

B.E.S.T Academy High School
Mathematics Department
Atlanta, Georgia 30318

Math IV Course Syllabus

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Description: This is a course in precalculus and statistics, designed to prepare students to enter college at the calculus level. It includes rational, trigonometric, and inverse trigonometric functions; basic trigonometric identities and the laws of sines and cosines; sequences and series; vectors; the central limit theorem and confidence intervals.

Course Prerequisite: Successful completion of Mathematics 3 or Accelerated Mathematics 2.

GPS Standards:

ALGEBRA

Students will analyze rational and trigonometric functions. Students will investigate and apply sequences and series and will understand and use vectors.

MM4A1. Students will explore rational functions.

- a. Investigate and explain characteristics of rational functions, including domain, range, zeros, points of discontinuity, intervals of increase and decrease, rates of change, local and absolute extrema, symmetry, asymptotes, and end behavior.
- b. Find inverses of rational functions, discussing domain and range, symmetry, and function composition.
- c. Solve rational equations and inequalities analytically, graphically, and by using appropriate technology.

MM4A2. Students will use the circle to define the trigonometric functions.

- a. Define and understand angles measured in degrees and radians, including but not limited to 0° , 30° , 45° , 60° , 90° , their multiples, and equivalences.
- b. Understand and apply the six trigonometric functions as functions of general angles in standard position.
- c. Find values of trigonometric functions using points on the terminal sides of angles in the standard position.
- d. Understand and apply the six trigonometric functions as functions of arc length on the unit circle.
- e. Find values of trigonometric functions using the unit circle.

MM4A3. Students will investigate and use the graphs of the six trigonometric functions.

- a. Understand and apply the six basic trigonometric functions as functions of real numbers.
- b. Determine the characteristics of the graphs of the six basic trigonometric functions.
- c. Graph transformations of trigonometric functions including changing period, amplitude, phase shift, and vertical shift.
- d. Apply graphs of trigonometric functions in realistic contexts involving periodic phenomena.

MM4A4. Students will investigate functions.

- a. Compare and contrast properties of functions within and across the following types: linear, quadratic, polynomial, power, rational, exponential, logarithmic, trigonometric, and piecewise.
- b. Investigate transformations of functions.
- c. Investigate characteristics of functions built through sum, difference, product, quotient, and composition.

MM4A5. Students will establish the identities below and use them to simplify trigonometric expressions and verify equivalence statements.

MM4A6. Students will solve trigonometric equations both graphically and algebraically.

- Solve trigonometric equations over a variety of domains, using technology as appropriate.
- Use the coordinates of a point on the terminal side of an angle to express x as $r\cos\theta$ and y as $r\sin\theta$
- Apply the law of sines and the law of cosines.

MM4A7. Students will verify and apply $CabA\sin 21=$ to find the area of a triangle.

MM4A8. Students will investigate and use inverse sine, inverse cosine, and inverse tangent functions.

- Find values of the above functions using technology as appropriate.
- Determine characteristics of the above functions and their graphs.

MM4A9. Students will use sequences and series.

- Use and find recursive and explicit formulas for the terms of sequences.
- Recognize and use simple arithmetic and geometric sequences.
- Find and apply the sums of finite and, where appropriate, infinite arithmetic and geometric series.
- Use summation notation to explore finite series.

MM4A10. Students will understand and use vectors.

- Represent vectors algebraically and geometrically.
- Convert between vectors expressed using rectangular coordinates and vectors expressed using magnitude and direction.
- Add, subtract, and compute scalar multiples of vectors.
- Use vectors to solve realistic problems.

DATA ANALYSIS AND PROBABILITY

Students will organize, represent, investigate, interpret, and make inferences from data, using the central limit theorem and the standard normal distribution. Students will apply the Central Limit Theorem to calculate confidence intervals for a population mean using data from large samples. Students will use sample data and confidence intervals to draw conclusions about populations.

MM4D1. Using simulation, students will develop the idea of the central limit theorem.

MM4D2. Using student-generated data from random samples of at least 30 members, students will determine the margin of error and confidence interval for a specified level of confidence.

MM4D3. Students will use confidence intervals and margins of error to make inferences from data about a population. Technology is used to evaluate confidence intervals, but students will be aware of the ideas involved.

Process Standards

The following process standards are essential to mastering each of the mathematics content standards. They emphasize critical dimensions of the mathematical proficiency that all students need.

MM4P1. Students will solve problems (using appropriate technology).

- Build new mathematical knowledge through problem solving.
- Solve problems that arise in mathematics and in other contexts.
- Apply and adapt a variety of appropriate strategies to solve problems.
- Monitor and reflect on the process of mathematical problem solving.

MM4P2. Students will reason and evaluate mathematical arguments.

- Recognize reasoning and proof as fundamental aspects of mathematics.
- Make and investigate mathematical conjectures.
- Develop and evaluate mathematical arguments and proofs.
- Select and use various types of reasoning and methods of proof.

MM4P3. Students will communicate mathematically.

- Organize and consolidate their mathematical thinking through communication.
- Communicate their mathematical thinking coherently and clearly to peers, teachers, and others.
- Analyze and evaluate the mathematical thinking and strategies of others.
- Use the language of mathematics to express mathematical ideas precisely.

MM4P4. Students will make connections among mathematical ideas and to other disciplines.

