

**MATHEMATICS****Level Expectations**

	CP2	CP1	HR	A.P.
Pace	Teachers provide repetition of topics, and conduct regular re-teaching.	Teachers provide some re-teaching and repetition of selected topics.	Teachers have an expectation of prior knowledge, use an accelerated pacing	Teachers have an expectation of prior knowledge, use an accelerated pacing, and have abbreviated course time for tests.
Independence	Students may require frequent prompts and in class support to solve problems.	Students show independence but benefit from prompts when solving problems.	Student is an independent learner able to solve problems independently and not limited to teacher taught techniques used on similar problems.	Student is an independent learner able to solve problems independently and not limited to teacher taught techniques used on similar problems.
Writing Skills	Students receive guidance to use mathematical terms and symbols; assistance given to explain solutions to problems in context.	Students use mathematical terms and symbols with minimal assistance; capable of explaining solutions in context.	Students use precise and appropriate mathematical terms and symbols; students can make clear effective explanations of solutions.	Students use precise and appropriate mathematical terms and symbols; students can make clear effective explanations of solutions.
Reading Skills	Students receive guidance to distinguish between pertinent and extraneous information. Students may not accurately interpret the question; sometimes understand vocabulary, notations, charts, etc.	Students often distinguish between pertinent and extraneous information. Student interprets questions accurately and completely; often understand vocabulary, notations, charts, etc.	Students consistently distinguish between pertinent and extraneous information; interpret questions accurately and completely, anticipate further uses; understand vocabulary, etc.	Students consistently distinguish between pertinent and extraneous information; interpret questions accurately and completely, anticipate further uses; understand vocabulary, etc.
Analytical/Critical Thinking Skills	Students sometimes use an adequate strategy to approach a problem. Students demonstrate a difficulty with mathematical reasoning.	Students use an adequate strategy that leads to a solution. Students use and demonstrate adequate mathematical reasoning to correctly solve problems.	Students use efficient and/or sophisticated strategy leading directly to a solution and apply procedures accurately. He/she makes relevant observations or connections.	Students use efficient and/or sophisticated strategy leading directly to a solution and apply procedures accurately. He/she makes relevant observations or connections.
Homework	Students are expected to solve problems very similar to work in class. Students receive a daily homework review.	Students are expected to solve problems similar to work in class and receive a review of selected homework problems.	Students are expected to extend knowledge of work done in class, and review only homework when necessary.	Students are expected to extend knowledge of work done in class and review limited homework.
Time Commitment - Outside of Class	Students need assistance with time management and frequent reminders of deadlines. Students may sometimes receive outside help to maintain coursework.	Students have good time management skills but sometimes need reminders of deadlines. Students may sometimes receive outside help to maintain coursework.	Students have strong time management skills, ability to meet all deadlines and plan for long term projects. Students should not rely on help from others to maintain coursework.	Students have excellent time management skills, ability to meet all deadlines, and plan for long term projects independently. Students should not rely on help from others to maintain coursework.

**MATHEMATICS PROGRAM**

<u>Grade</u>	<u>HONORS</u>	<u>COLLEGE PREP 1</u>	<u>COLLEGE PREP 2</u>
9	Algebra I	Algebra I	Algebra I
10	Geometry	Geometry	Geometry
11	Algebra II	Algebra II	Algebra II
12	Calculus Statistics	Calculus Statistics	Statistics Math Models with Applications

**ADVANCED PLACEMENT**

Calculus AB

Statistics

**\*TAKING TWO COURSES SIMULTANEOUSLY\***

There are opportunities to “double up” on math courses at certain points in the curriculum. However, due to cumulative nature of mathematics, these opportunities are limited by the need for specific prerequisite skills before enrolling in certain courses.

The following criteria must be met in order for a student to take two math courses simultaneously:

- The student must have a teacher recommendation and department head approval before enrolling in two math courses.
- Taking two math courses simultaneously should not be coupled with a level change, as taking two courses at the same time is a challenge unto itself.

