MATHEMATICS

5 Credits Required

Common Pathways:

Integrated Math I, Integrated Math II, Integrated Math III, Mathematical Studies, (1 - Math Elective)
OR
Integrated Math I, Integrated Math II, Integrated Math III, Pre-Calculus (Dual Credit), (1 - Math Elective)
OR
Integrated Math I, Integrated Math II, IB Mathematics: Applications and Interpretation or IB Mathematics: Analysis and Approaches, (1 - Math Elective)
(Or IB, AP or Dual Credit course equivalents)

Course Name	9	10	11	12	Credit	Prerequisite[#]
Pre-IB Integrated Math I	X				1.0	Acceptance into the PMSA Pre-IB Program, Pre-IB Summer Acceleration Integrated Math I OR Placement Test
Advanced Pre-IB Integrated Math I	X				1.0	Placement Test
Pre-IB Integrated Math II		X			1.0	Pre-IB Integrated Math I, Pre-IB Summer Acceleration Integrated Math II OR Placement Test
Pre-IB Summer Acceleration Integrated Math II		X			0.5	PMSA Pre-IB Integrated Math I AND Departmental Recommendation
Advanced Pre-IB Integrated Math II		X			1.0	Advanced Pre-IB Integrated Math 1
Advanced Integrated Math III		X	X		1.0	Integrated Math II, Departmental Recommendation
Integrated Math III		X	X		1.0	Integrated Math II
AP Computer Science Principles		X	X	X	1.0	Integrated Math 1
AP Calculus AB			X	X	1.0	(Pre-Calculus (Dual Credit)*, Department Recommendation) OR (Integrated Math III, Mathematical Studies, Department Recommendation)
AP Calculus BC			X	X	1.0	Advanced Placement (AP®) - Calculus AB, and Department Recommendation
AP Computer Science			X	X	1.0	Junior/Senior-level standing and Department Recommendation
AP Statistics			X	X	1.0	Integrated Math II, Department Recommendation, Junior or Senior level standing
IB Mathematics: Applications and interpretation - DP Year 1			X	X	1.0	Acceptance into the IB Diploma Programme/Permission of Instructor (Certificate Candidates), Integrated Math III
Pre-Calculus (Dual Credit)*			X	X	1.0	(Integrated Math II, Department Recommendation)
IB Mathematics: Analysis and approaches - DP Year 1			X		1.0	Acceptance into the IB Diploma Programme/Permission of Instructor (Certificate Candidates), Integrated Math III
Mathematical Studies			X		1.0	Integrated Math II

Course Name	9	10	11	12	Credit	Prerequisite[#]
Pre-IB Summer Acceleration Integrated Math III			X		1.0	Pre-IB Integrated Math 2
College Mathematics[+]				X	1.0	(Integrated Math III, Mathematical Studies) OR (Integrated Math III, Pre-Calculus (Dual Credit)*)
IB Mathematics: Applications and interpretation - DP Year 2				X	1.0	IB Mathematics: Applications and interpretation - DP Year 1
IB Mathematics: Analysis and approaches - DP Year 2				X	1.0	IB Mathematics: Analysis and approaches - DP Year 1

*All Dual Credit courses require students to meet qualification requirements established by Triton College.

[+]This course satisfies PWR Act Transitional Math requirements.

[#]Prerequisite courses must be completed with a passing grade.

Course Descriptions (alphabetical order)

Advanced Integrated Math III
Grade: 10, 11
Length: 2 semesters
State Course Code: 02303A000
Advanced Integrated Math courses emphasize the teaching of mathematics as problem solving, communication, and reasoning, and emphasize the connections among mathematical topics and between mathematics and other disciplines. Advanced Integrated Math III covers the following topics: algebra, functions, geometry from both a synthetic and an algebraic perspective, trigonometry, statistics and probability, discrete mathematics, the conceptual underpinnings of calculus, and mathematical structure. Advanced Integrated Math III involves the study of polynomial, rational, logarithmic and trigonometric functions represented algebraically, graphically, numerically in tables and by verbal descriptions. Students write equivalent polynomial, rational, trigonometric and logarithmic expressions to reveal information and key features. Students make geometric constructions and apply geometric concepts and trigonometric ratios to describe, model and solve problems. Students distinguish among sample surveys, experiments and observational studies to determine and interpret data. With this course, students further explore quadratic functions and extend learning to polynomial functions. Students extend their understanding of arithmetic and geometric sequences to series, and their knowledge of trigonometric ratios to trigonometric functions. Additionally, students explore distributions of data, confidence intervals, and statistical significance.

