INSTITUTE OF CANADIAN EDUCATION

Course Title: Principles of Mathematics

Course Name: Principles of Mathematics

Course Code: MPM2D

Grade: 10

Course Type: Academic

Credit Value: 1.0

Prerequisite: None

Curriculum Policy Document: *The Ontario Curriculum: Mathematics, Grades 9 & 10 (Revised); Growing Success: Assessment, Evaluation, and Reporting in Ontario Schools (2010)*

Course Developer: Institute of Canadian Education

Department: MATHEMATICS

Head of Department: Meena yohan

Development Date: 2025

Most Recent Revision Date: August 2026

Course Description

This course enables students to broaden their understanding of relationships and extend their problem-solving and algebraic skills through investigation, the effective use of technology, and abstract reasoning. Students will explore quadratic relations and their applications; solve and apply linear systems; verify properties of geometric figures using analytic geometry; and investigate the trigonometry of right and acute triangles. Students will reason mathematically and communicate their thinking as they solve multi-step problems.

UNIT ORDER

UNIT	UNIT NAME	UNIT DESCRIPTION	Time Allocated
Unit 1	Quadratic Relations	Students investigate quadratic relations represented algebraically, graphically, and numerically. They explore factoring, vertex form, and applications of quadratic equations to solve real-life problems involving maximum and minimum values.	**27 Hours**
Unit 2	Algebra: Expressions and Equations	Explore linear and quadratic expressions, solve equations, and apply algebraic reasoning to real-life problems.	**27 Hours**
Mid-Semester Point			
Unit 3	Analytic Geometry	Students verify properties of geometric figures using analytic geometry. Topics include distance, midpoint, slope, equations of lines, and relationships between lines. Students apply algebraic reasoning to geometric problems.	**27 Hours**
Unit 4	Trigonometry	Students investigate the trigonometry of right and acute triangles. They solve problems involving sine law and cosine law, and apply trigonometric relationships to real-life situations.	**27 Hours**
Final	Final Exam	The final exam assesses students' understanding of quadratic relations, systems of equations, analytic geometry, and trigonometry through problem-solving and application-based questions.	**2 Hours**
	TOTAL		**110 Hours**

OVERALL CURRICULUM EXPECTATIONS

A. Quadratic Relations of the Form $y = ax^2 + bx + c$

A1. Determine the basic properties of quadratic relations.

A2. Relate transformations of the graph of $y = x^2$ to the algebraic representation $y = a(x - h)^2 + k$.

A3. Solve quadratic equations and interpret the solutions with respect to the corresponding relations.

A4. Solve problems involving quadratic relations.

B. Analytic Geometry

B1. Model and solve problems involving the intersection of two straight lines.

B2. Solve problems using analytic geometry involving properties of lines and line segments.

B3. Verify geometric properties of triangles and quadrilaterals, using analytic geometry.

C. Trigonometry

C1. Use their knowledge of ratio and proportion to investigate similar triangles and solve problems related to similarity.

C2. Solve problems involving right triangles, using the primary trigonometric ratios and the Pythagorean theorem.

C3. Solve problems involving acute triangles, using the sine law and the cosine law.

TEACHING AND LEARNING STRATEGIES

In this course, students will experience the following activities:

- **Presentations and Multimedia:** Presentations, videos, examples, demonstrations, practice questions, and interactive activities are used to introduce and reinforce mathematical concepts and skills.
- **Teacher–Student Discussions**: Classroom discussions, conferences, and virtual meetings provide opportunities for students to ask questions, explain mathematical thinking, and receive timely feedback.
- **Instructor Demonstrations:** Teachers model problem-solving strategies, mathematical procedures, graphing, algebraic techniques, geometry, and trigonometric applications.
- **Guided Practice**: Students work through examples and practice questions with teacher guidance before completing independent tasks.
- **Problem Solving:** Students solve problems involving quadratic relations, analytic geometry, and trigonometry and explain their reasoning.
- **Discussion Forums:** Students share mathematical strategies, compare solutions, discuss problem-solving approaches, and provide and receive constructive feedback.
- **Individual Activities and Assignments:** Students complete practice exercises, assignments, quizzes, and problem-solving tasks to consolidate and demonstrate their learning. Teachers provide ongoing feedback and appropriate accommodations in accordance with students' IEPs.
- **Collaborative Learning:** Students work individually and collaboratively through mathematical investigations, problem-solving activities, and peer discussions.
- **Practical Application:** Students apply mathematical concepts to real-life situations, including measurement, geometry, financial contexts, and other problem-solving situations.
- **Technology and Digital Tools:** Students use graphing tools, calculators, online resources, and other digital technologies to explore, represent, and communicate mathematical ideas.
- **Reflection and Metacognition:** Students reflect on their problem-solving strategies, identify areas for improvement, and use feedback to strengthen their mathematical understanding.