The following courses can be taken simultaneously, if the above criteria are met:

- Precalculus and Statistics
- Algebra II and Statistics

The Mathematics curriculum attempts to provide learning experiences for all students consistent with their academic abilities, needs, and aspirations. The program offered by the Mathematics Department reflects an awareness that we live in a complex age in which mathematics plays an increasingly important role for society and the individual alike. The intent of the curriculum is to present mathematics as a useful, exciting, and creative area of study that can be appreciated, enjoyed, and mastered by all students. Particular emphasis is placed on understanding mathematics with the goal of preparing students to adapt in a continuously changing, technical world. Students will be

challenged to achieve mathematical power through problem solving, communicating mathematically, reasoning, and making connections.

## CORE CURRICULUM

### **ALGEBRA I HONORS**

Year Course

5 credits

Prerequisite: Advanced Grade 8 Math; min grade of 88

Open to: Freshmen

Grade 8 Math; min grade of 93, Teacher Recommendation,  
Or Department Head Approval

This course is the first in a three-year sequence of courses that prepares students for AP Calculus in their senior year. Instructional time will focus on the following critical areas: deepening and extending understanding of linear and exponential relationships; solving systems of linear equations and inequalities; contrasting linear and exponential relationships with each other and engaging in methods for analyzing, solving, and using quadratic functions; applying linear models to data that exhibit a linear trend. Concepts will be explored in greater depth and extended to include the study of additional topics such as multi-variable and non-linear systems of equations, complex numbers, radical equations, and inverse functions.

### **ALGEBRA I CP1**

Year Course

5 credits

Prerequisite: Grade 8 Math; min grade of 80

Open to: Freshmen

Teacher Recommendation, or Department Head Approval

This course formalizes and extends the mathematics that students learned in the middle grades. Instructional time will focus on the following critical areas: deepening and extending understanding of linear and exponential relationships; solving systems of linear equations and inequalities; contrasting linear and exponential relationships with each other and engaging in methods for analyzing, solving, and using quadratic functions; applying linear models to data that exhibit a linear trend. Other topics to be studied include sequences, piecewise-defined functions, rational exponents, and statistical data displays. Concepts will be explored in greater depth and may be extended to include the study of additional topics.

### **ALGEBRA I CP2**

Year Course

5 credits

Prerequisite: Teacher Recommendation,

Open to: Freshmen

Or Department Head Approval

This course formalizes and extends the mathematics that students learned in the middle grades. Instructional time will focus on the following critical areas: deepening and extending understanding of linear and exponential relationships; solving systems of linear equations and inequalities; contrasting linear and exponential relationships with each other and engaging in methods for analyzing, solving, and using quadratic functions;

applying linear models to data that exhibit a linear trend. Other topics to be studied include sequences, piecewise-defined functions, rational exponents, and statistical data displays.

**GEOMETRY HONORS**

Year Course

5 credits

Prerequisite: Algebra Honors; min grade of 80,

Open to: So

Algebra I CP1; min grade of 91,

Teacher Recommendation or Department Head Approval

This course is the second in a three-year sequence of courses that prepares students for AP Calculus in their senior year. Instructional time will focus on the following critical areas: establishing criteria for congruence of triangles based on rigid motions; establishing criteria for similarity of triangles based on dilations and proportional reasoning; developing explanations of circumference, area, and volume formulas; applying the Pythagorean Theorem in the coordinate plane; proving basic geometric theorems. Other topics to be studied include right triangle trigonometry and working with conditional and compound probability. Concepts will be explored in greater depth and extended to include the study of additional topics such as the Laws of Sines and Cosines and their various applications.

**GEOMETRY CP1**

Year Course

5 credits

Prerequisite: Algebra I CP1; min grade of 75,

Open to: So.

Algebra I CP2; min. grade of 93, Teacher Recommendation,

Or Department Head Approval

This course is designed to develop good habits for valid deductive and inductive reasoning through the study of the size, shape and position of figures, their measurements and relationships. Instructional time will focus on the following critical areas: establishing criteria for congruence of triangles based on rigid motions; establishing criteria for similarity of triangles based on dilations and proportional reasoning; developing explanations of circumference, area, and volume formulas; applying the Pythagorean Theorem in the coordinate plane; proving basic geometric theorems. Other topics to be studied include right triangle trigonometry and working with conditional and compound probability. Concepts will be explored in greater depth and may be extended to include the study of additional topics.

