

## MATHEMATICS DEPARTMENT

The goals of the Mathematics Department are to improve and extend arithmetical skills, to develop a facility with the kinds of problems most citizens meet, to develop a facility with mathematical skills and concepts necessary to use in jobs, technical schools, armed services, and college work; and, to provide personal enjoyment. It is the goal of the department to provide opportunities for each student to progress in mathematics as far as personal ability, maturity, interest, and time allow. **Department Chair – Mr. Brent Larson – 402.557.3358**

### Number of Credits Required for Graduation:

Six

### Required Courses:

Students will take courses which best meet their needs, as determined by level and success in previous coursework. Math is sequential and classes must be completed successfully before moving on to the next course. Regardless of the first math class taken, all students must earn 3 years of math (6 credits) in order to graduate. This may range from Ramp Up to Algebra, Algebra 1-2, and Geometry to Honors Algebra 3-4, Honors Trigonometry/Pre-Calculus, and AP Calculus. It all depends on the individual student's point of entry in the sequence.

### Honors Courses:

Honors Algebra 1-2  
Honors Geometry 1-2  
Honors Algebra 3-4  
Honors Pre-Calc/Trig 1-2  
Honors Calculus 3  
Honors Differential Equations  
Honors Enrichment Math 1-2  
Honors Advanced Topics 1-2

### AP Courses:

AP Statistics 1-2  
AP Calculus AB 1-2  
AP Calculus BC 1-2

### Elective Courses:

Math Essentials 5-6  
Pre-Algebra 1-2  
Algebra 1-2  
Geometry 1-2  
Bridge to Algebra 3-4  
Algebra 3-4  
Math Analysis  
Pre-Calc/Trig 1-2  
Consumer Math

## PRE-ALGEBRA 1-2

This course is designed to meet the needs of the student who will benefit from a transition course which bridges the similarities of arithmetic and algebra. This course will contain spiraling reinforcement of basic algebraic concepts and topics in order to prepare students for successful placement in Algebra 1-2. This course will cover the content standards for pre-algebra, including operations on real numbers, conversions among fractions, decimals, and percents, solving linear equations and inequalities, graphing linear equations, working with polynomials, and using measures of central tendency to interpret data.

*Prerequisites: None*

*Duration: 2 semesters*

*Credit: 1 per semester*

*Grade Level: 9, 10*

## ALGEBRA 1-2

This course is a first-year algebra survey. It covers traditional algebra topics including a study of the four basic operations dealing with signed numbers and polynomials, solution of first and second degree equations, verbal problems, systems of linear equations, graphing and writing linear equations and inequalities, and simplifying exponential expressions.

*Prerequisites: None*

*Duration: 2 semesters*

*Credit: 1 per semester*

*Grade Level: 9, 10, 11, 12*

## HONORS ALGEBRA 1-2

This course is the honors section of Algebra 1-2. It covers traditional algebra topics including operations with signed numbers and polynomials, solving first-and second-degree equations, verbal problems, systems of linear equations, graphing and writing linear equations and inequalities, and simplifying exponential expressions. As an honors class, these topics will be covered in greater depth and with enrichment.

*Prerequisites: Grade of "A" in middle school pre-algebra and teacher recommendation and parent/student signature indicating a full year commitment*

*Duration: 2 semesters*

*Credit: 1 per semester*

*Grade Level: 9*

## GEOMETRY 1-2

This course is a complete study of geometry. Topics include congruence and similarity of figures, parallelism and perpendicularity, right triangle relationships, formal and informal proof, coordinate geometry, properties of polygons and circles, and perimeter, area, and volume of two- and three-dimensional figures. This course is the first semester of Geometry 1-2. Students enrolling in Geometry 1-2 should have passing grades in both semesters of Algebra 1-2.

*Prerequisites: Must have passed Algebra 1-2 in high school or earned a "B" or higher in Algebra 1-2 in middle school*

*Duration: 2 semesters*

*Credit: 1 per semester*

*Grade Level: 9, 10, 11, 12*

## HONORS GEOMETRY 1-2

This course is the honors section of Geometry 1-2. Topics include congruence and similarity of figures, parallelism and perpendicularity, right triangle relationships, formal and informal proof, coordinate geometry, properties of polygons and circles, and perimeter, area, and volume of two- and three-dimensional figures. As an honors class, each topic will be covered in greater depth and with enrichment. This course is the first semester of Honors Geometry 1-2. Students enrolling in this course should have proficient or advanced grades in both semesters of Honors Algebra 1-2, or advanced grades both semesters of Algebra 1-2 and teacher recommendation.