ASSESSMENT STRATEGIES

Assessment practices support student progress and achievement through a variety of diagnostic, formative, and summative strategies. Checklists, observations, conferences, discussions, assignments, quizzes, problem-solving activities, and tests are used regularly to monitor learning and provide timely feedback. Students also participate in self-assessment and peer assessment to reflect on their mathematical thinking and identify areas for improvement. Appropriate accommodations are provided in accordance with students' IEPs.

GRADING POLICIES

The Final Grade

Term Work (65%)

Based on assessments completed throughout the course, including:

Category	Weight	Examples
Knowledge & Understanding (K/U)	25%	Quizzes, tests, concept checks
Thinking / Inquiry (T/I)	25%	Multi-step problem solving, investigations
Communication (C)	25%	Written solutions, explanations, math journals

Application (A)	25%	Real-life problems, modeling tasks

Term work is assessed continuously through assignments, homework, projects, and tests.

Final Assessment (20%)

The final assessment evaluates achievement of overall course expectations and includes:

- **Final Exam**

All final assessments must be completed independently.

ATTENDANCE POLICY

Regular attendance and active engagement are important for student success in MPM2D – Principles of Mathematics, Grade 10, Academic. Attendance and participation are monitored through the school's Learning Management System (LMS).

The MPM2D online credit course is designed to meet or exceed the minimum 110 hours of instructional time required for a credit course. Instructional time and student engagement are monitored through:

- **LMS Engagement:** Students are expected to log in regularly and actively participate in lessons, examples, practice activities, assignments, and other online learning activities.
- **Biweekly Check-Ins:** Students complete a brief check-in every two weeks to review their progress, participation, and completion of course requirements.
- **Course Assessments:** Assignments, practice activities, problem-solving tasks, quizzes, tests, and other assessments are used to monitor student progress and pacing.
- **Instructional Records:** The school maintains records of instructional time, attendance, course participation, and student engagement through the LMS and other course records.

Students are responsible for maintaining regular participation, completing required learning activities, and meeting course deadlines. Students who demonstrate limited participation or fall behind in course requirements may be contacted and provided with appropriate academic support.

Attendance and Participation (15%)

Excused absences will not negatively affect a student's mark. Attendance and participation will be evaluated using the Ministry's established criteria, including participation in class discussions, contribution of ideas, asking relevant questions, respecting the contributions of others, and contributing to a positive classroom learning environment.

EVALUATION MODEL(15% TOTAL ATTENDANCE WEIGHT)

Component	Weight	Quantifiable Metric Criteria
Physical Attendance	5%	Marked present, or late within 10 minutes, for each scheduled class period; excused absences are removed from the calculation.
Weekly Participation Checklist	5%	Meets at least 3 of 4 weekly in-class engagement indicators (responding/volunteering, group work, guided practice, on-task behaviour).
Homework Assignment Punctuality	5%	Submits homework on or before the due date, through the required platform, with a complete submission.