**GEOMETRY CP2**

Year Course

5 credits

Prerequisite: Algebra I CP2,

Open to: So.

Teacher Recommendation or Department Head Approval

This course is designed to develop good habits for valid deductive and inductive reasoning through the study of the size, shape and position of figures, their measurements and relationships. Instructional time will focus on the following critical areas: establishing

criteria for congruence of triangles based on rigid motions; establishing criteria for similarity of triangles based on dilations and proportional reasoning; developing explanations of circumference, area, and volume formulas; applying the Pythagorean Theorem in the coordinate plane; proving basic geometric theorems. Other topics to be studied include right triangle trigonometry and working with conditional and compound probability.

### **ALGEBRA II HONORS**

Year Course

5 credits

Prerequisite: Geometry Honors; min grade of 80,  
or Geometry CP1; min grade of 91, Teacher Recommendation  
or Department Head Approval

Open to: Jr

This course is the third in a three-year sequence of courses that prepares students for AP Calculus in their senior year. Instructional time will focus on the following critical areas: relating the arithmetic of polynomial and rational expressions to the arithmetic of rational numbers; expanding understanding of functions and graphing to include trigonometric functions; synthesize and generalize functions and extend understanding of exponential functions to logarithmic functions. Other topics to be studied include data displays and summary statistics, probability, and data collection methods. Concepts will be explored in greater depth and extended to include the study of additional topics such as binomial expansion, graphs of rational functions, and solving trigonometric equations.

### **ALGEBRA II CP1**

Year Course

5 credits

Prerequisite: Geometry CP1; min grade of 75,  
or Geometry CP2; min grade of 93, Teacher Recommendation  
or Department Head Approval

Open to: Jr

This course builds on the work done in Algebra I and extends the repertoire of functions to include logarithmic, polynomial, rational, radical, and trigonometric functions. Instructional time will focus on the following critical areas: relating the arithmetic of polynomial and rational expressions to the arithmetic of rational numbers; expanding understanding of functions and graphing to include trigonometric functions; synthesize and generalize functions and extend understanding of exponential functions to logarithmic functions. Other topics to be studied include data displays and summary statistics, probability, and data collection methods. Concepts will be explored in greater depth and may be extended to include the study of additional topics.

### **ALGEBRA II CP2**

Year Course

5 credits

Prerequisite: Teacher Recommendation,  
or Department Head Approval

Open to: Jr

This course builds on the work done in Algebra I and extends the repertoire of functions to

include logarithmic, polynomial, rational, radical, and trigonometric functions. Instructional time will focus on the following critical areas: relating the arithmetic of polynomial and rational expressions to the arithmetic of rational numbers; expanding understanding of functions and graphing to include trigonometric functions; synthesize and generalize functions and extend understanding of exponential functions to logarithmic functions. Other topics to be studied include data displays and summary statistics, probability, and data collection methods.

## MATH ELECTIVES

### PRECALCULUS HONORS

Year Course

5 credits

Prerequisite: Algebra II Honors; min grade of 80,  
or Algebra II CP1; min grade of 91, Teacher Recommendation,  
Or Department Head Approval

Open to: Jr., Sr.

This preparatory course for Calculus examines functions in four ways: graphically, numerically, analytically, and through the context of real-world problems. The types of functions studied include polynomial, rational, exponential, logarithmic, and trigonometric. Other topics include induction, sequences and series, limits and introductory calculus concepts.

### PRECALCULUS CP1

Year Course

5 credits

Prerequisite: Algebra II CP1; min grade of 75,  
Teacher Recommendation or Department Head Approval

Open to: Jr., Sr.

This course is offered for students who have demonstrated interest and ability in mathematics. It is an extension of skills and concepts taught in college preparatory mathematics and provides a firm foundation for the study of higher-level mathematics. Topics studied include: trigonometry, advanced functions and graphing, conic sections, sequences and series, and elements of calculus.