AP Calculus AB
Grade: 11, 12
Length: 2 semesters
State Course Code: 02124A000
*Dual Credit students must meet qualification requirements established by Triton College This course is intended for the mature student interested in earning college credit. Students investigate differential and integral calculus with algebraic and transcendental functions. Special emphasis is given to techniques of integration and application to maxima and minima, related rate, curve sketching, area and volume problems. Analytic geometry is also studied with emphasis on equations of curves. Students interested in pursuing careers in engineering, medicine, and the sciences should consider this course necessary for these careers. Explore the key concepts, methods, and applications of single-variable calculus including functions, graphs, and limits, derivatives, integrals, and the

Fundamental Theorem of Calculus. Become familiar with concepts, results, and problems expressed in multiple ways including graphically, numerically, analytically, and verbally. Use technology to help solve problems, experiment, interpret results, and support your conclusions. Triton College dual credit may be available. Students in this course are required to take the AP® Exam. Fee: Cost of the AP® Exam fee per the College Board rate. Reduced fee waivers may apply.

AP Calculus BC
Grade: 11, 12
Length: 2 semesters
State Course Code: 02125A000
*Dual Credit students must meet qualification requirements established by Triton College Explore the key concepts, methods, and applications of single-variable calculus including all topics covered in AP® Calculus AB (functions, graphs, and limits, derivatives, integrals, and the Fundamental Theorem of Calculus) as well as additional topics in differential and integral calculus, such as parametric, polar and vector functions, and series. Become familiar with concepts, results, and problems expressed in multiple ways including graphically, numerically, analytically, and verbally. Use technology to help solve problems, experiment, interpret results, and support your conclusions. Triton College dual credit may be available. Students in this course are required to take the AP® Exam. Fee: Cost of the AP® Exam fee per the College Board rate. Reduced fee waivers may apply.

AP Computer Science
Grade: 11, 12
Length: 2 semesters
State Course Code: 10157A000
AP Computer Science A is based on the syllabus developed by the College Board. Students are introduced to the formal concepts of object-oriented computer programming, including program design, control structures, data structures and algorithms using the Java programming language. Students will gain an understanding of the history of computing, and the nature of hardware and software, the software design process, and the basics of object-oriented programming, as well as the ethical considerations of computer science. They will also gain a familiarity with Java classes, objects, and data types; basic Java syntax; constructor, accessor, and mutator methods; decision and looping statements; and logical operators, among others. Students will have the opportunity to further develop and refine their programming skills by focusing on the techniques of data abstraction, including encapsulation and inheritance. In particular, the emphasis is on the organization of information and the implementation of common data structures such as arrays and array lists, as well as various searching and sorting methods through such structures. Students also explore recursion and the close relationship between data structures and algorithms including basic complexity analysis and comparisons between several different methods. In addition, AP® Computer Science A is a course designed to enhance students' logical problem solving abilities. Not only does it increase student understandings of the Java language, but it also builds analytical skills that are valuable in the field of computer science, in other academic courses, and in life in general. This class will enable students to significantly increase their computer science and programming skills - skills that are needed in an ever-increasing array of college courses and workplaces. Throughout this course, students are encouraged to work individually and collectively to solve problems, share solutions, and make important discover. Triton College dual credit may be available. Students in this course are required to take the AP® Exam associated with this content area.
Fee: Cost of the AP® Exam fee per the College Board rate. Reduced fee waivers may apply.

AP Computer Science Principles
Grade: 10-12
Length: 2 semesters
State Course Code: 10161A000
AP Computer Science Principles offers a multidisciplinary approach to teaching the underlying principles of computation. The course will introduce students to the creative aspects of programming, abstractions, algorithms, large data sets, the Internet, cybersecurity concerns, and computing impacts.

