

MATHEMATICS

The Math Department offers a variety of courses for the college-bound and non-college-bound student. Students should be aware that many colleges and universities require four credits for admission. Activities in all math classes include in-class work, homework assignments, problem solving, practical applications, and the use of technology. A calculator is required for all math classes. Some prerequisites may be waived by permission of the instructor. The Math department is dedicated to ensuring that every Horizon student graduates with a strong background in the fundamentals of algebra, geometry, and statistics. *All schedule changes to math courses require administrative approval.*

INTEGRATED MATH I - (Single period - 2155)

9 **1 credit**

In Integrated Math I, students will study linear and exponential equations and functions. Students will use linear regression and perform data analysis. They will also learn about geometry topics such as simple proofs, congruence, and transformations.

INTEGRATED MATH II - (Single period – 2160)

9, 10 **1 credit**

In Integrated Math II, students will study quadratic, absolute value, and other functions. Students will also explore polynomial equations, factoring, probability and their applications. Coverage of geometry topics extends to polygon relationships, proofs, similarity, trigonometry, circles, and three-dimensional figures.

PREREQUISITE: Integrated Math I

INTEGRATED MATH I & INTEGRATED MATH II BLOCK - (Two periods – 2155B & 2160B)

9 **2 credits**

In Integrated Math I, students will study linear and exponential equations and functions. Students will use linear regression and perform data analysis. They will also learn about geometry topics such as simple proofs, congruence, and transformations.

In Integrated Math II, students will study quadratic, absolute value, and other functions. Students will also explore polynomial equations, factoring, probability and their applications. Coverage of geometry topics extends to polygon relationships, proofs, similarity, trigonometry, circles, and three-dimensional figures.

Students will cover Integrated Math I first semester and Integrated Math II second semester. Block courses are designed so that students remain in the course for the entire year.

INTEGRATED MATH III - (Single period – 2165)

10, 11, 12 **1 credit**

In Integrated Math III, students will expand their understanding of area and volume with geometric modeling, which students will apply throughout the course as they learn new types of functions. Students will study polynomial, radical, logarithmic, rational, and trigonometric functions. They will also learn how visual displays and statistics relate to different types of data and probability distributions.

PREREQUISITE: Integrated Math II

INTEGRATED MATH II & INTEGRATED MATH III BLOCK - (Two periods – 2160B & 2165B)

9, 10 **2 credits**

In Integrated Math II, students will study quadratic, absolute value, and other functions. Students will also explore polynomial equations, factoring, probability and their applications. Coverage of geometry topics extends to polygon relationships, proofs, similarity, trigonometry, circles, and three-dimensional figures.

In Integrated Math III, students will expand their understanding of area and volume with geometric modeling, which students will apply throughout the course as they learn new types of functions. Students will study polynomial, radical, logarithmic, rational, and trigonometric functions. They will also learn how visual displays and statistics relate to different types of data and probability distributions.

Students will cover Integrated Math II first semester and Integrated Math III second semester. Block courses are designed so that students remain in the course for the entire year.

PREREQUISITE: Integrated Math I and Teacher Recommendation.

INTEGRATED MATH III & TRIGONOMETRY/PRECALCULUS BLOCK - (Two periods – 2165B & 2115B)

10, 11

2 credits

In Integrated Math II, students will study quadratic, absolute value, and other functions. Students will also explore polynomial equations, factoring, probability and their applications. Coverage of geometry topics extends to polygon relationships, proofs, similarity, trigonometry, circles, and three-dimensional figures. Trig/Precalculus courses combine the study of Trigonometry, Elementary Functions, Analytic Geometry, and Math Analysis topics as preparation for calculus. Topics typically include the study of complex numbers; polynomial, logarithmic, exponential, rational, right trigonometric, and circular functions, and their relations, inverses and graphs; trigonometric identities and equations; solutions of right and oblique triangles; vectors; the polar coordinate system; conic sections; sequences and series.

MUST REGISTER FOR BOTH COURSES TO TAKE AS A BLOCK. Students will cover Integrated Math III first semester and Trig/Pre-Calc second semester. Block courses are designed so that students remain in the course for the entire year.

PREREQUISITE: Recommended “B” in Integrated Math I/II Block.

AP PRECALCULUS - (Single period – 110140)

10, 11, 12

1 credit

In AP Precalculus (formally TRIGONOMETRY/PRECALCULUS at HHS), students explore everyday situations and phenomena using mathematical tools and lenses in order to prepare students for other college-level mathematics and science courses. Students study each function type through their graphical, numerical, verbal, and analytical representations and their applications in a variety of contexts. The major units covered include polynomial and rational functions, exponential and logarithmic functions, trigonometric and polar functions, as well as functions involving parameters, vectors, and matrices. Students will apply their understanding of these functions by constructing and validating appropriate function models for various scenarios and data sets. Successful performance on the AP Exam may earn college credit.

PREREQUISITE: Integrated Math III. Teachers strongly recommend a grade of “C” or higher to move on to the next level.

NOTE: Students are required to complete a recommendation form which will need to be signed by their current Math 3 teacher. Advanced Placement exam required, \$99 fee (subject to change based on the College Board). For more information about AP, go to their website at: www.collegeboard.org/ap. AP courses cannot be dropped once they are approved.

ALGEBRAIC LITERACY & COLLEGE ALGEBRA (MAT 1340) - (Single Period – 110030 & 114000)

11, 12

1 HS credit, 4 college credit

Focuses on a variety of functions and the exploration of their graphs. Topics include: equations and inequalities, operations on functions, exponential and logarithmic functions, linear and non-linear systems, and an introduction to conic sections. The last five units of study will span the Spring semester. These units correspond with the Front Range Community College Algebra (MAT 1340). All students must register for the Front Range concurrent enrollment credit in the Spring semester. **Successful students will be awarded 4 CE math credits for MAT 1340.** MAT 1340 is a statewide Guaranteed Transfer (GT) class. This class will transfer to other public colleges and universities in Colorado. It is not guaranteed to transfer to out-of-state schools. There are no fees to take this course.

