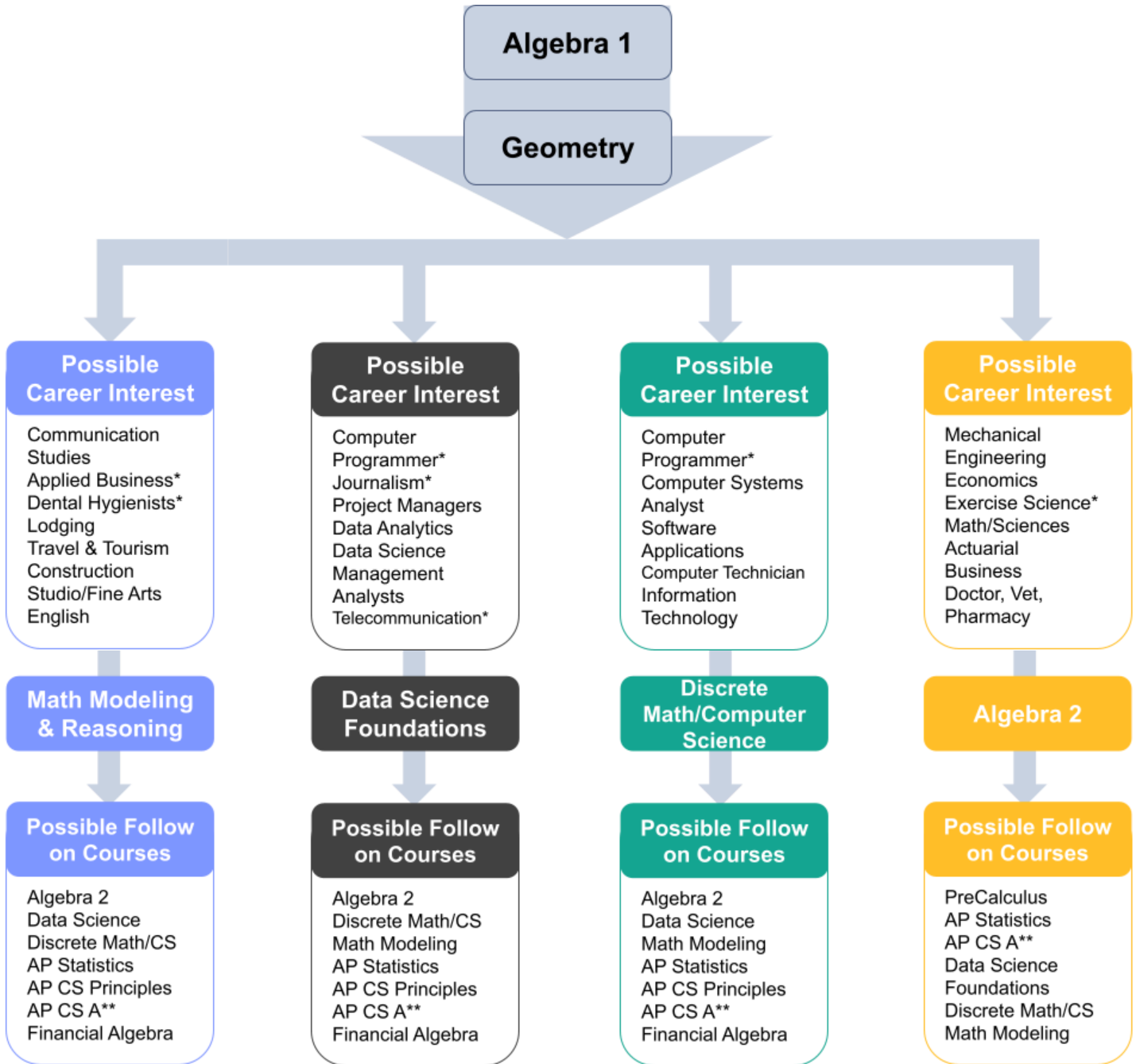


# Mathematics Curriculum

All students are required to earn at least four credits in Mathematics. Nordonia High School's course sequence in Mathematics provides students flexibility in selecting third and fourth credit courses. All students are required to complete Algebra 1, Geometry, and an Algebra 2 Equivalency course. Each of our Algebra 2 Equivalency courses will provide students with mathematical instruction that is relevant to their intended major/career choice and preferred learning styles while meeting the Ohio Department of Education's definition of [rigor](#). For further details on possible career interests follow this [link](#).

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\* Appears in multiple pathways, requirements differ by institution or a major may require multiple math courses. Check with your local college to see their requirements.

