

## **BACKGROUND OF MATHEMATICS PROGRAMMING IN BHM SCHOOLS**

### **Buffalo High School**

Students are required to earn 3 credits of mathematics for graduation. Each 2 trimester course is worth 1 credit. For the majority of students, mathematics instruction at the high school begins with an Intermediate Algebra course which is differentiated for various readiness levels through layers of support. BHS strives to provide students with a self-directed and relevant learning path. There are also a variety of elective courses that students may choose upon the completion of Intermediate Algebra, Geometry, and Algebra 2 courses. These include a variety of opportunities for students to connect, collaborate, and communicate, as well as a chance to earn college credit in CIS (College in the Schools) courses or AP courses.

### **BHS Elective Math Courses:**

Algebra 3 with Trig  
CIS College Algebra  
Pre-Calculus  
Trigonometry  
Advanced Placement (AP) Calculus A/B  
Advanced Placement (AP) Calculus B/C  
Statistics  
CIS Statistics  
Intro to Computer Programming  
AP Computer Science  
Life Skills

## **MATH PROGRAM STANDARDS**

**From the MDE Website:** “The *Minnesota K-12 Academic Standards in Mathematics* are grounded in the belief that all students can and should be mathematically proficient. All students need to learn important mathematical concepts, skills, and relationships with understanding. The standards describe a connected body of mathematical knowledge students learn through the processes of problem solving, reasoning and proof, communication, connections, and representation. The standards are grouped by strands: 1) Number and Operation; 2) Algebra; 3) Geometry and Measurement; and 4) Data Analysis and Probability.

According to the Minnesota Department of Education, in accordance with Minnesota Statutes, “Minnesota’s academic standards are reviewed and revised on a 10-year cycle. During 2021-2022, the department facilitated a review of the Minnesota K-12 Academic Standards in Mathematics. The standards were revised for Minnesota public schools, by Minnesotans. The Minnesota K-12 Academic Standards for Mathematics review and revision was being conducted by a committee that includes members with varying perspectives and backgrounds from across Minnesota. Minnesota Statutes outline who must be represented on the committee, including parents, currently licensed and in classroom teachers, licensed school administrators, school board members, post-secondary institution faculty teaching core subjects, and business community members.

Standards were adopted in spring 2022, and are to be implemented no later than the 2027-28 school year.

## **SUMMARY OF PROCESS FOR REVIEW OF INSTRUCTIONAL RESOURCES**

### **Precalculus**

Pre-calculus is being offered at Buffalo High School for the first time in six years. In reinstating the bridge between Algebra II and Calculus, there is a need for an updated curriculum that aligns with current mathematical standards and also engages students in hands-on learning experiences. Throughout the research and pilot years, focusing on the evolution of teaching mathematics and the choice of instructional materials that reflect best practices was paramount.

The Miller Precalculus High School Edition focuses on both clarity and rigor while incorporating real-world applications that help students see the relevance of advanced mathematics. Hands-on learning is also a focal point of this curriculum. It emphasizes conceptual understanding through inquiry based learning, interactive problem solving, and meaningful application.

The team reviewed the scope and sequence of Miller’s Precalculus text thoughtfully and with the transition into Buffalo High School’s Calculus course in mind. This alignment ensures continuity in instruction.

An intentional aspect of this adoption is the exclusive use of physical textbooks and teacher materials, with no digital component. In an era that is dominated by screens, the team recognizes the importance of students developing the skill of navigating and utilizing a traditional textbook. This decision reinforces critical study habits, note-taking strategies, and the ability to engage deeply with content.

### **Calculus**

During the research and pilot years, the team determined that upgrading the current text being used, Calculus for the AP Course, 3rd edition to the Calculus for the AP Course, 4th Edition is a necessary and strategic step forward. This updated edition provides students with the comprehensive preparation needed for their future mathematics courses.

The transition from the 3rd to 4th edition is driven by several key factors. First, the field of calculus instruction continues to evolve, with updates that reflect instructional methods, and best practices for student engagement. The 4th edition includes refined explanations, additional practice problems, and deeper conceptual applications that help students develop a strong understanding of calculus principles.

As in the Precalculus adoption, the team found that the inclusion of physical textbooks and teacher materials support learning and growth. There will be no digital component. This decision is intentional, reinforcing the importance of teaching students how to effectively utilize a textbook as a learning tool. This also supports the development of their academic skills, and prepares them for rigorous college and career pathways.

## **RECOMMENDATIONS**

### **Precalculus**

The team recommends moving forward with the adoption of the Miller, Precalculus High School Edition 1e, 2024 from McGraw Hill to ensure that students receive a high-quality mathematical education that prepares them for the challenges of Calculus and beyond. A classroom set of this text will provide students with hands-on learning experiences, collaboration, and critical thinking. Students will develop strong problem-solving skills and mathematical reasoning that will serve them well in future coursework and real-world applications.

### **Calculus**

The team reviewed the needs of students in our Calculus courses and recommends moving forward with the adoption of Calculus for the AP Course, 4th Edition by Sullivan and Miranda. This decision is rooted in the commitment to ensuring that students have access to a rigorous curriculum that aligns with instructional outcomes and fosters deeper conceptual understanding and problem solving skills. The team recognizes the importance of equitable access to instructional materials. To support this, three classroom sets of the text have been recommended for purchase, ensuring that each student has the opportunity to engage with content both in class and at home.

## **FINANCIAL IMPLICATIONS**

Precalculus · 40 textbooks, / book · \$6,547.52

Calculus · 120 textbooks, \$154.98/ book · \$19,527.48

## **NEXT STEPS**

- Timeline for purchase
  - After July 1, 2025.

- Professional Development needs or Preparation for Use
  - Summer Curriculum Writing Planning Time
  - Spring / Fall Professional Development
  - Implementation CIP days on workshop district days in 2025-2026