AP Statistics
Grade: 11, 12
Length: 2 semesters
State Course Code: 02203A000
Learn about the major concepts and tools for collecting, analyzing, and drawing conclusions from data. Develop analytical and critical thinking skills as you learn to describe data patterns and departures from patterns, plan and conduct studies, use probability and simulation to explore random phenomena, estimate population parameters, test hypotheses, and make statistical inferences. Triton College dual credit may be available. Students in this course are required to take the AP® Exam associated with this content area. Fee: Cost of the AP® Exam fee per the College Board rate. Reduced fee waivers may apply.

Advanced Pre-IB Integrated Math I
Grade: 9
Length: 2 semesters
State Course Code: 02061A000
This course prepares students to take the International Baccalaureate at the subsidiary or higher level. Topics include the integration of operations and properties of number sets; trigonometric functions, equations, graphs, algebra and coordinate geometry; some linear equations, polynomial and quadratic functions and equations; logarithmic functions, statistics and probability, discrete mathematics, the conceptual underpinnings of calculus, and mathematical structure. The multi-period sequence of integrated math replaces the traditional algebra1, geometry, algebra 2 sequence of courses, and covers the following topics during a 3 or 4 year sequence; algebra, functions, geometry from both synthetic and algebraic perspective, trigonometry, statistics and probability, discrete mathematics, the conceptual underpinnings of calculus, and mathematical structure.

Advanced Pre-IB Integrated Math II
Grade: 10
Length: 2 semesters
State Course Code: 02061A000
This course prepares students to take the International Baccalaureate at the subsidiary or higher level. Topics include the integration of operations and properties of number sets; trigonometric functions, equations, graphs, algebra and coordinate geometry; some linear equations, polynomial and quadratic functions and equations; logarithmic functions, statistics and probability, discrete mathematics, the conceptual underpinnings of calculus, and mathematical structure. The multi-period sequence of integrated math replaces the traditional algebra 1, geometry, algebra 2 sequence of courses, and covers the following topics during a 3 or 4-year sequence; algebra, functions, geometry from both synthetic and algebraic perspective, trigonometry, statistics and probability, discrete mathematics, the conceptual underpinnings of calculus, and mathematical structure.

College Mathematics
Grade: 12
Length: 2 semesters
State Course Code: 02102A000
Discrete Mathematics courses include the study of topics such as number theory, discrete probability, set theory, symbolic logic, Boolean algebra, combinatorics, recursion, basic algebraic structures, graph theory, consumer mathematics, numeral systems, and geometry in nature and in daily life. Satisfies Illinois PWR Act for Transitional Math.

IB Mathematics: Applications and Interpretation - DP Year 1
Grade: 11, 12
Length: 2 semesters
State Course Code: 02131A000
IB Mathematical Studies emphasizes the applications of mathematics with a focus on statistical techniques. This course is designed for students of varied mathematical backgrounds and abilities, giving them the opportunity to

gain understanding and learn the concepts and techniques to enable them to solve problems in a variety of settings. Students will learn important concepts and techniques and gain an understanding of various mathematical topics (including number and algebra, descriptive statistics, logic/sets/probability, statistical applications, geometry and trigonometry, mathematical models, intro to differential calculus). Students will undertake a project involving the collection of information or the generation of measurements, and the analysis and evaluation of the information or measurements. Students will be able to apply the skills and techniques learned in Mathematical Studies to the needs of their other DP courses or in their post-secondary studies. (Additionally, students are required to take the IB examinations in May, which include short response and extended response questions.)

IB Mathematics: Applications and Interpretation - DP Year 2
Grade: 12
Length: 2 semesters
State Course Code: 02131A000
IB Mathematical Studies emphasizes the applications of mathematics with a focus on statistical techniques. This course is designed for students of varied mathematical backgrounds and abilities, giving them the opportunity to gain understanding and learn the concepts and techniques to enable them to solve problems in a variety of settings. Students will learn important concepts and techniques and gain an understanding of various mathematical topics (including number and algebra, descriptive statistics, logic/sets/probability, statistical applications, geometry and trigonometry, mathematical models, intro to differential calculus). Students will undertake a project involving the collection of information or the generation of measurements, and the analysis and evaluation of the information or measurements. Students will be able to apply the skills and techniques learned in Mathematical Studies to the needs of their other DP courses or in their post-secondary studies. (Additionally, students are required to take the IB examinations in May, which include short response and extended response questions.)

