Insight Academy of Canada

Course Outline

Course Title	Principles of Mathematics, Grade 19, Academic (MPM1D)
Grade	9
Course Type	Academic
Course Code	MPM1D
Credit Value	1.0
Curriculum Policy Document	The Ontario Curriculum, Grades 9 and 10: Mathematics, 2005 (revised)
Prerequisite(s)	None

Course Description

This course enables students to develop an understanding of mathematical concepts related to algebra, analytic geometry, and measurement and geometry through investigation, the effective use of technology, and abstract reasoning. Students will investigate relationships, which they will then generalize as equations of lines, and will determine the connections between different representations of a linear relation. They will also explore relationships that emerge from the measurement of three-dimensional figures and two-dimensional shapes. Students will reason mathematically and communicate their thinking as they solve multi-step problems.

Overall Curriculum Expectations

A. Number Sense and Algebra By the end of this course, students will:	
A1	Operating with Exponents
A2	Manipulating Expressions and Solving Equations
B. Linear Relations By the end of this course, students will:	
B1	Using Data Management to Investigate Relationships
B2	Understanding Characteristics of Linear Relations
B3	Connecting Various Representations of Linear Relations
C. Analytic Geometry By the end of this course, students will:	
C1	Investigate the Relationship Between the Equation of a Relation and the Shape of Its Graph
C2	Investigating the Properties of Slope
C3	Using the Properties of Linear Relations to Solve Problems
D. Measurement and Geometry By the end of this course, students will:	
D1	Investigating the Optimal Values of Measurements
D2	Solving Problems Involving Perimeter, Area, Surface Area, and Volume
D3	Investigating and Applying Geometric Relationships

Outline of Course Content

Unit No.	Unit Title	Instructional Time	Overall Expectations
1	Number Sense	15 hours	A1, A2

2	Algebra	20 hours	A1, A2
3	Linear Relations	25 hours	B2, B3, C3
4	Analytic Geometry	25 hours	B1, C1, C2
5	Measurement and Geometry	25 hours	D1, D2, D3
Total Instructional Time		**110 HOURS**	
6	Proctored Exam	2 hours	All

Unit Descriptions
The entire course is delivered online

Unit 1: Number Sense

This unit will introduce the concepts of working with exponents, fractions, decimals, and significant digits. Students will feel more comfortable converting numbers from one form to another, such as changing from percentage to fractions. Students will also learn and work with squaring and square roots. This unit focuses on developing the students' mathematical knowledge and become comfortable working with different types of numerical representations.

Overall and Specific Expectations: A1, A2

Unit 2: Algebra

In this unit, students will be introduced to the power functions and characteristics of polynomial functions. Student will learn up to degree three and understand the physical representations of one, two, and three dimensional objects. Students will encounter problems dealing with addition and subtraction of polynomials as well as multiplying by monomials. In this unit, students will work with rearranging various formulae and learn techniques to solve first-degree equations. The goal of this unit is to get students comfortable working with polynomials including simplifying and expanding polynomial expressions.

Overall and Specific Expectations: A1, A2

Unit 3: Linear Relations

In this unit, students will work with different representations of lines, such as slope-intercept form and standard form. Students will be able to represent a linear relation using equations, tables of values, and graphs. Student can solve problems using linear relations and understand the slope of a line in relation to application questions. This unit will get students familiar with linear relations and able to solve application questions using various representations of linear relations

Overall and Specific Expectations: B2, B3, C3

Unit 4: Analytic Geometry

In this unit, students will learn to recognize trends and relationship that are observed in the data. Students will use the problem analysis process of posing problems, formulate hypothesis, carry out investigations, and analyze data. Students will also investigate different relationships between equations of relations and graphs of relations, shapes of different relations, and the correlations

between dependent and independent variables.

Overall and Specific Expectations: B1, C1, C2

Unit 5: Measurement and Geometry

In this unit student will explore the relationship between area and perimeter of rectangles and using the relationship to find optimal values. Students will work with 3-D objects, such as prisms, and find optimal volume and surface areas of square-based prisms. Student will find relationship between surface area and volume and using the relationship to find optimal values. In this unit, students will also investigate various patterns involving angles of polygons. Students will describe various properties of polygons in relation to angles.

Overall and Specific Expectations: D1, D2, D3

Teaching and Learning Strategies

Effective instruction is key to student success and students learn best when they are engaged in a variety of ways of learning. Teachers at Insight Academy of Canada (IAC) provide numerous opportunities and use a variety of instructional, assessment, and evaluation strategies to help students develop skills of inquiry, problem solving, and communication as they investigate and learn fundamental concepts. The activities offered enable students not only to make connections among these concepts throughout the course but also to relate and apply them to relevant societal, environmental, and economic contexts. Opportunities to relate knowledge and skills to these wider contexts will motivate students to learn and to become lifelong learners.

The following seven mathematical process expectations describe a set of skills that support lifelong learning in mathematics and that students need to develop on an ongoing basis, as they work to achieve the expectations outlined within the course.
- Problem Solving: develop, select, apply, compare, and adapt a variety of problem-solving strategies as they pose and solve problems and conduct investigations, to help deepen their mathematical understanding;
- Reasoning and Proving: develop and apply reasoning skills to make mathematical conjectures, assess conjectures, and justify conclusions, and plan and construct organized mathematical arguments;
- Reflecting: demonstrate that they are reflecting on and monitoring their thinking to help clarify their understanding as they complete an investigation or solve a problem;
- Selecting Tools and Computational Strategies: select and use a variety of concrete, visual, and electronic learning tools and appropriate computational strategies to investigate mathematical ideas and to solve problems;
- Connecting: make connections among mathematical concepts and procedures, and relate mathematical ideas to situations or phenomena drawn from other contexts;
- Representing: create a variety of representations of mathematical ideas, connect and compare them, and select and apply the appropriate representations to solve problems;
- Communicating: communicate mathematical thinking orally, visually, and in writing, using precise mathematical vocabulary and a variety of appropriate representations, and observing mathematical conventions.

