + y)^n$ in powers of x and y for a positive integer n , where x and y are any numbers, with coefficients determined using Pascal's Triangle.

Rewrite rational expressions

MGSE9-12.A.APR.6 Rewrite simple rational expressions in different forms using inspection, long division, or a computer algebra system; write $a(x)/b(x)$ in the form $q(x) + r(x)/b(x)$, where $a(x)$, $b(x)$, $q(x)$, and $r(x)$ are polynomials with the degree of $r(x)$ less than the degree of $b(x)$.

Build a function that models a relationship between two quantities

MGSE9-12.F.BF.1 Write a function that describes a relationship between two quantities.

MGSE9-12.F.BF.1b Combine standard function types using arithmetic operations in contextual situations (Adding, subtracting, and multiplying functions of different types).

MGSE9-12.F.BF.1c Compose functions. *For example, if $T(y)$ is the temperature in the atmosphere as a function of height, and $h(t)$ is the height of a weather balloon as a function of time, then $T(h(t))$ is the temperature at the location of the weather balloon as a function of time.*

Build new functions from existing functions

MGSE9-12.F.BF.4 Find inverse functions.

MGSE9-12.F.BF.4a Solve an equation of the form $f(x) = c$ for a simple function f that has an inverse and write an expression for the inverse. For example, $f(x) = 2(x^3)$ or $f(x) = (x+1)/(x-1)$ for $x \neq 1$.

MGSE9-12.F.BF.4b Verify by composition that one function is the inverse of another.

MGSE9-12.F.BF.4c Read values of an inverse function from a graph or a table, given that the function has an inverse.

Unit 3 – Polynomial Functions Weeks (7 weeks total)

In this unit, students continue their study of polynomials by identifying zeros and making connections between zeros of a polynomial and solutions of a polynomial equation.

Use complex numbers in polynomial identities and equations.

MGSE9-12.N.CN.9 Use the Fundamental Theorem of Algebra to find all roots of a polynomial equation.

Interpret the structure of expressions

MGSE9-12.A.SSE.1 Interpret expressions that represent a quantity in terms of its context.

MGSE9-12.A.SSE.1a Interpret parts of an expression, such as terms, factors, and coefficients, in context.
MGSE9-12.A.SSE.1b Given situations which utilize formulas or expressions with multiple terms and/or factors, interpret the meaning (in context) of individual terms or factors.
MGSE9-12.A.SSE.2 Use the structure of an expression to rewrite it in different equivalent forms. For example, see $x^4 - y^4$ as $(x^2)^2 - (y^2)^2$, thus recognizing it as a difference of squares that can be factored as $(x^2 - y^2)(x^2 + y^2)$.

Understand the relationship between zeros and factors of polynomials

MGSE9-12.A.APR.2 Know and apply the Remainder Theorem: For a polynomial $p(x)$ and a number a , the remainder on division by $x - a$ is $p(a)$, so $p(a) = 0$ if and only if $(x - a)$ is a factor of $p(x)$.

MGSE9-12.A.APR.3 Identify zeros of polynomials when suitable factorizations are available, and use the zeros to construct a rough graph of the function defined by the polynomial.

Use polynomial identities to solve problems

MGSE9-12.A.APR.4 Prove polynomial identities and use them to describe numerical relationships. *For example, the polynomial identity $(x^2 + y^2)^2 = (x^2 - y^2)^2 + (2xy)^2$ can be used to generate Pythagorean triples.*

Interpret functions that arise in applications in terms of the context

MGSE9-12.F.IF.4 Using tables, graphs, and verbal descriptions, interpret the key characteristics of a function which models the relationship between two quantities. Sketch a graph showing key features including: intercepts; interval where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity. *(Limit to polynomial functions.)*

Analyze functions using different representations

MGSE9-12.F.IF.7 Graph functions expressed algebraically and show key features of the graph both by hand and by using technology. *(Limit to polynomial functions.)*

MGSE9-12.F.IF.7c Graph polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior.

Unit 4 – Rational & Radical Relationships Weeks (4 weeks total)

In this unit students will Explore Rational and Radical Functions; Determine rational numbers extend the arithmetic of integers by allowing division by all numbers except zero. Similarly, rational expressions extend the arithmetic of polynomials by allowing division by all polynomials except the zero polynomial.

Extend the properties of exponents to rational exponents.

