



**Honors Algebra II Syllabus  
CHS Mathematics Department**

**Contact Information:** Parents may contact me by phone, email, or visiting the school.

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**Teacher Contact Websites:**

- Google Classroom: code TBA

**CCSD Vision Statement:** The Chillicothe City School District will provide tomorrow's leaders with a high quality education by developing high expectations and positive personal relationships among students, staff, and community members.

**CCSD Mission Statement:** The Chillicothe City School District empowers students to learn, to lead, and to serve.

**Course Description and Prerequisite(s) from Course Handbook:**

**Honors Algebra II - 271**

**State Course #: 110302**

**Prerequisite:** Students must have attained a "B" or better in Algebra I, have completed a Geometry course, and gain teacher approval

**Required Option** Grade: 10-11

**Graded Weighted** Credit: 1

**Course Description:**

Building on their work with linear, quadratic, and exponential functions, students extend their repertoire of functions to include polynomial, rational, and radical functions. Students work closely with the expressions that define the functions, and continue to expand and hone their abilities to model situations and to solve equations, including solving quadratic equations over the set of complex numbers and solving exponential equations using the properties of logarithms. The Mathematical Practice Standards apply throughout each course and, together with the content standards, prescribe that students experience mathematics as a coherent, useful, and logical subject that makes use of their ability to make sense of problem situations.

This honors course will include additional standards and students in the honors course will also be expected to complete additional coursework which will extend or enrich the included concepts of the course of study. Students will benefit from the richness of the course by completing in-depth explorations of the extension activities, increasing their awareness of mathematical applications, further developing their critical thinking and ability to communicate their understanding. Successful completion of this course or Algebra II is needed to take Physics and/or Honors Chemistry.

**Learning Targets:** Defined below for clarity are the Unit Titles, Big Ideas of every Unit taught during this course, and the Essential Questions to be answered to better understand the Big Ideas. A student's ability to grasp and answer the Essential Questions will define whether or not he or she adequately learns and can apply the skills found in Big Ideas. This will ultimately define whether or not a student scores well on assessments administered for this course.

- **1st Quarter**
  - **Unit I Title: Exponents, Polynomials, and Polynomial Functions**
    - **Big Idea #1:** I can factor polynomials.
      - *Essential Question #1: How do I factor by using the greatest common factor and grouping?*
      - *Essential Question #2: How do I factor trinomials?*
      - *Essential Question #3: How do I factor in special cases such as: difference of squares, perfect square, difference and sum of cubes?*
      - *Essential Questions #4: How do I solve equations by factoring?*
    - **Big Idea #2:** I can write and simplify polynomial expressions using arithmetic operations.
      - *Essential Question #1: How do I simplify expressions using properties of exponents?*
      - *Essential Question #2: How do I add and subtract polynomial expressions?*
      - *Essential Question #3: How do I find compositions of functions?*
      - *Essential Question #4: How do I multiply (including binomial theorem) and divide (synthetic and long division) polynomials?*
  - **Unit II Title: Complex Numbers and Quadratic Functions**
    - **Big Idea #1:** I can write and simplify complex expressions using arithmetic operations.
      - *Essential Question #1: How do I identify and interpret a complex number?*

- *Essential Question #2: How do I add and subtract complex numbers?*
  - *Essential Question #3: How do I multiply and divide complex numbers?*
  - *Essential Question #4: How do I factor polynomial expressions using complex numbers?*
  - **Big Idea #2:** I can solve quadratic equations and inequalities
    - *Essential Question #1: How do I solve quadratic equations by factoring, completing the square, and quadratic formula?*
    - *Essential Question #2: How do I solve equations of quadratic form?*
    - *Essential Question #3: How do I solve inequalities of quadratic form?*
    - *Essential Question #4: How do I solve real world problems involving quadratic equations and inequalities?*
- **2nd Quarter**
  - **Unit III Title: Rational Expressions and Functions**
    - **Big Idea #1:** I can write and simplify rational expressions using arithmetic operations.
      - *Essential Question #1: How do I simplify rational expressions?*
      - *Essential Question #2: How do I multiply, divide, add, and subtract rational expressions?*
      - *Essential Question #3: How do I simplify complex fractions?*
    - **Big Idea #2:** I can solve rational equations and inequalities.
      - *Essential Question #1: How do I solve rational equations?*
      - *Essential Question #2: How do I solve rational inequalities?*
      - *Essential Question #3: How do I solve real world problems involving rational expressions, equations, and inequalities?*
  - **Unit IV Title: Roots and Radicals**
    - **Big Idea #1:** I can write and simplify radical expressions using arithmetic operations.
      - *Essential Question #1: How do I simplify radical expressions?*
      - *Essential Question #2: How do I convert between radical and rational exponent notation?*