Each unit of the course contains a Unit Overview, a number of lessons, a Mid-Unit Quiz, a Unit Test, and a Unit Exit Card. Lessons are delivered through the following format.

- Mind on. Students are introduced to the content through a variety of exploratory and instructional strategies including watching online videos.
- Actions. Students practice and apply their new learning through worked examples, investigation, and exploration. Students are actively engaged in their assessment process as they monitor their own learning to determine their next steps and set individual learning goals.
- Consolidation. Students are provided opportunities to demonstrate what they have learned through independent practice, reflection assignments, and discussion posts (Exit Slip).
- Extension Activities. Students study extra lesson resources, complete homework assignment, and response to teacher's follow-up questions to expand their learning and prepare for unit test.

A variety of teaching and learning strategies will be used in this course.

Direct Instruction Strategies	Independent Learning Strategies
- Online lecture - Video/Animation - Examples of full solutions - Scaffolding - Administering probes and/or prompts - Providing descriptive feedback - Providing pictorial or diagram presentation - Allowing independent practice and individually paced instruction - Teacher modelling - Providing individual instruction - Class activity, practice - Class and 1:1 Discussion/Chat - Student-Teacher Conferences - Q&A - Review, Seminar - Virtual Office Hours	- Homework Q&A - Handout, Work and Task Sheet - Class Investigations - Independent Study (teacher direction) - Self-Assessment - Self-regulation - Self-reflection - Exit Card - Survey - Learning Log - ePortfolio - Computer-Assisted Instruction - Interactive Online Activity - Student Exploration Tasks - Simulation - Graphing Software
Cooperative Strategies	Thinking-Skills Strategies
- Discussion Boards - Group/Peer Discussion (Think-Pair-Share) - Emails - Peer Conferencing - Peer Assessment - Peer Feedback	- Opinion Sharing/Commentary Offering - Oral Explanation - Presentation - Problem-Based Learning - Problem Solving - Reasoning and Proving - Reflective Thinking - Research Process - Case Study

Strategies for Assessment & Evaluation of Student Performance

Insight Academy of Canada's (IAC) Assessment and Evaluation policy is aligned with the Ministry of Education's Growing Success policy document which outlines the assessment, evaluation, and reporting policies and practices in Ontario schools.

Basic Considerations

The primary purpose of assessment and evaluation is to improve student learning. Assessment is the process of gathering information from a variety of sources that accurately reflects how well a student is achieving the curriculum expectations in a course. Evaluation refers to the process of judging the quality of student learning on the basis of established performance standards, and assigning a value to represent that quality.

In order to ensure that assessment and evaluation are valid and reliable, and that they lead to the improvement of student learning, IAC teachers will use assessment and evaluation strategies that:
- are fair, transparent, and equitable for all students;
- support all students, including those with special education needs, those who are learning the language of instruction (English or French), and those who are First Nation, Métis, or Inuit;
- are carefully planned to relate to the curriculum expectations and learning goals and, as much as possible, to the interests, learning styles and preferences, needs, and experiences of all students;
- are communicated clearly to students and parents at the beginning of the school year or course and at other appropriate points throughout the school year or course;
- are ongoing, varied in nature, and administered over a period of time to provide multiple opportunities for students to demonstrate the full range of their learning;
- provide ongoing descriptive feedback that is clear, specific, meaningful, and timely to support improved learning and achievement;
- develop students' self-assessment skills to enable them to assess their own learning, set specific goals, and plan next steps for their learning

Evaluation and Reporting of Student Achievement

Insight Academy of Canada's (IAC) will use the Provincial Report Card, Grades 9–12, for formal written reports to students and parents two times a term. The report card provides a record of the student's achievement of the curriculum expectations in the course, at particular points in the school year or term, in the form of a percentage grade. The percentage grade represents the quality of the student's overall achievement of the expectations for the course and reflects the corresponding level of achievement as described in the achievement chart for the discipline.

A final grade is recorded for the course, and a credit is granted and recorded for the course in which the student's grade is 50% or higher. The final grade for the course will be determined as followings:
- Seventy per cent of the grade will be based on evaluations conducted throughout the course. This portion of the grade will reflect the student's most consistent level of achievement throughout the course, although special consideration will be given to more recent evidence of achievement.
- Thirty per cent of the grade will be based on a final evaluation in the form of an examination and administered at the end of the course.

Assessment and Evaluation Categories and Weights			
Achievement Categories	Percent	Evaluation for Final Grade	Percent
Knowledge/Understanding	25%	Term Work	70%
Inquiry/Thinking	25%		

Communication	25%	Final Evaluation	30%
Application	25%		

Reporting on Demonstrated Learning Skills & Work Habits

The report card provides a record of the learning skills demonstrated by the student in every course, in the following six categories: Responsibility, Organization, Independent Work, Collaboration, Initiative & Self-regulation. These learning skills and work habits are evaluated using a four-point scale (E-Excellent, G-Good, S-Satisfactory, N-Needs Improvement). The separate evaluation and reporting of the learning skills and work habits in these six areas reflect their critical role in students' achievement of the curriculum expectations. To the extent possible, the evaluation of learning skills and work habits, apart from any that may be included as part of a curriculum expectation in a course, should not be considered in the determination of percentage grades.

In order to ensure that assessment and evaluation are valid and reliable, and that they lead to the improvement of student learning, I.A.C teachers use a variety of strategies throughout the course.