MGSE9-12.N.RN.1. Explain how the meaning of rational exponents follows from extending the properties of integer exponents to rational numbers, allowing for a notation for radicals in terms of rational exponents. *For example, we define $5^{(1/3)}$ to be the cube root of 5 because we want $[5^{(1/3)}]^3 = 5^{[(1/3) \times 3]}$ to hold, so $[5^{(1/3)}]^3$ must equal 5.*

MGSE9-12.N.RN.2 Rewrite expressions involving radicals and rational exponents using the properties of exponents.

Rewrite rational expressions

MGSE9-12.A.APR.7 Understand that rational expressions form a system analogous to the rational numbers, closed under addition, subtraction, multiplication, and division by a nonzero rational expression; add, subtract, multiply, and divide rational expressions.

Create equations that describe numbers or relationships

MGSE9-12.A.CED.1 Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear, quadratic, simple rational, and exponential functions (integer inputs only).

MGSE9-12.A.CED.2 Create linear, quadratic, and exponential equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales. (The phrase “in two or more variables” refers to formulas like the compound interest formula, in which $A = P(1 + r/n)^m$ has multiple variables.) *(Limit to radical and rational functions.)*

Understand solving equations as a process of reasoning and explain the reasoning

MGSE9-12.A.REI.2 Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.

Interpret functions that arise in applications in terms of the context

MGSE9-12.F.IF.4 Using tables, graphs, and verbal descriptions, interpret the key characteristics of a function which models the relationship between two quantities. Sketch a graph showing key features including: intercepts; interval where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity. *(Limit to radical and rational functions.)*

MGSE9-12.F.IF.5 Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. *For example, if the function $h(n)$ gives the number of person-hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function. (Limit to radical and rational functions.)*

Analyze functions using different representations

MGSE9-12.F.IF.7 Graph functions expressed algebraically and show key features of the graph both by hand and by using technology. *(Limit to radical and rational functions.)*

MGSE9-12.F.IF.7b Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.

MGSE9-12.F.IF.7d Graph rational functions, identifying zeros and asymptotes when suitable factorizations are available, and showing end behavior.

Evaluation and Grading:

Course Components		Weights	<table><tr><th colspan="2">Grading Scale</th></tr><tr><td>100-90</td><td>A</td></tr><tr><td>89-80</td><td>B</td></tr><tr><td>79-70</td><td>C</td></tr><tr><td>69-0</td><td>F</td></tr><tr><td>Not Evaluated</td><td>NE</td></tr></table>		Grading Scale		100-90	A	89-80	B	79-70	C	69-0	F	Not Evaluated	NE
Grading Scale																
100-90	A															
89-80	B															
79-70	C															
69-0	F															
Not Evaluated	NE															
Classwork, Homework & Projects		50%														
Lesson Quizzes		20%														
Unit Tests		30%														
TOTAL		100%														

Campus Portal for Parents and Guardians: Visit - <https://ic.apsk12.org/portal> to view class schedules, attendance records and grades. To activate your account, visit the school to receive your login (activation key).

Required Materials:

Supplies: Students must have the following

- 3-ring binder
- 5 notebook dividers with tabs
- Lined paper
- Pencils, Pencils, Pencils
- Graphing Calculator or Scientific Calculator is encouraged

Note on Calculators:

Students are required to have a graphing calculator. (Texas Instruments® TI-83/Plus is highly recommended).

Each student is required to have a **1½** inch three ring binder with graph paper, college ruled filler paper and pencils. The binder must have a Cover Sheet (Student name, Advisor, Advance Algebra Honors, Teacher name, Room #) **and** dividers arranged in the following order:

- a. Course Syllabus / Classroom Management Guidelines (rules and expectations)

- b. Warm ups arranged according to dates.
- c. Notes and Vocabulary Words with definitions according to dates.
- d. Homework and Classroom Assignments arranged according to dates.
- e. Quizzes

Notebooks will be checked randomly during the semester.

All assignments must be done in PENCIL except for vocabulary and notes

Classroom Expectations:

Each student is to: (1) Actively participate with their learning teams in reading, thinking, listening, manipulative interaction, scientific/graphing calculator and computer instruction needed to achieve mastery of algebraic concepts, (2) assure learning success by individually committing to learning with a positive, controlled attitude, (3) abide by classroom discipline plan

Class rules:

1. Be in the classroom preparing for class to begin when the tardy bell rings.
2. **Come to class prepared. Bring paper, pencil, homework, textbook, and calculator every day.**
3. **NO FOOD, CANDY, OR SOFT DRINKS ALLOWED IN CLASS!!** The only drink that is allowed is bottled water.
4. Respect and courtesy must be shown for students and teachers. Basically the Golden Rule:

TREAT OTHERS THE WAY YOU WANT TO BE TREATED.

