



## MATHEMATICS DEPARTMENT

The mission of the Mathematics Department is to reveal to our students the simplicity, the beauty, and the power of mathematics. We assist students in cultivating critical thinking skills and problem solving strategies. Students develop oral, written, and technological skills through collaborative initiatives.

### Possible Math Progressions

\*Based on a student's final grade in his math class, it is possible to move into different math Levels

<b>Student Starts with Algebra I Level 1</b>			
<b>9th Grade</b>	<b>10th Grade</b>	<b>11th Grade</b>	<b>12th Grade</b>
Algebra I Level 1	Algebra II Level 1	Geometry Level 1	Statistics Level 2 or Pre-Calculus Level 2
<b>Student Starts with Algebra I Level 2</b>			
<b>9th Grade</b>	<b>10th Grade</b>	<b>11th Grade</b>	<b>12th Grade</b>
Algebra I Level 2	Algebra II Level 2	Geometry Level 2	Statistics Level 2 or Pre-Calculus Level 2
<b>Student Starts with Honors Algebra I</b>			
<b>9th Grade</b>	<b>10th Grade</b>	<b>11th Grade</b>	<b>12th Grade</b>
Algebra I Honors Level 3	Algebra II Honors Level 3	Geometry Honors Level 3 Trigonometry Honors Level 3	Pre-Calculus Honors or Calculus Level 3 AP Calculus or AP Statistics
<b>Student Starts with Honors Algebra II</b>			
<b>9th Grade</b>	<b>10th Grade</b>	<b>11th Grade</b>	<b>12th Grade</b>
Algebra II Honors Level 3	Geometry Honors Level 3 and Trigonometry Honors Level 3	Pre-Calculus Honors Level 3 or Calculus Level 3 or AP Calculus or AP Statistics	Calculus Honors AP Calculus Calculus II at UNH AP Statistics



### #M13A/B Algebra I Honors

**1 Credit      Level 3      NCAA**

This course is intended for the gifted mathematics student. It includes all the topics of Algebra I as well as additional topics. Enrichment material is provided, and the pace and Level of difficulty are accelerated over Algebra I.

*Requirements for placement: previous record: entrance exam results: placement test: signature of school counselor*

### #M12A/B Algebra I

**1 Credit      Level 2      NCAA**

Algebra I guides students in discovering mathematical principles, strengthens their comprehension of these principles, and affords numerous opportunities to apply these understandings and skills to varied and realistic problem situations. Providing the foundation for upper Level mathematics courses, this course helps the student understand the basic structure of Algebra, recognize the techniques of Algebra as reflections of this structure, acquire facility in applying algebraic concepts and skills, perceive the role of deductive reasoning, and appreciate the need for precision of language.

*Requirements for placement: freshman status or successful completion of Pre-Algebra: signature of math teacher.*

### #M11A/B Algebra I

**1 Credit      Level 1      NCAA**

This course is designed for students who need to strengthen their basic math and study skills. All Algebra I topics will be covered. Emphasis will be on solving basic problems. A review of arithmetic will precede each topic in this Algebra course.

*Requirements for placement: previous record: entrance exam results: signature of school counselor.*

### #M33A/B Algebra II Honors

**1 Credit      Level 3      NCAA**

This course is intended for the gifted mathematics student. The course will briefly review, reinforce, and expand upon major points from Algebra I. Several new topics will be introduced: functional analysis, asymptotes, symmetry, zeros, continuity, inverses, composition. The course explores these topics with relation to linear, quadratic, polynomial, exponential, and logarithmic functions.

*Requirement for placement: 90 or above in Algebra I Level 2 and signature of Algebra I teacher or 80 or above in Algebra I Honors and signature of Algebra I teacher or placement exam*

### #M32A/B Algebra II

**1 Credit      Level 2      NCAA**

This course will review reinforce, and expand upon the major topics presented in Algebra I. In addition, more rigorous work will be done with properties of real numbers, solving systems of equations, and working with linear and quadratic functions. Exponential notation will be expanded to include rational exponents. Radicals will be presented as well as polynomials, rational expressions, exponential functions and the common logarithmic function.

*Requirements for placement: completion of Algebra I Level 2 or signature of math teacher*

### M31A/B Algebra II

**1 Credit      Level 1      NCAA**

This course is designed for students who need to strengthen their algebra and study skills. This course will review reinforce, and expand upon the major topics presented in Algebra I. In addition, more rigorous work will be done with properties of real numbers, solving systems of equations, and working with linear and quadratic functions. Exponential notation will be expanded to include rational exponents. Radicals will be presented as well as polynomials, rational expressions, exponential functions and the common logarithmic function.

*Requirements for placement: completion of Algebra I: signature of math teacher*

### #M23A Geometry Honors

**0.5 Credit      Level 3      NCAA**

This course is intended for the gifted mathematics student. This course covers the same topics as Geometry Level 2 while introducing more rigor. Also included are: the study of volumes of solids, coordinate geometry.

*Requirements for placement: 80 in Algebra I Honors and Algebra 2 Honors, or 90 in Algebra I Level 2 and Algebra 2 Level 2 and signature of Algebra 2 teacher or placement exam*

### #M22A/B Geometry

**1 Credit      Level 2      NCAA**

This course emphasizes the basics of plane geometry. The course teaches use of logical skills with special attention to deduction and induction. The topics covered are points, lines, planes, angles, polygons, circles, and arcs. The relationships discussed are congruence, similarity, parallelism, perpendicularity, area, length, distance, and ratio. Algebra applications are integrated into the course through problem solving.

