

MATHEMATICS

Mathematics offers students an appreciation and understanding of the world of numbers and space, and skill in working with them. Placement will be determined by the Math Department. For students to continue in the Honors curriculum, it is necessary to have the recommendation of the instructor. For Honors and AP courses, such a recommendation may depend on the student receiving an ‘A’ in both semesters of the current year. Students in Algebra II/Trig Honors or above must have a T1-89 calculator.

The mathematics sequences offered at Jesuit:

| <i>9th</i> | <i>10th</i> | <i>11th</i> | <i>12th</i> |
|-------------------------|-------------------------|--------------------------|----------------------------------|
| General Algebra I | General Geometry | General Algebra II | Statistics |
| Algebra I | Geometry | Algebra II/Trigonometry. | Precalculus or Statistics |
| Algebra I Honors | Geometry Honors | Algebra II/Trig. Honors | Precalculus Honors or Statistics |
| Algebra I Honors | Geometry Honors | Precalculus Honors | AP Calculus AB |
| Geometry Honors | Algebra II/Trig. Honors | Precalculus Honors | AP Calculus AB |
| Geometry Honors | Precalculus Honors | AP Calculus AB | AP Calculus BC |
| Algebra II/Trig. Honors | Precalculus Honors | AP Calculus AB | AP Calculus BC |
| Precalculus Honors | AP Calculus AB | AP Calculus BC | *Advanced Math Offering |
| Precalculus Honors | AP Calculus AB/BC | *Advanced Math Offering | *Advanced Math Offering |
| AP Calculus AB | AP Calculus BC | *Advanced Math Offering | *Advanced Math Offering |
| AP Calculus AB/BC | *Advanced Math Offering | *Advanced Math Offering | *Advanced Math Offering |
| AP Calculus BC | *Advanced Math Offering | *Advanced Math Offering | *Advanced Math Offering |

*Advanced Math Offerings include Multivariable Calculus, Introduction to Linear Algebra, Discrete Mathematics or Number Theory. These courses may receive dual-credit through Portland State University.

Students are not locked into any one of these sequences. Mathematics teachers assess each student’s progress continuously and will accelerate any student who may be ready to move to a higher level of math. Some students take summer school math classes (with teacher permission) to progress to a higher level in the fall. A student who is struggling with one level of mathematics may move to a different sequence which more appropriately meets the student’s academic needs.

MATHEMATICS - HONORS AND ADVANCED PLACEMENT

The student in an Honors or Advanced Placement mathematics class is expected to do a greater amount of work than is normally done in that year of mathematics studies. The assumption is that a student who selects, with the approval of the instructor, an advanced section is willing both to approach the subject at a more sophisticated level and to devote additional time to study at home. Mathematics Honors students must be able to work independently. See “Requirements of Students Taking Honors and Advanced Placement Classes.”

GENERAL ALGEBRA I

Topics for study include: properties of the real numbers; solving and graphing linear equations, solving quadratic equations; introduction to rational equations and functions; and an introduction to radicals. This course differs from Algebra I in its pace and emphasis on fundamentals.

ALGEBRA I

Topics for study include: properties of the real numbers; equations in one and two variables; inequalities in one and two variables; functions; graphing equations and inequalities; systems of equations and inequalities; exponents and polynomials; quadratic functions and equations; exponential and radical functions; and rational functions and equations.

ALGEBRA I - HONORS

Topics for study include those covered in Algebra I, with a faster pace and greater emphasis on advanced concepts.

GENERAL GEOMETRY

Topics for study include: principles of geometric construction; properties of triangles; introduction to proofs; properties of polygons and circles; and postulates and theorems. This course differs from Geometry in its pace and emphasis on fundamentals.

GEOMETRY

Topics for study include: coordinate geometry; properties of triangles; introduction to logic and proofs; properties of polygons and circles; postulates and theorems; congruence; similarity; area; volume; and right triangle trigonometry.

GEOMETRY - HONORS

Topics of study include those in Geometry plus fundamental Algebra II/Trigonometry topics including: rational and negative exponents; polynomials and factoring; graphing; rational expressions; an introduction to exponential and logarithmic functions; and right triangle trigonometry.

GENERAL ALGEBRA II

Topics for study include: review of Algebra I concepts; graphing of equations; polynomials; rational expressions; rational and negative exponents; and an introduction to exponential and logarithmic functions. This course differs from Algebra II in its pace and emphasis on fundamentals.

ALGEBRA II / TRIGONOMETRY

Topics for study include: review of Algebra I concepts; rational and negative exponents; polynomials; graphing of equations; rational expressions; logarithms; exponential and logarithmic equations; and trigonometry (including the unit circle and right triangle trigonometry).