MUST REGISTER FOR BOTH COURSES.

College courses are designed so that students remain in the course for the entire year. Students must pass Algebraic Literacy with a “C” or better first semester to assume successful completion of College Algebra second semester.

PREREQUISITE: “B” or better each semester in Integrated Math III or Pre-Calculus or acceptable SAT score (560)

NOTE: Students are required to complete a recommendation form which will need to be signed by their current Math teacher. There is currently a fee of \$100-\$150 associated with this course. The fee is subject to change in the future.

EXPLORING DATA SCIENCE AND STATISTICS- 110170

10, 11, 12

1 credit

This course focuses on descriptive statistics, with an introduction to inferential statistics. Topics include event probability, normal probability distribution, collection and description of data, frequency tables and graphs, measures of central tendency and variability, random variables, and random sampling. Students will build a foundational knowledge of statistics and data science to prepare them for future math classes.

MATHEMATICAL MODELING AND REASONING- 110160

10, 11, 12

1 credit

This course allows students to apply foundational mathematical skills and analytical concepts to real-world situations. These courses focus on strategies required for problem solving, critical evaluation of numerical information, decision making, and economic productivity in real-world applications. Topics included are numeracy, ratio and proportional reasoning, modeling, financial literacy, spatial and geometric modeling, and statistics.

QUANTITATIVE LITERACY & MATH FOR LIBERAL ARTS(MAT 1240) (Single Period- 110010 & 110020)

11, 12

1 HS credit, 4 CE college credits for MAT 1240

This course focuses on connections between mathematics and the society in which we live and is intended for liberal arts majors. Topics include: set theory and logic, mathematical modeling, probability and statistical methods, and consumer mathematics. The last four units of study will span the Spring semester. These units correspond with the Front Range Community College course Math for Liberal Arts (MAT 1240). All students must register for the Front Range concurrent enrollment credit in the Spring semester. **Successful students will be awarded 4 CE math credits for MAT 1240.** MAT 1240 is a statewide Guaranteed Transfer (GT) class. This class will transfer to other public colleges and universities in Colorado. It is not guaranteed to transfer to out-of-state school. **MUST REGISTER FOR BOTH COURSES**

College courses are designed so that students remain in the course for the entire year. Students must pass Quantitative Literacy with a "C" or better first semester to assume successful completion of Math for the Liberal Arts second semester.

PREREQUISITE: "B" or better each semester in Math III or equivalent, or acceptable SAT score (500+). Teacher recommendation is required for enrollment.

NOTE: There is currently a fee of \$48 associated with this course. The fee is subject to change in the future. Students are required to complete a recommendation form which will need to be signed by their current Math teacher.

AP STATISTICS - (Single period – 2175)

11, 12

1 credit

Probability and Statistics courses focus on descriptive statistics, with an introduction to inferential statistics. Topics typically include event probability, normal probability distribution, collection and description of data, frequency tables and graphs, measures of central tendency and variability, random variables, and random sampling. Course topics may also include covariance and correlation, central limit, theorem, confidence intervals, and hypothesis testing.

PREREQUISITE: Math III or higher with Teacher Recommendation.

AP CALCULUS AB - (Single period – 2000)

11, 12

1 credit

This class is equivalent to a first semester college calculus and analytic geometry course and follows the College Board's suggested curriculum designed to parallel college-level calculus courses. AP Calculus AB provides students with an intuitive understanding of the concepts of calculus and experience with its methods and applications. Topics covered include elementary functions, properties of functions and their graphs, limits and continuity, differential calculus (including definition of the derivative, derivative formulas, theorems about derivatives, geometric applications, optimization problems, and rate-of-change problems), and integral calculus (including anti derivatives and the definite integral). Activities include in-class oral and written work and *extensive* work outside the classroom. Students will need to purchase a graphing calculator. Students are required to take the AP Calculus AB Test and can earn 4 college credits by receiving a satisfactory score on the AP Calculus AB test.

PREREQUISITE: Recommended "C" or better in Trigonometry/Precalculus.

AP CALCULUS BC - (Single period – 2005)

12

1 credit

Following the College Board's suggested curriculum designed to parallel college-level calculus courses, AP Calculus BC courses provide students with an intuitive understanding of the concepts of calculus and experience with its methods and applications, and also require additional knowledge of the theoretical tools of calculus. These courses assume a thorough knowledge of elementary functions, and cover all of the calculus topics in AP Calculus AB as well as the following topics: vector functions, parametric equations, and polar coordinates; rigorous definitions of finite and nonexistent limits; derivatives of vector functions and parametrically defined functions; advanced techniques of integration and advanced applications of the definite integral; and sequences and series.

PREREQUISITE: Recommended "C" or better in AP Calculus AB

CALCULUS III - (Single period – 2007)**11, 12****1 credit**

This course continues the study of derivatives, differentiation, integration, the definite and indefinite integral, and applications of calculus. Typically, students have previously attained knowledge of precalculus topics (some combination of trigonometry, elementary functions, analytic geometry, and math analysis). Multivariate Calculus courses include the study of hyperbolic functions, improper integrals, directional derivatives, and multiple integration and its applications. Differential Calculus courses include the study of elementary differential equations including first- and higher-order differential equations, partial differential equations, linear equations, systems of linear equations, transformations, series solutions, numerical methods, boundary value problems, and existence theorems.

PREREQUISITE: Teacher Recommendation.