*Requirements for placement: completion of Algebra I and Algebra 2*



## #M21A/B Geometry

**1.0 Credit    Level 1**

This course is designed for students who need to strengthen their problem-solving and study skills. This course emphasizes the basics of plane geometry. The course teaches use of logical skills with special attention to deduction and induction. The topics covered are points, lines, planes, angles, polygons, circles, and arcs. The relationships discussed are congruence, similarity, parallelism, perpendicularity, area, length, distance, and ratio. Algebra applications are integrated into the course through problem solving.

*Requirements for placement: completion of Algebra 1 and Algebra 2: signature of math teacher*

## #M43A Trigonometry Honors

**0.5 Credit    Level 3                    NCAA**

This course is intended for the gifted mathematics student. This course focuses on trigonometry and how it is applied. Topics include triangle trigonometry, the unit circle, radians and degrees, special right triangles, the law of sines, and the law of cosines. There will be an introduction to the trigonometric functions as well as inverse trigonometric functions.

*Requirements for placement: 80 or above in Algebra 2 Honors and in Honors Geometry or 90 or above in Algebra 2 Level 2 and 90 or above in Geometry Level 2: signature of the Algebra 2 teacher*

## ELECTIVES

### #MM3A/B C++ Computer Programming

**1 Credit    Level 2**

This course will emphasize problem-solving using the object-oriented programming language, C++. Through rigorous theoretical and hands-on approaches, students will master logical reasoning, C++ syntax, programming techniques, the creation and application of basic algorithms, and program design. The main topics covered in the class will include: loops, arrays, functions, strings, searching and sorting techniques, and the implementation of various classes. Students will also work in teams to complete a major programming project.

*Requirements for placement: 90 or higher in Algebra 2, Level 2: 85 or higher in Honors Algebra 2: signature of the math teacher*

### #M92A/B AP Statistics

**1 Credit    Level 4                    NCAA**

This course will provide a rigorous introduction to statistics by exploring data and how it is used to picture and describe the world and is designed for the gifted mathematics student. Such topics as data collection, surveys, sampling, measures of central tendency are included. Probability, normal distribution,

and statistical inference will also be covered. Students may take the Advanced Placement Exam in May for potential advanced placement credit.

*Requirements for placement: 85 or above in Honors Algebra 1 and Honors Algebra II or Honors Algebra III/Trig and signature of Honors Algebra II or Honors Algebra III/Trig teacher: 90 or above in Algebra 1, Level 2 and Algebra 2, Level 2 and signature of Algebra 2 teacher.*

### #M92A/B Statistics

**1 Credit    Level 2                    NCAA**

This course will provide an introduction to statistics by exploring data and how it is used to picture and describe the world. Such topics as data collection, surveys, sampling, measures of central tendency are included. Probability, normal distribution, and statistical inference will also be covered.

*Requirements for placement: completion of Algebra 1, Algebra 2 and Geometry and signature of the math teacher.*

### #M62A/B Pre-Calculus

**1 Credit    Level 2                    NCAA**

This course will provide a comprehensive presentation of Pre-Calculus topics with an emphasis on functions, their properties and applications. These topics include domain, range, intercepts, asymptotes, symmetry, zeros, continuity, inverses, composition, exponential functions, logarithmic functions, and other discontinuous functions. This course also includes the fundamentals of trigonometry and some of its applications. Topics include triangle trigonometry, the unit circle, radians, degrees, and special right triangles.

*Requirements for placement: completion of Algebra 1, Algebra 2 and Geometry and signature of the math teacher*

### #M63A/B Pre-Calculus Honors

**1 Credit    Level 3                    NCAA**

This course is intended for the gifted mathematics student. It will provide a comprehensive presentation of Pre-Calculus topics with an emphasis on functions, particularly their properties and applications. These topics include domain, range, intercepts, asymptotes, symmetry, zeros, continuity, inverses, and composition, exponential functions, logarithmic functions, inverse trigonometric functions, piece-wise functions, and step functions. It will also include an overview of introductory Calculus topics.

*Requirements for placement: 75 or above in Honors Algebra 2/ Trig and signature of the Algebra 2/Trig teacher*



### **#M73A/B Calculus Honors**

**1 Credit      Level 3      NCAA**

This is a high school Level course in Calculus. It meets the needs of students planning to study advanced mathematics in college. This course includes topics in Calculus and analytic geometry, limits, differentiation, and integration with application to physics, engineering, and economics.

*Requirements for placement: 85 or above in Honors Algebra 2/Trig and signature of the Algebra 2/Trig teacher.*

### **#M84A/B AP Calculus**

**1 Credit      Level 4      NCAA**

This is a college Level course which provides students with the analytical skills necessary for advanced work in the sciences and mathematics. Topics included are limits, differentiation, and integration. The course follows the syllabus for Advanced Placement Calculus AB of the College Board. Students may take the Advanced Placement Exam in May for potential advanced placement credit.

*Requirements for placement: 90 or above in Honors Algebra 2/Trig and signature of Honors Algebra 2/Trig teacher.*

### **M95A College Mathematics**

The University of New Haven allows Notre Dame students who have completed their junior year to take advanced calculus courses offered at the university during the summer or during senior year. These courses are intended for those students with above average ability and achievement in mathematics.

*Requirements for placement: Completed Calculus Level 4: overall 85 average or above: signatures of the math department chairperson and your school counselor*