

Accelerated Algebra 2 with Statistics and Precalculus 2023-24

Paul Kustos, Ph.D.

kustosp@mtnbrook.k12.al.us

Rules and Procedures

1. Come to class prepared—have your notebook, pencils, and calculators for each class. Additionally, you may use your Chromebook if you so choose, but it should be used for academic purposes only. Using your Chromebook is a privilege, and that privilege, if abused, may be revoked.
2. Come to class on time. On a typical school day, class begins promptly at 7:15 am.
3. Be respectful of yourself, your classmates, your teacher, and property. This includes following directions, not speaking while others are speaking, and handling complaints privately.
4. Participate actively during class, including taking part in class discussions, completing assignments, and getting help when needed. Do not wait until the last minute to get help.
5. At this time, eating is not allowed in the classroom. Drinks may be consumed at the discretion of the teacher. Only bring bottle or cups with lids—no open cups, aluminum cans, etc. Dispose of trash appropriately.
6. The only personal digital devices allowed in the classroom are calculators and Chromebooks. Cell phones should not be out at all during class unless permission is granted, and they should also be placed on silent (non-vibrating) prior to entering class. If a cell phone is seen out in class without permission, punitive consequences will ensue.
7. When absent, the student is responsible for checking Schoology and completing any assignments listed.
8. If a student misses an assessment, email me promptly, no later than the day of the absence, so that we can arrange for a make-up plan. Make-up plans will be individualized at the discretion of the teacher; however, they will follow standard guidelines.
9. In the grade book, an MA indicates a missing assignment that can be made up (for assessments, this means the unit or nine weeks test grade will replace it). A zero in the grade book indicates work that cannot be made up.
10. All work is to be done as independent work unless otherwise specified. Students are prohibited from unauthorized usage of artificial, algorithmic, decision-making tools for any assignment. All work should be completed in accordance with the Mountain Brook Schools academic integrity policies.

Grading Policy

Grades will be determined on the total points method (total points earned divided by total points assigned). Grades for each nine weeks will come from tests, quizzes, and any other assignments. A nine weeks cumulative test will be given at the end of each nine weeks, and that nine weeks test may be used to replace a grade of your choice for that term; in the first and third nine weeks, that test also counts as a grade itself (that grade is used as a replacement score only in the second and fourth nine weeks, due to its proximity to a semester exam). A semester exam will be given at the end of the second and fourth nine weeks.

The grading scale is as follows:

A: 90-100

B: 80-89

C: 70-79

D: 65-69

F: 0-64

Homework

Homework will be given in-class but not counted for a grade—the point of homework is to give the student opportunity to practice mathematical skills and is vital for a more thorough understanding of mathematical concepts. Periodic homework quizzes will be given that consist of questions from the homework assignments.

Office Hours

Unless some urgent/pressing situation arises, I will be available in my room for help before 7:15 am Tuesday-Thursday and 1:30-2:00 pm Tuesday and Thursday. You may also make an appointment with me to see me outside of those times.

Contact

I may be contacted via my school e-mail address, kustosp@mtnbrook.k12.al.us.

For students:

- You may email me at this address from your school-issued Gmail account only—I will not respond to any student email from another source.
- I do not respond to emails sent to my school-issued Gmail account, so make sure to send email to the address above.
- Please include your first and last names in your email so that I will know with whom I am conversing.

For parents:

- Email is the best way to reach me. I will try to respond to emails within 24 hours.

Tentative Course Outline

Semester 1

I. Equations, Inequalities, & Functions

Solving equations & inequalities
Absolute value equations
Linear & absolute value inequalities
Function notation
Domain & range
Interval notation
One-to-one functions
Inverse functions
Linear functions
Piecewise functions
Other special functions
Parent functions/transformations
Operations on functions

II. Systems of Linear Equations & Matrices

Methods to solve systems
Solving systems of inequalities by graphing
Optimization & linear programming
Operations on matrices
Determinants
Cramer's rule
Inverse matrices
Solving systems using matrices

III. Quadratic Functions

Graphing quadratic functions
Solving quadratic functions
Complex numbers
Complex (Argand) plane
Completing the square
Discriminants
Solving quadratic inequalities

IV. Polynomials

Operations on polynomials
Synthetic division
End behavior
Graphing polynomials

Solving polynomial equations
Finding roots and zeros
Descartes' rule of signs
Rational zero theorem
Bounds for roots
Remainder and factor theorems
Fundamental theorem of algebra
Vieta's Formulas
Newton's Sums
Polynomial modeling

V. Rational Functions

Variation
Operations on rational functions
Partial fraction decomposition
Reciprocal functions
Asymptotes
Graphing rational functions
Solving equations

VI. Root Functions & Rational Exponents

Composition of functions
More on inverse functions
Square root & cube root functions
Square root & cube root inequalities
Nth roots
Radicals & rational exponents
Solving radical equations & inequalities

VII. Exponential & Logarithmic Functions

Graphs of exponential & logarithmic functions
Solving equations & inequalities involving exponential & logarithmic functions
Exponential & logarithmic properties
Modeling (power and exponential functions, fitting data)
Financial models
Natural growth/decay models
Logistic growth models
Newton's law of cooling

VIII. Trigonometric Functions

Right triangle trigonometry
Angle measure
Trigonometric values of any angle
Unit circle
Graphing trigonometric functions,
including transformations
Sinusoidal function graphs & modeling

IX. Analytic Trigonometry

Inverse trigonometric functions
Identities, including verification
Sum and difference rules
Double- and half-angle rules
Product-to-sum, sum-to-product rules
Solving trigonometric equations

Semester 2

X. Additional Trigonometric Identities

Law of sines
Law of cosines

XI. Polar Coordinates

Notation
Polar equations & graphs
Polar form for complex numbers
DeMoivre's Theorem

XII. Vectors

Notation
Length & magnitude of vectors
Dot product
Angle between vectors
Cross product

XIII. Basic Conic Sections

Midpoint & distance formulas
Parabolas (equations & graphs)
Circles (equations & graphs)
Ellipses (equations & graphs)
Hyperbolas (equations & graphs)

XIV. Advanced Conic Sections & Parametric Equations

Classifying conic sections, including
degenerates
Rotation of conic sections
Solving systems involving conic sections
Latus rectum, eccentricity, & directrices
Areas enclosed by certain conic sections
Polar equations of conic sections
Graphing parametric equations
Projectile motion

XV. Probability/Statistics

Fundamental counting principle
Inclusion/exclusion
Permutations & combinations
Single & compound events
Geometric probability
Independence & dependence
Conditional probability
Decision making using statistics
Binomial/normal distributions
Expected value

XVI. Sequences & Series

Sequences as functions
Arithmetic sequences & series
Geometric sequences & series
Infinite geometric series
Hypergeometric series
Telescoping series
Recursion & iteration
Binomial theorem
Proof by mathematical induction

XVII. A Preview of Calculus

Finding limits graphically & analytically
Tangent and velocity problems
Continuity
Intermediate value theorem
Infinite limits/limits at infinity
Derivatives