IB Mathematics: Analysis and Approaches - DP Year 1
Grade: 11
Length: 2 semesters
State Course Code: 02132A000
IB Mathematics focuses on introducing important mathematical concepts through the development of mathematical techniques. Students will be introduced to these concepts in a comprehensible and coherent way. Students will be able to apply the mathematical knowledge they have acquired to solve realistic problems set in an appropriate context. Moreover, the primary aim of all IB Mathematics courses is that the students enjoy mathematics and appreciate its elegance and power. Topics of study include statistics and probability, algebra, functions, trigonometry. Each student will be introduced to the mathematics exploration, in which he/she will take a considered approach to various mathematical activities and explore different mathematical ideas on a topic of his/her choice. (Additionally, students are required to take the IB examinations in May, which include short response and extended response questions.)

IB Mathematics: Analysis and Approaches - DP Year 2
Grade: 12
Length: 2 semesters
State Course Code: 02132A000
Students will continue the study of important mathematical concepts through the development of mathematical techniques. Students will be able to apply the mathematical knowledge they have acquired to solve realistic problems set in an appropriate context. Topics of study include calculus and vectors. Students will complete the mathematics exploration introduced in Year 1. (Additionally, students are required to take the IB examinations in May, which include short response and extended response questions.

Integrated Math III
Grade: 10, 11
Length: 2 semesters
State Course Code: 02303A000

Integrated Math courses emphasize the teaching of mathematics as problem solving, communication, and reasoning, and emphasize the connections among mathematical topics and between mathematics and other disciplines. Integrated Math III covers the following topics: algebra, functions, geometry from both a synthetic and an algebraic perspective, trigonometry, statistics and probability, discrete mathematics, the conceptual underpinnings of calculus, and mathematical structure. Integrated Math III involves the study of polynomial, rational, logarithmic and trigonometric functions represented algebraically, graphically, numerically in tables and by verbal descriptions. Students write equivalent polynomial, rational, trigonometric and logarithmic expressions to reveal information and key features. Students make geometric constructions and apply geometric concepts and trigonometric ratios to describe, model and solve problems. Students distinguish among sample surveys, experiments and observational studies to determine and interpret data. With this course, students further explore quadratic functions and extend learning to polynomial functions. Students extend their understanding of arithmetic and geometric sequences to series, and their knowledge of trigonometric ratios to trigonometric functions. Additionally, students explore distributions of data, confidence intervals, and statistical significance.

Mathematical Studies
Grade: 11
Length: 2 semesters
State Course Code: 02109A000
Mathematical Studies is intended to provide students with the skills to cope with the mathematical demands of a technological society, course topics include linear, quadratic, and exponential functions, solutions, and graphs; skills in computation, estimation, and development of algorithms; data analysis, including collection, calculation, and presentation of statistics; set operations and logic; business techniques, including progressions and linear programming; and geometry and trigonometry.

Pre-Calculus (Dual Credit)
Grade: 11, 12
Length: 2 semesters
State Course Code: 02110A000
Operations on real and complex numbers, functional representation, systems of equations, determinants, mathematical induction, and theory of equations and inequalities are covered. Also included is an introduction to the basic ideas of the relational aspects of plane trigonometry.

Pre-IB Integrated Math I
Grade: 9
Length: 2 semesters
State Course Code: 02301A000
This course will emphasize the teaching of mathematics as problem solving, communication, and reasoning, and emphasize the connections among mathematical topics and between mathematics and other disciplines. Pre-IB Integrated Math I covers the following topics: algebra, functions, geometry from both a synthetic and an algebraic perspective, trigonometry, statistics and probability, discrete mathematics, the conceptual underpinnings of calculus, and mathematical structure. Pre-IB Integrated Math I involves the study of linear and exponential functions (with domains in the integers), including application and interpretation of statistics and real-world situations. Students reason about functions and the number and nature of solutions to equations, systems of equations, inequalities and systems of inequalities. Students define congruence using transformational geometry. Students apply transformations to linear, exponential, piece-wise, absolute value, square root and cube root functions. They explore these function types represented algebraically, graphically, numerically in tables, and by verbal descriptions. Students practice solving problems and expressing solutions in multiple ways while learning how various mathematics disciplines are connected. It will also involve the study of quadratic and exponential functions represented algebraically, graphically, numerically in tables and by verbal descriptions. Students write equivalent radical, rational and quadratic expressions to reveal information using properties of exponents, completing the square, and/or factoring. Students define similarity using transformational geometry and use this definition to prove geometric theorems. Students learn and apply trigonometric ratios, the Pythagorean Theorem and the

