IB Math: Analysis and Approaches (AA) at Harrison Trimble High School

Teacher: Jennifer MacDonald
Course Duration: February 2026 – May 2027

Welcome to IB Math: AA

This course is designed for students who enjoy mathematical problem-solving and are interested in exploring the principles of mathematics in depth. IB Math: AA develops analytical thinking, emphasizes mathematical rigor, and applies these skills to solve real-world problems.

Course Overview

The curriculum spans two years, covering various mathematical topics through innovative teaching methods like the Building Thinking Classroom (BTC) approach. Students will work collaboratively and independently to build a solid foundation in mathematical concepts.

Year 1: February 2026 – June 2026

1. **Number and Algebra**

   o Arithmetic and geometric sequences

   o Exponential and logarithmic functions

   o Financial mathematics (compound interest, depreciation)

   o **Activities:**

      ▪ Practice at non-permanent vertical surfaces (NPVS) for collaborative problem-solving.

      ▪ Use of Kognity for practice questions and formative assessments.

2. **Functions**

   o Quadratic and polynomial functions

   o Graph transformations

   o Inverse and composite functions

   o **Activities:**

      ▪ Students create and analyze their functions on NPVS.

      ▪ Hands-on exploration of graphing calculators (TI-83/TI-84).

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3. **Trigonometry**

   o   Unit circle, sine, and cosine laws

   o   Applications in solving triangles

   o   Trigonometric transformations and identities

   o   **Activities:**

        ▪   Interactive tasks connecting trigonometry to physics and engineering problems.

4. **Internal Assessment (IA) Introduction**

   o   Brainstorming ideas for exploration topics.

   o   Guidance on structure, rubric, and deadlines.

   o   **Timeline:** First draft consultations begin June 2026.

Year 2: February 2027 – May 2027

1. **Statistics and Probability**

   o   Measures of central tendency and dispersion

   o   Sampling techniques and bias

   o   Probability distributions and normal distribution

   o   **Activities:**

        ▪   Collect and analyze real-world data using box plots and scatter diagrams.

        ▪   Discussions on ethical implications of data manipulation.

2. **Calculus**

   o   Limits, derivatives, and integrals

   o   Optimization and kinematics applications

   o   Anti-differentiation and definite integrals

   o   **Activities:**

        ▪   Hands-on activities to connect calculus concepts with real-world phenomena.

▪ Use of graphing calculators to analyze motion and rates of change.

3. **Mathematical Proof and Applications**

   o Formal proofs and logical reasoning

   o Using mathematical models for interpolation and extrapolation

   o **Activities:**

      ▪ Collaboratively solve proof-based problems on NPVS.

      ▪ Apply models to environmental, economic, and scientific data.

4. **Internal Assessment (IA) Completion**

   o Peer reviews and teacher feedback on IA drafts.

   o **Timeline:** Final submission by March 2027.

Assessments

1. **Internal Assessments (IA):**

   o A student-led mathematical exploration connecting course concepts to real-world applications.

   o **Support:** Brainstorming sessions, teacher consultations, and structured feedback.

2. **External Assessments:**

   o **Paper 1:** Non-calculator questions covering all syllabus topics.

   o **Paper 2:** Calculator-allowed questions.

   o **Paper 3:** Problem-solving questions (HL only).

3. **Formative Assessments:**

   o Regular quizzes, classwork at NPVS, and online practice through Kognity.

4. **Summative Assessments:**

   o End-of-unit tests, mock exams, and IB final exams.

Skill Development

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- **Analytical Thinking:** Apply mathematical concepts to problem-solving and real-life scenarios.

- **Collaboration:** Work in groups to explore multiple approaches to solutions.

- **Critical Reflection:** Understand the connections between various mathematical areas.

- **Technology Proficiency:** Use graphing calculators and digital platforms effectively.

Resources

- **Primary Materials:**

    - *Calculus: A First Course* (McGraw Hill)

    - *Mathematics: Analysis and Approaches* (Oxford)

    - Pre-Calculus and Calculus textbooks

- **Digital Tools:**

    - Kognity for guided practice

    - Graphing calculators (TI-83/TI-84)

- **Supplementary Resources:**

    - Interactive tools like Open Middle, NRICH, and ThinkIB.

Why Study IB Math: AA?

This course is ideal for students who love exploring the "why" behind mathematical concepts. Whether pursuing science, engineering, or economics, IB Math: AA equips you with critical thinking and analytical tools to tackle academic and professional challenges.