- Recognize and use connections among mathematical ideas.
- Understand how mathematical ideas interconnect and build on one another to

produce a coherent whole.

c. Recognize and apply mathematics in contexts outside of mathematics.

MM4P5. Students will represent mathematics in multiple ways.

a. Create and use representations to organize, record, and communicate mathematical ideas.

b. Select, apply, and translate among mathematical representations to solve problems.

c. Use representations to model and interpret physical, social, and mathematical phenomena.

Course Outline:

Georgia Performance Standards: Mathematics IV Curriculum Map							
Quarter 1				Quarter 2			
Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6	Unit 7	Unit 8
Data Analysis	Sequences and Series	Rational Functions	Introduction to Trigonometry	Graphs and Inverses of Trigonometric Functions	Trigonometric Identities	Extended Trigonometry	Investigations of Functions
3 Weeks	3 Weeks	5 Weeks	5 Weeks	4 Weeks	4 Weeks	6 Weeks	2 Weeks
MM4D1 MM4D2 MM4D3	MM4A9	MM4A1	MM4A2	MM4A3 MM4A8	MM4A5	MM4A6 MM4A7 MM4A10	MM4A4

Required Materials:

Each student is required to have a **1 ½ or 2** inch three ring notebook with 5 dividers, graph paper, filler paper and pencils. This notebook is to contain Math IV materials and work only.

The notebook must be arranged in the following manner with dividers:

a. Cover Sheet (Your Name, Math IV, Dr. Bowers, Room 165)

b. Course Syllabus and Classroom Management Guidelines (rules and expectations)

Divider label – DAY PAGES with NOTES

- arranged by dates.

Divider label – VOCABULARY

- Vocabulary Words with definitions and examples

Divider label – MATH IV - CLASSWORK/HOMEWORK

- Graded Classwork and Homework Assignments arranged by dates.

Divider label – Math IV – QUIZZES/TESTS/PROJECTS

- Graded Quizzes, Tests, and projects

Divider label – COMPASS assignments

Notebooks will be checked randomly during the semester.

All assignments must be done in pencil except for vocabulary and notes.

Resources:

- Core-Plus Mathematics published by Glencoe/McGraw-Hill.
- Atlanta Public Schools Framework Supplement Student Edition at www.atlanta.k12.ga.us. Select the **Departments** tab. Then select **Math and Science Department**. On the left select **High School Math** and then under the **Math IV** column are the different Student Unit Supplements.
- Georgia Department of Education Frameworks at www.georgiastandards.org/standards selecting **Mathematics**, then selecting **9-12** and then selecting **Mathematics IV**.

Grading Procedure: The final grade for Math IV is computed as follows:

Class Work/Participation	30%
Homework/Notebook	10%
Performance Based Assessments	25%
Quizzes	20%
Midterm/Final	15%

Grading Scale:

A: 90 – 100 B: 80 – 89 C: 70 – 79 F: 0 - 69

Tutorials: Students may receive additional help at after school tutorial on Monday afternoons from 3:30 – 4:30pm.

Recovery: Students will be given opportunities throughout the semester to makeup low grades and zap zeros through extra credit packets.

Academic Integrity/Plagiarism: Academic integrity is a general term that incorporates numerous elements of student activities such as research, written and oral reports, homework, tests and quizzes, as well as technological resources. All currently available forms of media fall under the category of academic integrity.

All work submitted in this class must be your own work, generated exclusively for this class, and not work intended for submission in another course. The use of sources (ideas, quotations, paraphrasing) should be properly documented. Failure to demonstrate academic honesty will result in a zero on the assignment and disciplinary action. Examples of cheating include: discussing test or quiz materials with other students, copying answers during an exam or quiz, copying tests or quizzes, allowing student to copy answers, copying of student notes or projects.

Plagiarism is the use of someone else’s ideas or work without including appropriate acknowledgment of that work. This definition relates to all forms of media from books, magazines, web sites, interviews, periodicals, radio, and television, to other recorded media, such as compact discs or tapes. All student work must be the result of the student’s own efforts or the original author must be referenced. Examples of plagiarism include: using material in its original format with no or little modifications without referencing whole and/or partial copying, translating or paraphrasing without proper citation, direct quotation of a reference source without quotation marks or the source cited, and copying information and/or software without referencing the original author or owner.

DISCIPLINE EXPECTATIONS/CONSEQUENCES:

1. Be on time and ready to begin class when the bell rings.
2. Always bring materials to class.
3. **No** food or drink in class.
4. Listen and follow instructions at all times.
5. Remain in your seat at all times.
6. Cell phones **must not** visible or used during class.
7. **No** sleeping or putting your head down in class.
8. No cheating. If caught or suspected cheating, you will receive a zero.

Consequences

- 1st offense - warning
- 2nd offense - phone call to parent
- 3rd offense - after school detention
- 4th offense – behavior referral reported to administrator

I have read and understand the Math IV Course Syllabus.

Student's Printed Name: _____

Student's Signature: _____ Date: _____

Parent's/Guardian's Signature: _____ Date: _____

Parent's/Guardian's Printed Name: _____

Parent's/Guardian's Home Phone Number: _____

Parent's/Guardian's Cell/Alternate Phone Number: _____

Parent's/Guardian's Email: _____

Please write any comments or concerns in the space provided below.
