

## Algebra 2

### Ashley Gabbard

**Contact Information:** If at any time you have a question regarding your student's progress or the course in general, feel free to contact me from 9:05-10:00 at 606-287-7155 or by email at [Ashley.gabbard@jackson.kyschools.us](mailto:Ashley.gabbard@jackson.kyschools.us).

**Prerequisite:** Successfully complete Algebra 1 and Geometry.

**Course description:** Fundamental skills of mathematics will be applied to such topics as equations and inequalities, matrices, systems, complex numbers, quadratics equations and inequalities, relations and functions, polynomial functions, rational exponents and expressions, rational functions, exponential and logarithmic functions, arithmetic and geometric sequences and series, conics, trigonometric functions, and probability. Technology will be used to introduce and expand upon the areas of study.

Units of Study will be sent home at the completion of the prior unit in addition to the listing of Units and Standards below.

### Units of Study and Course Objectives:

#### Multi-Step Equations and Inequalities

Students will be able to:

- Solve two step algebra problems
- Solve multi step algebra problems
- Solve radical equations
- Solve real world problems including multiple steps
- Solve multi-step inequalities
- Solve absolute value equations and inequalities
- Solve real world scenarios including inequalities
- Analyze algebraic problems that contain errors to create proficient responses

#### Matrices

Students will be able to:

- Add matrices
- Multiply matrices by a constant
- Subtract matrices
- Multiply matrices
- Calculate the determinant of a matrix
- Find the inverse of a matrix
- Solve matrix equations
- Apply operations of matrices to solve real-world problems

#### Systems of Equations and Inequalities

Students will be able to:

- Define key vocabulary specific to systems
- Distinguish between parallel, intersecting, and collinear lines
- Find intersection points given a graph
- Solve systems of equations by substitution
- Solve systems of equations by elimination
- Solve systems of equations using matrices
- Solve systems in three variables
- Graph systems of linear inequalities
- Solve real world problems by systems of equations
- Solve real world problems by systems of inequalities
- Solve problems using linear programming
- Graph systems of equations and inequalities
- Interpret solutions of systems of equations and inequalities in context

## Complex Numbers

Students will be able to:

- Define an imaginary number
- Identify real and imaginary parts of a complex number
- Simplify imaginary numbers
- Perform operations on imaginary numbers
- Add and subtract complex numbers
- Multiply complex numbers
- Divide complex numbers
- Simplify complex numbers
- Solve real-world situations that may require the use of imaginary or complex numbers

## Solving Quadratic Equations and Inequalities

Students will be able to:

- Solve quadratic equations by factoring
- Solve quadratic equations using the quadratic formula
- Solve quadratic equations with complex roots
- Solve quadratic equations using the square root method with difference of two squares
- Solve quadratic equations using the square root method with perfect squares
- Solve quadratic equations by completing the square
- Solve real-world quadratic problems using various methods
- Interpret quadratic solutions in context
- Calculate the discriminant
- Determine the number and type of solutions based on the value of the discriminant
- Graph quadratic equations

- Find the intercepts of a quadratic equation
- Solve quadratic inequalities
- Graph quadratic inequalities
- Solve systems of quadratic equations and inequalities

## Relations and Functions

Students will be able to:

- State the domain and range of a relation given an ordered pair, table, or equation
- Define key vocabulary specific to relations and functions
- Determine if a relation is a function given a set of ordered pairs
- Write equations in function notation
- Find solutions by substitution in function notation
- Create a table of values for a function given a rule
- Recognize the graph of a function using the vertical line test
- Identify distinguishable characteristics between functions
- Graph basic functions
- Perform transformations of functions
- Determine domain and range of a function
- Combine functions in function notation
- Evaluate composed functions at given values

## Polynomial Equations and Functions

Students will be able to:

- Define key vocabulary specific to polynomials
- Factor by grouping
- Find roots of polynomial equations
- Apply the Rational Root Theorem
- Apply the Factor Theorem
- Solve polynomials equations for all roots
- Solve polynomial equations analytically
- Perform polynomial division to determine roots
- Solve polynomials equations graphically
- Identify key characteristics of Quadratic functions using technology
- Identify key characteristics of Cubic functions using technology
- Identify key characteristics of other polynomials functions using technology
- Classify functions based on their characteristics
- Graph transformations of polynomial functions
- Identify multiplicity of graphs of polynomial functions
- Determine end behavior of polynomial functions

- Solve real-world problems involving polynomial functions using various methods and resources including technology

## Rational Exponents and Expressions

Students will be able to:

- Define key vocabulary specific to rational exponents and radical expressions
- Apply basic properties of roots
- Simplify rational roots
- Extract monomial roots to simplify roots with variables
- Add and subtract with rational exponents
- Multiply with fractional exponents
- Divide with fractional exponents
- Simplify radical expressions
- Solve real world radical expressions
- Simplify rational expressions
- Add rational expressions by finding common denominators
- Subtract rational expressions
- Multiply rational expressions
- Divide rational expressions

## Rational Equations and Functions

Students will be able to:

- Solve rational equations
- Graph rational functions
- Identify key characteristics of rational functions
- Graph transformations of rational functions
- Solve real world scenarios involving rational functions
- Interpret solutions of rational functions in context

## Exponential and Logarithmic Functions

Students will be able to:

- Define key vocabulary specific to exponential and logarithmic functions
- Find the inverse of exponential functions
- Find the inverse of logarithmic functions
- Apply basic properties of logarithms to simplify
- Differentiate between the key characteristics of exponential and logarithmic functions
- Determine the key characteristics of an exponential or logarithmic function
- Perform transformations on logarithmic and exponential functions
- Solve real-world situations involving exponential and logarithmic functions

## Arithmetic and Geometric Sequences and Series

Students will be able to:

- Distinguish between arithmetic and geometric sequences
- Calculate partial sums of a sequence using sigma
- Write partial sums in sigma notation
- Calculate term value of a given term of an arithmetic sequence using a formula
- Calculate sums of arithmetic sequences using a formula
- Create an explicit rule for any given term of an arithmetic sequence
- Calculate term value of a given term of a geometric sequence using a formula
- Calculate sums of geometric sequences using a formula
- Create an explicit rule for any given term of a geometric sequence
- Write and Solve real world patterns and situations by applying arithmetic or geometric sequences

## Conics

Students will be able to:

- Write equations for circles
- Graph circles
- Convert equations of conics into standard form by completing the square
- Recognize and differentiate between conic sections
- Graph conic sections
- Write equations for parabolas
- Write equations for ellipses
- Write equations for hyperbolas

## Trigonometric Functions

Students will be able to:

- Define trigonometric ratios
- Calculate values for trigonometric ratios
- Apply trigonometric ratios to find degree measures
- Recognize key points on the unit circle
- Find radians on the unit circle by applying trigonometric ratios
- Evaluate expressions using the six trigonometric functions and values of certain angles
- Graph trigonometric functions
- Define key vocabulary with the properties of trigonometric functions
- Apply properties of trigonometric functions

- Identify key characteristics of trigonometric functions
- Apply trigonometric characteristics and properties to solve real world situations

## Probability

Students will be able to:

- Define vital probability terms
- Apply the Fundamental Counting Principle
- Calculate the probability in context given a situation
- Draw tree diagrams to determine probability
- Differentiate between dependent and independent events
- Calculate the probability of dependent and independent events
- Calculate the probability of mutually exclusive events
- Calculate conditional probability
- Predict based on probability
- Use counting techniques to find probability
- Write in set notation
- Find probability in sets

## Grading Policy

92-100	A
81-91	B
70-80	C
60-69	D
0 – 59	F

Your term grade will be calculated in the following way:

60% - Summative Assessments/Exams

40% - Formative Assessments/ Daily Work/ Homework

The Final grade will be calculated as following:

20% - Term 1

20% - Term 2

20% - Term 3

20% - Term 4

20% - Final Exam /EOC

After the end of each term 20% of the grade is set in stone.

Grades are weighted to be reflective of Standards based instruction and grading. Each unit is broken into standards taken from the Kentucky Core Academic Standards and are reflective of what each student should know once they have completed the unit. In order to be prepared for the next course in the sequence each student should master each standard in this course. Each summative assessment is organized with an equal number of questions for each standard. In order to reach mastery a 75% must be reached on the standard. The student will not receive a holistic exam grade like we are accustomed to, however, the student will receive a series of 10 point exam grades that correspond to the standards on the exam. If the student does not reach mastery on the first try of the exam they will receive a grade of 0 for that standard and be required to complete remedial work from Study Island and/or worksheets to help learn the material. After the assignments are completed the student can redo any unmastered standard to bring their summative grade to mastery and complete that standard. This is different from what is normally seen in the classroom. In my experience the past three years it makes it much easier to track student progress both for the student, the parent, and myself. We know exactly what is lacking and work to fix it.

### **Tardy and Break Procedure**

The student will be counted tardy if they are not in class by the time the bell rings. After 5 tardies the student will be turned in as an office referral.

Students can not leave class the first or last ten minutes of any given class period, in accordance to the adopted 10/10 policy.

Students can leave a total of 5 times from the classroom during the semester and is required to sign in and out with the indicated times.

### **Materials Needed**

Although other materials may be requested within the trimester the necessities include:

- Three Ring Binder
- Loose – Leaf Notebook Paper
- Graph Paper
- Pencils

We will be utilizing technology such as personal electronic devices to better our instruction.

It is very important that you keep a binder during this course and throughout this year in Algebra 2. Algebra 2 students are required to take the End of Course Assessment at the end of Algebra 2. To have the most success it is important that you keep the notes and assignments throughout this year to help refresh and study as the time gets close. Remember if you fail the End of Course Assessment you will receive a grade of F for the course and will be required to repeat the whole course next year.

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We have read and discussed the classroom policies and procedures and understand the importance of following them at all times.

\_\_\_\_\_ Parent Signature  
\_\_\_\_\_ Date

\_\_\_\_\_ Student Signature  
\_\_\_\_\_ Date

Parents please include your email address for more efficient communication.

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I will be emailing the Units and Standards as well as important dates and information for our course. Thank you!