- *Essential Question #3: How do I perform operations on radical expressions?*
  - **Big Idea #2:** I can solve radical equations and inequalities.
    - *Essential Question #1: How do I solve radical equations?*
    - *Essential Question #2: How do I solve radical inequalities?*
- MID-TERM EXAM
- 3rd Quarter
  - **Unit V Title: Piecewise and Absolute Value**
    - **Big Idea #1:** I can interpret and graph piecewise graphs.
      - *Essential Question #1: How do I identify and interpret a piecewise graphs?*
      - *Essential Question #2: How do I graph and analyze piecewise expressions?*
      - *Essential Question #3: How do I graph and analyze the greatest integer function?*
    - **Big Idea #2:** I can graph and write absolute value functions a piecewise and solve absolute value equations and inequalities.
      - *Essential Question #1: How do I write absolute value expressions as piecewise expressions?*
      - *Essential Question #2: How do I graph absolute value functions?*
      - *Essential Question #3: How do I solve absolute value equations?*
      - *Essential Question #4: How do I solve absolute value inequalities?*
  - **Unit VI Title: Function Analysis**
    - **Big Idea #1:** I can analyze polynomial functions.
      - *Essential Question #1: How do I use and apply the fundamental theorem of algebra?*
      - *Essential Question #2: How do I find the intercepts of a polynomial function algebraically as well as with a graphing calculator?*
      - *Essential Question #3: How do I determine whether a function is increasing, decreasing, positive, or negative?*
      - *Essential Question #4: How do I find relative maximums and minimums using a graphing calculator?*
      - *Essential Question #5: How do I determine whether a function is even, odd, or neither?*

- *Essential Question #6: How do I algebraically find vertical asymptotes, end behavior asymptotes, and holes of a rational function?*
  - *Essential Question #7: How do I sketch the graph of a polynomial function using end behavior, zeros, and test points?*
  - *Essential Question #8: How do I calculate and interpret average rate of change?*
- **Big Idea #2:** I can identify and apply transformations of functions.
  - *Essential Question #1: How do I reflect functions?*
  - *Essential Question #2: How do I dilate functions?*
  - *Essential Question #3: How do I translate functions?*
  - *Essential Question #4: How do I graph a function that has multiple transformations?*
  - *Essential Question #5: How do I identify transformations of a function from a graph and an equation?*
- **4th Quarter**
  - **Unit VII Title: Inverse, Exponential, and Logarithmic Functions**
    - **Big Idea #1:** I can find and identify inverse functions.
      - *Essential Question #1: How do I find inverse functions graphically, numerically, and algebraically?*
      - *Essential Question #2: How do I determine whether a function has an inverse function?*
      - *Essential Question #3: How do I prove functions are inverses?*
    - **Big Idea #2:** I can graph and solve exponentials.
      - *Essential Question #1: How do I define and graph exponential functions?*
      - *Essential Question #2: How do I solve exponential equations?*
      - *Essential Question #3: How do I solve exponential growth and decay problems?*
    - **Big Idea #3:** I can graph and solve logarithmics.
      - *Essential Question #1: How do I define and graph logarithmic function as inverses of exponential functions?*
      - *Essential Question #2: How do I prove and use properties of logarithms?*
      - *Essential Question #3: How do I solve logarithmic equations?*
      - *Essential Question #4: How do I apply logarithms to real world problems?*

- **Unit VIII Title: Systems and Matrices**
  - **Big Idea #1:** I can solve systems of equations and inequalities.
    - *Essential Question #1: How is a system of equations and inequalities solved graphically?*
    - *Essential Question #2: What methods can be used to solve a system of equations and inequalities algebraically?*
    - *Essential Question #3: How can systems of equations and inequalities be used in the real-world?*
  - **Big Idea #2:** I can use matrix algebra to manipulate and model data.
    - *Essential Question #1: How can matrices be used to represent and manipulate data?*
    - *Essential Question #2: When would matrices be multiplied scalars to produce new matrices and how are matrices multiplied scalars to produce new matrices?*
    - *Essential Question #3: When and how are matrices of appropriate dimensions added, subtracted, and multiplied?*
    - *Essential Question #4: What properties does matrix multiplication for square matrices satisfy, and which properties are not satisfied and why?*
    - *Essential Question #5: How do zero and identity matrices play a role in matrix addition and multiplication similar to the role of 0 and 1 in the real numbers?*
    - *Essential Question #6: What is the role of the determinant and how is one found?*
- **If Time Allows**
  - **Unit IX Title: Trigonometry and Trigonometric Functions**
    - **Big Idea #1:** I can solve triangles and derive the area of triangles using trigonometry.
      - *Essential Question #1: How do I use the Pythagorean Theorem and trigonometric ratios to solve applied problems?*
      - *Essential Question #2: How do I derive the formula for the area of a triangle using trigonometry?*
      - *Essential Question #3: How do I prove the laws of sines and cosines?*
      - *Essential Question #3: How do I use the laws of sines and cosines to solve real world problems?*