- Keep the room neat – throw all trash in the garbage cans
- Be quiet – do not talk across the room to another student
- Keep inappropriate comments to yourself

Consequences for failing to follow class rules will result in a phone call/email to your parents, a teacher detention, and ultimately a referral to an administrator.

LATE ASSIGNMENTS: It is important that students are responsible and meet established due dates for assignments. A late assignment is defined as work submitted after the teacher collected the assignment. **All missing/not turned in assignments will be recorded in Infinite Campus with an "M-Missing" designation.**

MISSING ASSIGNMENTS (late assignments or unexcused absences): Students with late assignments or unexcused absences will be expected to submit missed work within two weeks of the end of the grading periods. The deadlines for missing assignments are as follows:

- Midterm is October 11th. Deadline September 30th - (for assignments from August 12th - September 27th)
- End of Semester is December 20th. Deadline is December 9th –(for assignments from September 30th -December 6th)

As noted above, all missing/not turned in assignments will be recorded in Infinite Campus with an "M-Missing" designation.

Late assignments will be assessed a 20% penalty.

MAKE-UP ASSIGNMENTS (Excused Absences): Students with an excused absence will be expected to submit missed work on or before the third class meeting after the absence. Pre-announced assignments are due upon return to school.

REASSESSMENT OPPORTUNITY: Reassessment opportunities are available for all students on assessments only. There will be only **one** reassessment opportunity on assessments. This reassessment will be a newly generated teacher assessment and the reassessment score will replace the original score. Reassessment can occur during the class period, tutorials, and/or lunch-and-learn sessions (at the teacher's discretion).

For classes with content on Edgenuity: If the student has not demonstrated mastery of the content during the reassessment opportunity, the student will be assigned Edgenuity. The student must take the assessments in a teacher-proctored environment.

School-wide Expectations:

MASTERY LEARNING: With mastery learning, a unit of material is taught, and student understanding is evaluated before students are able to move on to the next unit. Students who have not shown mastery for a particular unit will receive feedback and support in reaching mastery. They may be given practice exercises, study guides, group work or complementary resources to help them improve and achieve mastery. Students who demonstrate mastery of the content for a particular unit are given enrichment exercises like special projects, tasks or academic games to further or broaden their knowledge of the material.

DEFICIENCY REPORTS: Parents and guardians are informed when students are making unsatisfactory progress in classes. Poor performance will be reported to parents and guardians as soon as problems are evident. Deficiency reports with plans for remediation will be provided for all students making unsatisfactory progress, and parent-guardians conferences must be scheduled. Unsatisfactory grades should never come as a surprise to parents, guardians, or students. Also, see Board Policy Administrative Regulation IHA-R(1) under "Students in danger of not meeting academic expectations" for further information. Teachers will:

- Contact parents/guardians early in the semester if academic, attendance, or behavioral difficulties are apparent.
- Notify the counselor, Student Support Team (SST)/Response To Intervention(RTI) Chair, and/or an Assistant Principal of serious problems that are affecting classroom performance.
- Set up parent conferences as necessary.

ATHLETIC ELIGIBILITY: Students wanting to participate in athletic programs governed by the GHSA and extracurricular activities must meet eligibility requirements to participate. The Athletic Director (and the Extracurricular Activities sponsors) will collaborate with teachers to monitor and to identify students in danger of failing courses. A master list of students participating in extracurricular activities and athletics under the auspices of the GHSA will be available to all staff.

Dear Parent/Guardian:

Advanced Algebra Honors is a fast paced class with a challenging curriculum that will be taught to high standards. Therefore, please invest in your student's success by checking their progress early and often to be sure they are completing their out-of-class assignments, keeping up with their reading, and studying for tests. If you have any questions or concerns, feel free to contact me via e-mail (ghsceogden@gmail.com).

Is there anything that you want me to know about your child that will help him or her to be successful?

Parent/Guardian Contact Information: (please PRINT neatly)

Parent/Guardian Name _____

**E-mail
address**

**Daytime
phone**

**Evening
phone**

By signing below I state that I have read the Advance Algebra Honors Syllabus and Class Expectations and have discussed it with my child

Student Signature

Parent/Guardian Signature

Date

Date

