BOSTON UNIVERSITY ACADEMY

December 18, 2024

Dear BUA families,

We are excited to share news about an upcoming revision to BUA's math curriculum – a change our math department has been planning for several years and is eager to now make a reality. BUA's math teachers are designing a curriculum from the ground up, specifically tailored for our exceptional students. While the changes will impact no current BUA students and a subset of incoming students next year, we think it is important for the broader community to understand the direction and why we believe so strongly in it.

Our Math Program

BUA's math program is an area of strength and a key differentiator in the market. Students appreciate that they can begin their math journey at whatever level is right for them, depending on the results of their placement test and evidence of their preparedness through their transcript and application to BUA. Currently, BUA offers four year-long math courses – Advanced Algebra, Geometry, Precalculus, Calculus – and two semester-long courses: Calculus 2 and Multivariate Calculus. All courses are honors-level, with no tracking. Roughly half of our new 9th graders begin in Advanced Algebra or Geometry, with the other half mainly in Precalculus and Calculus. Calculus is a graduation requirement.

Students and families also appreciate the upper-level course math offerings at BU – offerings no high school in the country can match. A significant number of BUA upperclassmen take two or more semesters of BU math courses after having completed BUA's multivariate course.

These two key features – placing into courses based on experience (rather than grade level) and the availability of upper-level math offerings at BU – will not change.

Curricular Reform

Our plan is to build on strength. For several years, the department has been discussing an evolution in the first two levels of BUA math offerings (Advanced Algebra and Geometry) – moving those courses in an integrated and problem-based direction. We are now in a position to do just that.

- **Integrated**: Rather than distinct Advanced Algebra and Geometry as the first two levels of BUA math, we will move to an approach where each of the first two courses in the sequence integrates algebraic and geometric concepts, while also introducing students to other topics like combinatorics, number theory, statistics, and data analysis. While blended, this first-level course will focus more on algebra, and level 2 more on geometry.

The primary advantages of this approach are (1) avoiding a year-long "geometry gap" between algebra and precalculus; (2) inviting students to see connections between topics that are artificially separated by traditional approaches; and (3) deepening understanding of concepts as they spiral through the multi-year curriculum.

- **Problem-Based**: For many years, Precalculus at BUA has been taught through a problem-based approach, and we will adopt this approach for the preceding courses as well. Students in Precalculus do not work from a textbook, but instead spend the year working through a problem set consisting of hundreds of problems. Whereas in a traditional curriculum, problems of the same type are presented and practiced together in a block, topics in this approach are interleaved – spaced and mixed so that students encounter a topic multiple times over a period of weeks and learn to recognize the problem type, not just solve it as a mechanical exercise. The problem sets are carefully constructed sequences of problems where all needed information is embedded in the questions themselves. In class, students work together to present and discuss the solutions to those problems with one another, under the careful guidance of their teacher. The primary advantages are (1) building students' confidence as problem solvers; (2) avoiding the learning limitations of traditional approaches, where students sometimes struggle to determine what tool to apply to a problem if it is not presented in the context of other similar problems; (3) boosting long-term retention; and (4) strengthening math communication skills.

While the curricular changes mainly impact the first two levels of BUA math, there will also be a revision of the current level 3 course (Precalculus) in light of the changes in levels 1 and 2. No changes are envisioned for Calculus and beyond.

The rollout plan is:

- Fall 2025: **Algebraic Thinking & Coordinate Geometry: Integrated Math 1** launched for 9th-grade students placing into the first level of BUA math.
- Fall 2026: **Euclidean Geometry, Functions, & Graphs: Integrated Math 2** launched for rising 10th graders who took Algebraic Thinking & Coordinate Geometry in the previous year and any new students who place into the second level of BUA math.
- Fall 2027: A revised course – **Precalculus: Integrated Math 3** – launched to align with the previous two courses for any returning students who took Euclidean Geometry, Functions, & Graphs in the previous year and any new students who place into the third level of BUA math.

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In making these changes, BUA teachers are building on years of their own experience with these approaches. They are tailoring the curriculum to the needs and talents of our students. As a school, we are joining some of the most rigorous high schools in the country that have adopted similar approaches. Our conversations with those schools, review of the academic literature, and conversations with some of the leading math education researchers in the

country all indicate that our students will be even better served as we embark on this path. We are excited to get started.

For more information and a list of FAQs, please visit this site.

Warmly,

Chris Kolovos
Head of School