- **Big Idea #2:** I can use radian measure to derive the unit circle.
  - *Essential Question #1: How do I define radian measure?*
  - *Essential Question #2: How do I convert between degrees and radians?*
  - *Essential Question #3: How do I use reference and coterminal angles to derive the unit circle?*
  - *Essential Question #3: How do I construct the unit circle to extend trigonometric functions to all real numbers?*
- **Big Idea #3:** I can graph and analyze trigonometric functions.
  - *Essential Question #1: How do I graph periodic functions?*
  - *Essential Question #2: How do I identify key features of periodic functions?*
  - *Essential Question #3: How do I model trigonometric functions using amplitude, frequency and midline?*
- **Big Idea #4:** I can prove and apply trigonometric identities
  - *Essential Question #1: How do I prove the Pythagorean identity?*
  - *Essential Question #2: How do I apply the Pythagorean identity?*
- **END OF COURSE EXAM**

### **Course Materials:**

- Google Chromebook
- Composition Notebook
- Glue Stick
- Scissors
- Pencils
- Highlighters/colored pencils/markers

### **Textbook:**

A copy may be checked out from teacher if desired, otherwise see below for the online textbook (McGraw Hill Algebra 2/ Connect Ed).

### **Supplemental Textbook(s):**

- Glencoe Algebra 2 that is online through Connect Ed

### **Electronic Resources:**

- <https://connected.mcgraw-hill.com>
- <https://www.edulastic.com>

- Google Classroom: code TBA
- Google Apps
- Calculators

### **Course Expectations:**

This course will require dedication. What you put into the class is exactly what you will get out of it. Grades are earned in this classroom and I am there to help you earn the best grade possible. This classroom is a partnership and will only work if we all work together. I am always available for extra help after school or through email. This is an honors course, so we will move at a quick pace through our syllabus so it is vital that you keep up with notes and assignments. I am looking forward to this school year and getting to know all of you!

### **Grading:**

Unit Exams	50%
Assessments (Including: Quizzes, Essays, Labs, and Projects)	30%
Class work/Homework	20%

- Each nine week's grade comprises 20% of a student's final grade.
- The Mid-Term Exam and End of Course Exam each comprise 10% of a student's final grade.

### **Grading Scale:**

The grading scale for Chillicothe High School can be found in the student handbook or online at

<http://www.chillicothe.k12.oh.us/1/Content2/studenthandbook>.

**Late Work:** Late work will be subject to the Board-adopted policy on assignments that are submitted late (to be reviewed in class).

- Regardless of the absence type (excused, unexcused, OSS, etc.), students are expected to make up work and be held accountable for learning all material they missed.
- Any student who is absent from school will receive one (1) additional day for every day he/she missed to make up his/her work for full credit (100%).
- Any student who exceeds the allotted time to turn in an assignment for full credit may still submit work late for partial credit.
  - Any student who turns in work up to 1 week late must at least be given the opportunity to earn 75% on that assignment.
  - Any student who turns in work between 1 and 2 weeks late must at least be given the opportunity to earn 60% on that assignment.
- The end of the 9 weeks is the cut off point for teachers to accept late work from students for full or partial credit unless the teacher decides



to give the student an incomplete for the 9 weeks due to extenuating circumstances.

**Performance Based Section: Writing**

**Assignments/Exams/Presentations/Technology**

One or more of the End of Unit Exams may be Performance Based. According to the Ohio Department of Education, “Performance Based Assessments (PBA) provides authentic ways for students to demonstrate and apply their understanding of the content and skills within the standards. The performance based assessments will provide formative and summative information to inform instructional decision-making and help students move forward on their trajectory of learning.” Some examples of Performance Based Assessments include but are not limited to portfolios, experiments, group projects, demonstrations, essays, and presentations.

## CHS Honors Algebra II Course Syllabus

After you have reviewed the preceding packet of information with your parent(s) or guardian(s), please sign this sheet and return it to me so that I can verify you understand what I expect out of each and every one of my students.

Student Name (please print):

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Student Signature:

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Parent/Guardian Name (please print):

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Parent/Guardian Signature:

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Date: 

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