relationship between sine and cosine to solve problems. Students recognize, calculate and use conditional probability and independence. This course focuses on increasing students' complete mathematical understanding as they work with geometric relationships, coordinate planes, trigonometric ratios, and quadratic functions.

Pre-IB Integrated Math II
Grade: 10
Length: 2 semesters
State Course Code: 02302A000
This course will emphasize the teaching of mathematics as problem solving, communication, and reasoning, and emphasize the connections among mathematical topics and between mathematics and other disciplines. It covers the following topics: algebra, functions, geometry from both a synthetic and an algebraic perspective, trigonometry, statistics and probability, discrete mathematics, the conceptual underpinnings of calculus, and mathematical structure. Pre-IB Integrated Math II involves the study of quadratic and exponential functions represented algebraically, graphically, numerically in tables and by verbal descriptions. Students write equivalent radical, rational and quadratic expressions to reveal information using properties of exponents, completing the square, and/or factoring. Students define similarity using transformational geometry and use this definition to prove geometric theorems. Students learn and apply trigonometric ratios, the Pythagorean Theorem and the relationship between sine and cosine to solve problems. Students recognize, calculate and use conditional probability and independence. This course focuses on increasing students' complete mathematical understanding as they work with geometric relationships, coordinate planes, trigonometric ratios, and quadratic functions. It will also involve the study of polynomial, rational, logarithmic and trigonometric functions represented algebraically, graphically, numerically in tables and by verbal descriptions. Students write equivalent polynomial, rational, trigonometric and logarithmic expressions to reveal information and key features. Students make geometric constructions and apply geometric concepts and trigonometric ratios to describe, model and solve problems. Students distinguish among sample surveys, experiments and observational studies to determine and interpret data. With this course, students further explore quadratic functions and extend learning to polynomial functions. Students extend their understanding of arithmetic and geometric sequences to series, and their knowledge of trigonometric ratios to trigonometric functions. Additionally, students explore distributions of data, confidence intervals, and statistical significance.

Pre-IB Summer Acceleration Integrated Math II
Grade: (Rising Sophomores - Summer prior to Sophomore year)
Length: 1 semester
State Course Code: 02302A000
This course will bridge Pre-IB Integrated Math I and Pre-IB Integrated Math II and is designed to prepare the student for the following topics: algebra, functions, geometry from both a synthetic and an algebraic perspective, trigonometry, statistics and probability, discrete mathematics, the conceptual underpinnings of calculus, and mathematical structure. This course will involve the study of quadratic and exponential functions represented algebraically, graphically, numerically in tables and by verbal descriptions. Students write equivalent radical, rational and quadratic expressions to reveal information using properties of exponents, completing the square, and/or factoring.

Pre-IB Summer Acceleration Integrated Math III
Grade: Rising Juniors – (Summer prior to Junior year)
Length: 2 semesters
State Course Code: 02303A000
This course prepares students to take the International Baccalaureate at the subsidiary or higher level. Topics include the integration of operations and properties of number sets; trigonometric functions, equations, graphs, algebra and coordinate geometry; some linear equations, polynomial and quadratic functions and equations; logarithmic functions, statistics and probability, discrete mathematics, the conceptual underpinnings of calculus, and mathematical structure. The multi-period sequence of integrated math replaces the traditional algebra1, geometry, algebra 2 sequence of courses, and covers the following topics during a 3 or 4 year sequence; algebra,

functions, geometry from both synthetic and algebraic perspective, trigonometry, statistics and probability, discrete mathematics, the conceptual underpinnings of calculus, and mathematical structure. This course is for students who choose to accelerate their math skills during summer.