ALGEBRA II / TRIGONOMETRY - HONORS

Topics for study include those of Algebra II / Trigonometry, with a faster pace and greater emphasis on advanced concepts.

PRECALCULUS

Topics for study include: the real number system, including irrational numbers; linear, quadratic, and higher degree functions and their graphs; polynomial and rational functions; exponential and logarithmic functions; trigonometry and the unit circle; and trigonometric identities.

PRECALCULUS - HONORS

Topics for study include: review of Algebra I and Algebra II concepts; linear, quadratic, and higher degree functions and their graphs; polynomials; rational, exponential and logarithmic functions; right triangle trigonometry and the unit circle; trigonometric identities; law of sines and cosines; vector and matrix operations; arithmetic and geometric sequences; and probability.

INTRODUCTION TO PROBABILITY AND STATISTICS I & II (PSU STAT 243/244)

PREREQUISITE: ALGEBRA II OR GREATER; OPEN TO SENIORS ONLY

A basic course in statistical analysis including presentation of data probability, probability distributions, sampling distributions, estimation, tests of significance, experimental design and analysis of variance, regression and correlation, nonparametric statistics, selected topics, applications, and use of statistical

computer packages. Qualified students in this course may receive dual credit through Portland State University.

CALCULUS AB - ADVANCED PLACEMENT

Topics for study include: limits; differentiation; applications of differentiation; integration; applications of integration; and elementary differential equations. Qualified senior students may take the Advanced Placement Calculus AB Exam.

CALCULUS BC - ADVANCED PLACEMENT

Topics of study include: a review of AP Calculus AB topics; parametric equations; polar coordinates; advanced integration techniques; improper integrals; series; two-dimensional motion; and vectors. Qualified students may take the Advanced Placement Calculus BC Exam.

INTRODUCTION TO LINEAR ALGEBRA (PSU MTH 261)

PREREQUISITE: RECOMMENDATION OF AP CALCULUS BC TEACHER

Linear algebra deals with the theory of systems of linear equations, matrices, vector spaces, determinants, and linear transformations. This course develops concepts and techniques that are basic to advanced mathematics and are an important tool in a variety of disciplines, including engineering, physics, computer science, statistics, and economics. Qualified students in this course may receive dual credit through Portland State University.

MULTIVARIABLE CALCULUS (PSU MTH 254)

PREREQUISITE: RECOMMENDATION OF AP CALCULUS BC TEACHER

Topics of study include: infinite sequences and series, vectors and the geometry of space, vector functions, partial derivatives, multiple integrals, and vector calculus; and applications. Qualified students in this course may receive dual credit through Portland State University.

The following advanced math electives are available on a two-year cycle:

In 2015-16, Discrete Mathematics will be offered.

In 2016-17, Number Theory will be offered.

NUMBER THEORY (PSU MTH 346)

PREREQUISITE: RECOMMENDATION OF AP CALCULUS BC TEACHER

Number theory is the branch of pure mathematics concerned with the properties of integers. It is one of the oldest branches of mathematics, dating back to Euclid. One of its central objects of study is prime numbers and their properties and relations. Recently, number theory has found significant application in computer science and cryptography. Qualified students in this course may receive dual credit through Portland State University.

DISCRETE MATHEMATICS (PSU MTH 356)

PREREQUISITE: RECOMMENDATION OF AP CALCULUS BC TEACHER

Discrete mathematics is quickly becoming one of the most important areas of mathematical research, with applications to cryptography, engineering, and computer science. Topics of study include: combinatorics, probability, number theory, and graph theory. Qualified students in this course may receive dual credit through Portland State University.

INTRO TO COMPUTER SCIENCE/PROGRAMMING

OPEN TO SOPHOMORES, JUNIORS, AND SENIORS

PREREQUISITE: PERMISSION OF THE TEACHER

This first course in computer science offers a gentle introduction to programming using Alice, Python, and Java. Students program virtual worlds, manipulate digital photographs, and implement 2D games while learning the fundamentals of computer programming. No previous experience is required.

COMPUTER SCIENCE - ADVANCED PLACEMENT

OPEN TO SOPHOMORES, JUNIORS AND SENIORS

PREREQUISITES: INTRO TO COMPUTER SCIENCE/PROGRAMMING OR PERMISSION OF THE TEACHER

This is a course in algorithms and data structures using the Java programming language. Topics include searching and sorting algorithms, efficiency of algorithms, linked lists, binary trees, stacks, queues and maps. Object-oriented programming is emphasized. This course prepares students for the Advanced Placement exam in computer science.