*Prerequisites: Grade of "B" or higher in Honors Algebra 1-2 and teacher recommendation or an "A" in Algebra in high school and teacher recommendation and parent/student signature indicating a full year commitment*

*Duration: 2 semesters*

*Credit: 1 per semester*

*Grade Level: 9, 10*

## BRIDGE TO ALGEBRA 3-4

This course is designed to prepare struggling students for Algebra 3-4. It is an intensive review of geometry topics including 2 and 3 dimensional measurement, Pythagorean Theorem, congruence, similarity, and coordinate geometry and an intensive review of basic algebra topics including solving and writing linear, quadratic, and systems of equations, graphing, exponent rules. Through the coursework, struggling students will be better prepared and more mature mathematically to meet the challenge of Algebra 3-4 content.

*Prerequisites: Algebra 1-2, Geometry, and only by Math Department placement*

*Duration: 2 semesters*

*Credit: 1 per semester*

*Grade Level: 11*

## ALGEBRA 3-4

This course covers the topics of a traditional second-year algebra course. Content includes solving polynomial equations as well as linear, absolute value, and quadratic equations and inequalities, and working with exponents and logarithms, complex numbers, systems of equations and inequalities, and simple probability. Appropriate technology will be used to assist in instruction and learning. This course is the first semester of Algebra 3-4. Students enrolling in this course will have successfully completed both semesters of Algebra 1-2 with passing grades.

*Prerequisites: Must have passed Algebra 1-2 and have taken Geometry 1-2. Freshmen cannot enroll in Algebra 3-4.*

*Duration: 2 semesters*

*Credit: 1 per semester*

*Grade Level: 10, 11, 12*

## HONORS ALGEBRA 3-4

This is the honors section of Algebra 3-4. As such the topics and concepts will be covered in more depth, and additional content is present as well. This course covers the topics of a traditional second-year algebra course. Content includes solving polynomial equations as well as linear, absolute value, and quadratic equations and inequalities, and working with exponents and logarithms, complex numbers, systems of equations and inequalities, matrix algebra and matrix solutions to systems of equations, series and sequences, and compound probability. Appropriate technology will be used to assist in instruction and learning.

*Prerequisites: Sophomores and Juniors need a "C" or higher in Honors Geometry and teacher recommendation, or an "A" in Geometry and teacher recommendation.*

*Freshmen need a "B" or higher in 7th grade algebra and 8th grade geometry and 8th grade teacher recommendation and parent/student signature indicating a full year commitment*

*Duration: 2 semesters*

*Credit: 1 per semester*

*Grade Level: 9, 10, 11*

## PRE-CALC/TRIG 1-2

This course includes topics of mathematics that are necessary for the successful study of calculus. Topics include polar coordinates, right triangle trigonometry, circular functions, logarithms, and graphs of rational and polynomial relations and functions. Students enrolling in this course should have successfully completed both semesters of Algebra 3-4 with passing grades.

*Prerequisites: Must have passed Algebra 3-4 and all previous math courses*

*Duration: 2 semesters*

*Credit: 1 per semester*

*Grade Level: 11, 12*

## HONORS PRE-CALC/TRIG 1-2

This course is the honors section of Pre-calculus/trigonometry. This course includes topics of mathematics that are necessary for the successful study of calculus. Topics include polar coordinates, right triangle trigonometry, circular functions, logarithms, and graphs of rational and polynomial relations and functions. Students enrolling in this course should have successfully completed both semesters of Honors Algebra 3-4 with proficient or advanced grades.

*Prerequisites: Grade "C" or higher in Honors Algebra 3-4 and teacher recommendation and parent/student signature indicating a full year commitment*

*Duration: 2 semesters*

*Credit: 1 per semester*

*Grade Level: 10, 11, 12*

## AP STATISTICS 1-2

This is a course in statistics that covers the topics in the syllabus published by the College Board. College credit and placement depend on the individual college. This statistics class will introduce students to the major concepts and tools for collecting, analyzing, and drawing conclusions from data. Students are exposed to four broad conceptual themes: Exploring Data, Planning a Study, Anticipating Patterns, and Statistical Inference. This course is equivalent to a one-semester, introductory, non-calculus based college course in statistics.