ACHIEVEMENT CHART: MATHEMATICS GRADE 10 (MPM2D)

Level / %	Knowledge & Understanding (K/U)	Thinking (T/I)	Communication (C)	Application (A)
Level 4 (80–100%)	Thorough understanding of mathematical concepts	Highly effective reasoning and problem-solving	Very clear, precise mathematical communication	Highly effective application in complex contexts
Level 3 (70–79%)	Solid understanding of concepts	Effective problem-solving	Clear and logical communication	Effective application in familiar contexts
Level 2 (60–69%)	Some understanding with minor errors	Inconsistent reasoning	Partially clear communication	Limited application
Level 1 (50–59%)	Limited understanding	Minimal problem-solving skills	Unclear communication	Very limited application

CONSIDERATIONS FOR PROGRAM PLANNING

1. PLANNING PROGRAMS FOR STUDENTS WITH SPECIAL EDUCATION NEEDS

Area	Consideration / Strategy	Examples / Tools
1. Identification of Needs	Review IEPs and assessments	Learning disabilities, ADHD
2. Learning Goals	Develop individualized SMART goals	“Solve quadratic equations with support”
3. Curriculum Adaptation	Differentiate instruction	Guided notes, step-by-step examples
4. Instructional Strategies	Scaffold learning	Visual models, worked examples
5. Assessment & Evaluation	Provide accommodations	Extra time, calculator use
6. Collaboration	Work with support staff	Regular check-ins
7. Monitoring & Adjustment	Track progress	Ongoing formative assessment
8. Motivation & Engagement	Encourage perseverance	Real-life math applications
9. Resources	Provide additional supports	Digital graphing tools

2. PROGRAM CONSIDERATIONS FOR ENGLISH LANGUAGE LEARNERS

- Ontario schools have multilingual student populations.
- Students may have a first language other than English.
- English language learners may:
    - Be born in Canada and raised in multilingual families and communities.
    - Be newcomers from other countries with different linguistic, cultural, and educational backgrounds.
    - Have experience with highly developed educational systems or limited access to formal schooling.
- Many students are entering a **new linguistic and cultural environment** when they begin school in Ontario.

3. THE ROLE OF TECHNOLOGY IN THE PROGRAM

- **Information and communications technologies (ICT)** can extend and enrich teachers' instructional strategies and support student learning.
- ICT tools include:
    - Multimedia resources.
    - Databases and Internet websites.
    - Digital cameras.
    - Word-processing programs.
- ICT can help students:
    - Collect, organize, and sort information.
    - Write, edit, and present their findings.
    - Connect with other schools and the global community.
- Students should be encouraged to use ICT appropriately to **support and communicate their learning**.

REQUIRED SOFTWARE, EQUIPMENT, TEXTBOOKS

Required Textbooks and Resources

- *Nelson Principles of Mathematics 10* or equivalent Ontario-approved text
- Graphing calculators
- Teacher-prepared worksheets, problem sets, and investigations

Digital Resources and Software

- Google Drive – assignment submission and organization
- Internet access for math simulations and graphing tools
- Desmos, GeoGebra, or equivalent graphing software
- Microsoft Office Suite or equivalent

Teacher Considerations

- Assistive technology (text-to-speech, speech-to-text) may be used
- Alternative formats for demonstrating learning may be provided

TIPS TO BE SUCCESSFUL IN MPM2D

1. **Stay Updated** – Check Announcements, "What's New," and your mailbox daily for important course information and updates.
2. **Manage Your Time** – Check the course calendar, plan ahead, and submit assignments by the due dates. Aim for **1–2 hours of focused study each day**.
3. **Follow Instructions** – Review assignment instructions, success criteria, and assessment requirements before submitting your work.
4. **Participate and Communicate** – Participate in discussions and activities, ask questions, and communicate regularly with your teacher for support and feedback.
5. **Practise Regularly** – Complete practice questions regularly and review mathematical concepts, formulas, and problem-solving strategies.
6. **Use Feedback** – Review teacher feedback, correct errors, reflect on your problem-solving strategies, and use suggestions to improve future work.

For technical issues: Contact the Help Desk.
For course-related questions: Contact your teacher and expect a response within 24 hours. For urgent matters, include **"URGENT"** in the subject line.

Approach your learning with curiosity, responsibility, and consistent effort to be successful in MPM2D.