\*\* Teacher approval required

## Current Course Offerings:

Algebra 1 1 <sup>st</sup> credit	Geometry 2 <sup>nd</sup> credit - option	Honors Geometry 2 <sup>nd</sup> credit - option
Algebra 2 3 <sup>rd</sup> /4 <sup>th</sup> credit option	Honors Algebra 2 3 <sup>rd</sup> /4 <sup>th</sup> credit option	Mathematical Modeling & Reasoning 3 <sup>rd</sup> /4 <sup>th</sup> credit option
Data Science Foundations 3 <sup>rd</sup> /4 <sup>th</sup> credit option	Discrete Mathematics/ Computer Science 3 <sup>rd</sup> /4 <sup>th</sup> credit option	Financial Algebra 4 <sup>th</sup> credit option
Pre-Calculus 4 <sup>th</sup> /+ credit option	Honors Pre-Calculus 4 <sup>th</sup> /+ credit option	AP PreCalculus 4 <sup>th</sup> /+ credit option
AP Statistics 4 <sup>th</sup> /+ credit option	Honors Calculus 5 <sup>th</sup> /+ credit option	AP Calculus AB 5 <sup>th</sup> /+ credit option
AP Calculus BC 6 <sup>th</sup> /+ credit option	AP Computer Science Principles (Gr. 10 - 12) Elective	AP Computer Science A (Gr. 11 - 12) Elective

### Algebra 1

**Course Number: 2105**

**Credit: 1**

**Length: year**

**Sequence: 1<sup>st</sup>**

This course is designed to formalize and extend the mathematics that students learned in the middle grades. The units in this course will deepen and extend understanding of linear and exponential relationships by contrasting them with each other. Students will apply linear models to data that exhibit a linear trend, analyze the strength of the relationship between the two quantities, and use the model to make predictions. Students will build on their understanding of linear and exponential functions to develop methods for analyzing, solving and using quadratic functions as well as more complex equations.

### Geometry

**Course Number: 2205**

**Credit: 1**

**Length: year**

**Prerequisite: Credit in Algebra I**

**Sequence: 2<sup>nd</sup>**

This course is designed to formalize and extend the student's experience with geometry from the middle grades. Students will deepen their understanding of geometric relationships and demonstrate this understanding through formal mathematical arguments. There is an emphasis on transformational geometry and students will use their understanding of dilations and proportional reasoning to build a formal understanding of similarity. Students will be able to use a coordinate system to verify geometric relationships including relationships between lines, properties of special right triangles and quadrilaterals.

## Honors Geometry

**Course Number: 2210**

**Credit: 1**

**Length: year**

**Prerequisite: "A" in Algebra I AND teacher recommendation**

**Sequence: 2<sup>nd</sup>**

This course is designed to formalize and extend the student's experience with geometry from the middle grades. Students will deepen their understanding of geometric relationships and demonstrate this understanding through formal mathematical arguments and proof. There is an emphasis on transformational geometry and students will use their understanding of dilations and proportional reasoning to build a formal understanding of similarity. Students will develop and apply trigonometric ratios as well as develop equations for non-right triangles. Students will study probability including conditional probability, independence, unions, and intersections. The relationships between angles, arcs, and line segments in a circle will be investigated to develop "circle tools" that can help solve problems involving circles. Students will also study three-dimensional solids and their measurement. This course will prepare students who plan to continue through the high school honors math program.

## Algebra 2

**Course Number: 2110**

**Credit: 1**

**Length: year**

**Prerequisite: Credit in Algebra I and in Geometry**

**Sequence: 3<sup>rd</sup>/4<sup>th</sup>**

Did you enjoy the symbolic manipulation and abstract reasoning of Algebra 1? Do you plan to possibly pursue a STEM career? Then Algebra 2 might be for you! This course extends the use of functions to include advanced polynomial, rational, radical, logarithmic and trigonometric functions, where solutions to problems in real-world situations are formulated, validated and analyzed. You will use mental, paper-and-pencil, algebraic and technology-based techniques while using a variety of mathematical notation.

## Honors Algebra 2

**Course Number: 2115**

**Credit: 1**

**Length: year**

**Prerequisite: Credit in Algebra I and Geometry and Teacher recommendation**

**Sequence: 3<sup>rd</sup>/4<sup>th</sup>**

Did you enjoy the symbolic manipulation and abstract reasoning of Algebra 1? Do you plan to possibly pursue a **calculus-based** STEM career? Then Honors Algebra 2 might be for you! This course extends the use of functions to include advanced polynomial, rational, radical, logarithmic and trigonometric functions, where solutions to problems in real-world situations are formulated, validated and analyzed. You will use mental, paper-and-pencil, algebraic and technology-based techniques while using a variety of mathematical notation. This course will prepare students to continue through the high school honors math program. **A graphing calculator is expected.**

## Mathematical Modeling and Reasoning

**Course Number: 2300**

**Credit: 1**

**Length: year**

**Prerequisite: Credit in Algebra 1 and Geometry**

**Sequence: 3<sup>rd</sup>/4<sup>th</sup>**

Do you like to work and communicate with others? Do you enjoy hands-on activities using real-world contexts? Then Math Modeling and Reasoning might be for you! This course is designed to promote reasoning, problem solving, and modeling through thematic units focused on mathematical practices. The course builds on previous knowledge and extends that knowledge to new situations to create a deeper understanding. Critical thinking and communicating about mathematics are the primary objectives of this course.

