

$$\lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$$
$$\lim_{h \rightarrow 0} \frac{\frac{1}{\sqrt{x+h}} - \frac{1}{\sqrt{x}}}{h} \quad \left( \frac{\frac{1}{\sqrt{x+h}} + \frac{1}{\sqrt{x}}}{\frac{1}{\sqrt{x+h}} + \frac{1}{\sqrt{x}}} \right)$$

$\downarrow \sqrt{x}$



# MATHEMATICS AT GREENWICH ACADEMY

At Greenwich Academy, mathematics is taught with the goals of developing comprehensive understanding and honing the skills of critical and creative problem-solving. Through sixth grade, students are all taught in grade-level groupings only, with curricular and extra-curricular enrichment opportunities available for those who master content more quickly. Beginning in seventh grade, students are grouped by demonstrated ability, with many opportunities throughout a student's time at the school to move among groups.

Greenwich Academy offers the most rigorous and ambitious mathematics program of any school in the region. Our emphasis for all students is not just on mastery of skill, but on depth of understanding. Our highest achievers are challenged to explore concepts that students in most schools never have the opportunity to encounter. This focus on depth and creative thinking has proven effective and beneficial, and gifted students who love math have every opportunity for the most advanced and complete study of mathematics available in primary and secondary school.

## LOWER SCHOOL

The Lower School mathematics program at Greenwich Academy instills the basis of independent mathematical thinking and curiosity in our youngest students. Using the Singapore Math method as a foundation and supplementing with other, varied approaches, our students learn how to think mathematically and to solve problems in original ways. The program promotes confidence, resourcefulness, and a deep understanding of mathematics with increasing levels of abstraction over time.

## MIDDLE SCHOOL

Middle School mathematics continues to emphasize independent critical thinking and rigorous problem solving while fostering strong written and oral communication skills and the use of precise mathematical language. The program prioritizes depth of learning, offering a rigorous and comprehensive study of content foundational to future study of high-level mathematics. Curriculum and classroom environments promote risk-taking, creative problem-solving, and student-led inquiry. Real world problems allow for sophisticated analysis and full concept mastery, ultimately progressing to higher level generalization and abstraction. In Group V, students continue using the Singapore Math problem-solving method and also have the opportunity to join Math Olympiads. In Group VI, students begin studying pre-algebra and also tackle increasingly challenging multi-step word problems requiring deeper analytical skills. Outside the classroom, Group VI students and older are eligible to participate on GA's competitive math team. All students in Group VII and VIII cover Algebra I and specific concepts of Geometry, while students who demonstrate mastery during Group VIII may be invited to take a special Geometry course beginning in the spring of eighth grade and carrying over into early June. High achieving students who seek even more challenge and enrichment may test into the Middle School Math Circle, an extracurricular group that meets weekly to explore especially complex and exciting concepts in mathematics.

## UPPER SCHOOL

The Upper School mathematics program embodies active-learning, increased student autonomy, and problem-solving perseverance. Students develop their mathematical agency through an intentionally scaffolded curriculum driven by a close student-teacher collaboration in the classroom. Math teachers foster and develop a shift to more formally precise oral and written communication of mathematical ideas. Students are empowered as they navigate a rich and rigorous curriculum toward elective and AP level courses in Calculus and Statistics. Courses continue to be offered at the Accelerated and Honors level.

For students whose study reaches beyond BC Calculus, Greenwich Academy is proud to offer an array of collegiate level math courses in partnership with the

Stanford University-Level Online Math and Physics Program. Students study rigorous curricula and learn to write formal mathematical proofs to ensure long-term success in the discipline at the university level and beyond. Classes are seminar style, working under the close guidance of a GA math teacher to hone proof-writing strategy and precision. Popular choices include Multivariable Calculus, Linear Algebra, Differential Equations, and Modern Algebra. All courses carry Stanford University Continuing Studies credit and students earn a Stanford University Continuing Studies transcript. Additionally, through the school's partnership with Global Online Academy, students may take other math-related courses, such as Game Theory, Number Theory, and iOS App Design.

As in the Middle School, Upper School students are invited to demonstrate their passion for mathematics by joining the school's math team, which competes monthly in the Fairfield County Math League. Students practice weekly on a variety of targeted topics in preparation for each competition in a collaborative setting under the instruction of their coaches. Topics include content and skills that supplement a traditional math curriculum.

## UPPER SCHOOL TRAJECTORIES

Each path in the Upper School provides a rich mathematical program designed to challenge, stretch, and promote growth in every student in that level. While external summer courses for advancement are not accepted by Greenwich Academy, students whose mathematical skill exceeds our honors level may complete summer work or may double up in math classes in high school in order to advance their study.