*Prerequisites: Pre-Calc Trig 1-2 and teacher recommendation, or Honors Algebra 3-4 and teacher recommendation if taken concurrently with Honors Pre-Calc/Trig*

*Duration: 2 semesters*

*Credit: 1 per semester*

*Grade Level: 11, 12*

## MATH ANALYSIS

Math Analysis is a full-year terminal math course for students who have reached proficiency in advanced algebra topics but have no intention of pursuing math- or science-related fields of study in post-secondary school. The course content includes Critical Thinking, Set Theory, Number Theory, Functions, Measurement, Personal Finance, Combinatorics, Probability, Statistics, and Logic.

*Prerequisite: Algebra 3-4 (passed, at the below basic level) and placement by Math Department*

*Duration: 2 semesters*

*Credit: 1 per semester*

*Grade Level: 11 (by approval only), 12*

## AP CALCULUS AB 1-2

This course follows the College Board's Advanced Placement syllabus for Calculus AB, which stresses the concept of limit and introduces the student to differential and integral calculus, including both theorems and techniques. Students enrolling in this course should have proficient or advanced grades in both semesters of Honors Pre-calculus/Trigonometry 1-2, or teacher recommendation. College Dual Enrollment may be available with this course.

*Prerequisites: Grade of "B" or higher in Honors Pre-Calc/Trig 1-2, and teacher recommendation and parent/student signature indicating a full year commitment*

*Duration: 2 semesters*

*Credit: 1 per semester*

*Grade Level: 11, 12*

## AP CALCULUS BC 1-2

This course follows the College Board's Advanced Placement syllabus for Calculus BC, which includes functions, graphs, limits, derivatives, integrals, polynomial approximations, and series. Students enrolling in this course should have proficient or advanced grades in both semesters of Honors Pre-calculus/Trigonometry, or teacher recommendation. College Dual Enrollment may be available with this course.

*Prerequisites: Grade of "B" or higher in Honors Pre-Calc/Trig 1-2, and teacher recommendation and parent/student signature indicating a full year commitment*

*Duration: 2 semesters*

*Credit: 1 per semester*

*Grade Level: 11, 12*

## HONORS CALCULUS 3

Topics are from multi variable calculus and include partial derivatives, multiple integrals and calculus of vector functions. Students enrolling in this course should have successfully completed AP Calculus BC. College Dual Enrollment may be available with this course.

*Prerequisites: Grade of "C" or higher in Calculus BC, must be paired with Differential Equations*

*Duration: 1 semester*

*Credit: 1*

*Grade Level: 12*

## HONORS DIFFERENTIAL EQUATIONS

Topics include first order, linear, or homogeneous differential equations and systems; the Laplace transform; boundary value problems; series and numerical solutions; and nonlinear systems. Students enrolling in this course should have successfully completed AP Calculus BC. College Dual Enrollment may be available with this course.

*Prerequisites: Grade of "C" or higher in Calculus BC, must be paired with Calculus 3*

*Duration: 1 semester*

*Credit: 1*

*Grade Level: 12*

## HONORS ENRICHMENT MATH 1-2

This course offers the talented and motivated mathematics student who desires to broaden his/her mathematical horizons exposure to the following: reinforcement and extension of algebra, reinforcement and extension of geometry, number theory, symbolic logic, three dimension geometry, analytic geometry and general problem solving.

*Prerequisites: Concurrent enrollment in honors math course*

*Duration: 2 semesters*

*Credit: 1 per semester*

*Grade Level: 9, 10, 11, 12*

## HONORS ADVANCED TOPICS

This course includes semester long topics beyond Calculus that include, but are not limited to, Linear Algebra, Set Theory, and Partial Differential Equations. Prerequisites: AP BC Calculus and teacher recommendation

*Prerequisites: Calculus BC and teacher recommendation*

*Duration: 2 semesters*

*Credit: 1 per semester*

*Grade Level: 11, 12*

## MATH ESSENTIALS 5-6

This course is the third year of a three-year sequence designed for identified special education students and ESL students. Topics include integers, pre-algebra, geometry and data analysis.

*Prerequisites: Math Department placement*

*Duration: 2 semesters*

*Credit: 1 per semester*

*Grade Level: 11, 12*

## CONSUMER MATH

This course is for seniors only. It is designed to help students develop an understanding of the reasons for and the benefits derived from taxes, the services available from banks and other lending institutions, the workings of insurance, and the basic concepts of consumer credit. The skills obtained in this course will help students become mathematically knowledgeable citizens.

*Prerequisites: 3 years of math, graduating seniors only and should not to be taken concurrently with any other math course,*

*Counselor/math department recommendation only*

*Duration: 2 semesters*

*Credit: 1 per semester*

*Grade Level: 12*