## Data Science Foundations

**Course Number: 2310**

**Credit: 1**

**Length: year**

**Prerequisite: Credit in Algebra 1 and Geometry**

**Sequence: 3<sup>rd</sup>/4<sup>th</sup>**

In today's society, data is all around you. Whether you go online or to the supermarket, data about you is continuously being collected and used to make decisions. Data Science Foundations will teach you how to collect, analyze and make decisions using data. You will build graphical and statistical models to describe and communicate data using your newly acquired computer programming skills. This course is perfect for beginners!

## Discrete Mathematics/Computer Science

**Course Number: 2320**

**Credit: 1**

**Length: year**

**Prerequisite: Credit in Algebra 1 and Geometry**

**Sequence: 3<sup>rd</sup>/4<sup>th</sup>**

Are you interested in exploring the skills needed for a technology-based field? Then Discrete Math/Computer Science might be for you. This course builds upon concepts in algebra, geometry and probability and shows how these ideas apply to a digital world. Through hands-on computer programming, you will actively engage with discrete mathematics. Discrete math is the study of "counting" problems. Examples include the number of unique handshakes in a room full of people, the way viruses spread from contact to contact and the optimum strategy for board games. Discrete math is the language of computer science. This course is perfect for beginners. No prior programming experience is necessary. *Please note: if you are thinking about being a computer engineer your degree will most likely require calculus. Check the requirements at your intended college; if calculus is required you should take Algebra 2. You may take this course and Algebra 2 concurrently.*

## Pre-Calculus

**Course Number: 2400**

**Credit: 1**

**Length: year**

**Prerequisite: Credit in Geometry, "B" or better in Algebra II, teacher recommendation**

**Sequence: 4<sup>th</sup>/+**

Pre-Calculus includes an advanced study of functions and trigonometry as well as an introduction to discrete math. Students who successfully complete this course will be prepared for Nordonia's Honor Calculus course. Students must have approval of their Algebra II teacher in order to enroll.

## Honors Pre-Calculus

**Course Number: 2405**

**Credit: 1**

**Length: year**

**Prerequisite: Credit in Geometry, “B” or better in Honors Algebra II and teacher recommendation**

**Sequence: 4<sup>th</sup>/+**

This course is intended for students who excelled in Algebra II and have the recommendation of their Algebra II teacher. The course includes an advanced study of functions and trigonometry as well as topics in statistics, probability, and an introduction to discrete math. Students who complete this course will be prepared for AP Calculus. **A graphing calculator is expected.**

## AP Pre-Calculus

**Course Number: (2408)**

**Credit: 1**

**Length: year**

**Prerequisite: Successful completion of Geometry and Algebra II**

**Sequence: 4<sup>th</sup>/+**

AP Precalculus is designed to be the equivalent of a first semester college precalculus course. AP Precalculus provides students with an understanding of the concepts of college algebra, trigonometry, and additional topics that prepare students for further college-level mathematics courses. This course explores a variety of function types and their applications—polynomial, rational, exponential, logarithmic, trigonometric, polar, parametric, vector-valued, implicitly defined, and linear transformation functions using matrices. Before studying pre-calculus, all students should develop proficiency in topics typically found in Algebra 1, Geometry, and Algebra 2. *Students should have developed the following: Proficiency with the skills and concepts related to linear and quadratic functions, including algebraic manipulation, solving equations, and solving inequalities, Proficiency in manipulating algebraic expressions related to polynomial functions, including polynomial addition and multiplication, factoring quadratic trinomials, and using the quadratic formula.* Students will be prepared for, and are required to take the AP Pre-Calculus Exam **A graphing calculator is expected.**

## Financial Algebra

**Course Number: 2130**

**Credit: 1**

**Length: year**

**Prerequisite: Credit in Algebra II**

**Sequence: 4<sup>th</sup>**

This is a course that uses mathematics to give students the tools to become financially responsible young adults. The course employs algebra, probability and statistics, and geometry to solve financial problems that occur in everyday life. Real-world problems in investing, credit, banking, auto insurance, mortgages, employment, income taxes, budgeting and planning for retirement are solved by applying the relevant mathematics.