**\*\*There is no PreCalculus CP2. Students that enroll in this course have the option of remaining in the course for the year or withdrawing. Students will not be moved to a different course.\*\***

### CALCULUS HONORS

Year Course

5 credits

Prerequisite: Precalculus Honors,  
or Precalculus CP1; min grade of 91, Teacher Recommendation,  
Or Department Head Approval

Open to: Seniors

Calculus Honors is a challenging course provided for students who have shown above average ability and motivation in mathematics. The focus is on developing an

understanding of the concepts of calculus and providing practice with its methods and applications. Graphing calculators are used regularly to explore and to assist in interpreting results. The main topics of the course include limits, rates of change, derivatives, graphical analysis, and applications of the derivative.

**\*\*There is no Calculus CP1. Students that enroll in this course have the option of remaining in the course for the year or withdrawing. Students will not be moved to a different course.\*\***

### **MATH MODELS W/ APPLICATIONS CP2**

Year Course

5 credits

Prerequisite: Algebra II CP2,

Open to: Seniors

Teacher Recommendation or Department Head Approval

This course will expand upon topics previously covered in Algebra and Geometry with a focus on applications and how to utilize these skills to solve real-world problems. Students will use algebraic, graphical, and geometric reasoning to recognize patterns and structure, to model information, and to solve problems from various disciplines. They will use mathematical methods from algebra, geometry, probability, and statistics to model and solve real-life applied problems involving money, data, chance, patterns, music, design, and science.

### **STATISTICS HONORS**

Year Course

5 credits

Prerequisite: Geometry HR; min. grade of 80, co-requisite: Algebra II

Open to: Jr., Sr

Algebra II Honors; min. grade of 80,

Or Geometry CP1; min. grade of 91, co-requisite: Algebra II

or Algebra II CP1; min grade of 91, Teacher Recommendation,

Or Department Head Approval

This course is recommended for seniors who are thinking about careers in business, the sciences, or social sciences. The course will move at a faster pace and will expect more independent learning than Statistics CP1. Topics to be studied include, but are not limited to, descriptive statistics, correlation and linear regression, data collection and analysis, experimental design, normal distributions, probability and inferential statistics including confidence intervals and significance tests. A TI-83 or TI-84 calculator is required for the class.

### **STATISTICS CP1**

Year Course

5 credits

Prerequisite: Algebra II CP1; min. grade of 75,

Open to: Seniors

or Algebra II CP2; min grade of 93, Teacher Recommendation,

Or Department Head Approval

This course is recommended for seniors who are thinking about careers in business, the sciences, or social sciences. Topics to be studied include, but are not limited to, descriptive statistics, correlation and linear regression, data collection and analysis, experimental design, normal distributions, probability and inferential statistics including confidence intervals and significance tests.

**STATISTICS CP2**

Year Course

5 credits

Prerequisite: Algebra II CP2,

Open to: Seniors

Teacher Recommendation, or Department Head Approval

This is an introductory course in statistics. Topics to be studied include, but are not limited to, data exploration, probability and random behavior, sampling distributions, estimating and bias, modeling, and normal distributions.

**AP MATH COURSES****AP CALCULUS**

Year Course

5 credits

Prerequisite: Precalculus Honors; min grade of 88,

Open to: Seniors

Teacher Recommendation or Department Head Approval

This course closely parallels a freshman college course. The focus is on understanding calculus concepts. A multi-representational approach is emphasized. Concepts, results, and problems will be expressed geometrically, numerically, analytically and verbally. Graphing calculators are used regularly to reinforce the relationships among the multiple representations of functions, to confirm written results, to explore and to assist in interpreting results. The themes of the course include derivatives, integrals, limits, approximation, and applications. All students taking this course must take the AP exam. Failure to take the exam will result in removal from the AP course.

**AP STATISTICS**

Year Course

5 credits

Prerequisite: Geometry Honors; min. grade of 88, co-requisite: Algebra II

Or Algebra II Honors; min. grade of 88,

Open to: Jr., Sr.

Teacher Recommendation or Department Head Approval

This course will cover topics dealing with descriptive statistics, methods of data collection and analysis, probability, hypothesis testing, and test of significance. The course will rely heavily on the use of technology. A TI-84 calculator is required for this class. The Advanced Placement Program prepares students for intermediate and advanced college courses by making demands upon them equivalent to those full-year introductory college courses. The course content will conform to the guidelines established by the AP Commission. All students taking this course must take the AP exam. Failure to take the exam will result in removal from the AP course.