## AP Statistics

**Course Number: 2610**

**Credit: 1**

**Length: year**

**Prerequisite: “B” or better in Algebra II and Teacher recommendation**

**Sequence: 4<sup>th</sup>/+**

This college level introductory statistics course introduces students to the major tools for collecting, analyzing and drawing conclusions from data. Students develop analytical and critical thinking skills as they learn to describe data patterns, plan and conduct studies, use probability and simulation to explore random phenomena, estimate population parameters, test hypotheses, and make statistical inferences. May be taken concurrently with a Pre-Calculus or Calculus course. Students will be prepared for, and are required to take the AP Statistics Exam. **A graphing calculator is expected.**

## Honors Calculus

**Course Number: 2410**

**Credit: 1**

**Length: year**

**Prerequisite: Credit in Pre-Calculus or Honors Pre-Calculus**

**Sequence: 5<sup>th</sup>/+**

This course is intended for students who would like to develop an understanding of the major topics of calculus, but do not feel ready for the rigor of an AP course. Topics to be discussed are limits, differentiation and applications, and integration. This course will study calculus from a conceptual level and will provide a strong background for students who will need higher math courses in college. The AP Calculus test is not a requirement for this course.

## AP Calculus AB

**Course Number: 2500**

**Credit: 1**

**Length: year**

**Prerequisite: teacher recommendation and "B" average or better in Pre-Calc or Honors Pre-Calc**

**Sequence: 5<sup>th</sup>/+**

AP Calculus AB is designed to be the equivalent of a first semester college calculus course devoted to topics in differential and integral calculus. Topics covered will include the study of limits, derivatives, applications of derivatives, definite and indefinite integrals, applications of integrals, and introductory differential equations. Consistent with AP philosophy, concepts will be expressed and analyzed geometrically, numerically, analytically, and verbally. This college-level Calculus course offers an opportunity to earn college credit while in high school. The course will prepare students for the Advanced Placement Calculus exam (which must be taken as a course requirement). Due to the advanced subject matter, a strong background in algebra and trigonometry is assumed. Pre-Calculus or Honors Pre-Calculus is a prerequisite. Students will be issued a TI-89 calculator for use during the course.

## AP Calculus BC

**Course Number: 2502**

**Credit: 1**

**Length: year**

**Prerequisite: AP Calculus AB**

**Sequence: 6<sup>th</sup>/+**

AP Calculus BC is a full-year course that gives a complete survey in the calculus of functions of a single variable. AP Calculus BC is designed to be the equivalent to both first and second semester college calculus courses. It includes a thorough review of all topics covered in Calculus AB plus additional units of instruction. AP Calculus BC applies the content and skills learned in AP Calculus AB to parametrically defined curves, polar curves, and vector-valued functions; develops additional integration techniques and applications; and introduces the topics of sequences and series. Students will be required to take the AP Calculus BC Exam as a culmination of the course. All students will be issued a TI-89 calculator for use during the course.

## AP Computer Science Principles

**Course Number: 2620**

**Credit: 1**

**Length: year**

**Prerequisite: "A" or better in Algebra I, and Teacher recommendation**

**Grades: 10 – 12**

This course does not count as one of your 4 required math credits. The AP Computer Science Principles course is designed to be equivalent to a first semester introductory college computing course *for non-computer science majors*. This course will introduce you to the creative aspects of programming, abstractions, algorithms, large data sets, the Internet, cybersecurity concerns, and computing impacts on society. You will research and explore a computer innovation of your choosing, create a visual to summarize the innovation, and describe in writing how the innovation works, how it's used, and the harmful and beneficial effects of the innovation on people and society. You will be prepared for, and are required to take the AP Computer Science Principles Exam which includes writing an original computer program along with development documentation and submitting the work to the College Board.

## AP Computer Science A

**Course Number: 2630**

**Credit: 1**

**Length: year**

**Prerequisite: Teacher Approval**

**Grades: 11 – 12**

AP Computer Science A introduces students to computer science through programming. Fundamental topics in this course include the design of solutions to problems, the use of data structures to organize large sets of data, the development and implementation of algorithms to process data, and the ethical and social implications of computing systems. The course emphasizes object-oriented programming and design using the Java language. This course is equivalent to a first-semester, college-level course in computer science. It is recommended that a student has a strong foundation of linear functions, composition of functions, and problem-solving strategies that require multiple approaches and collaborative efforts. In addition, students should be able to use a Cartesian (x, y) coordinate system to represent points on a plane. It is important to understand that any significant computer science course builds upon a foundation of mathematical reasoning that should be acquired before attempting such a course.