

# Principles of Mathematics Grade 9, Academic

## Course Description/Rationale/Overview:

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.

## Class Requirements:

Materials/textbooks/equipment:

- Binder and note paper
- Pencil, eraser
- Calculator is must

- **Addison Wesley Mathematics 9  
Ontario Edition (\$70 replacement)**

## Missed Tests and Late Assignments

Students are to be present for test dates. There must be a verified, valid reason when a test is missed. The teacher may provide an alternative opportunity for testing or record an "absent" for that test.

All summative assignments will have a clear *Due Date*. Assignments that are handed after the *Due Date* will be accepted and assessed by the teacher if submitted prior to the *Deadline*. The *Deadline* is defined as the class period in which that graded assignment is returned to the class, unless there are extenuating circumstances.

For the mid-term report, no mark will be recorded for a missed summative assignment.

Where a student has not submitted enough work for the teacher to determine the student's level of achievement the report card will indicate that the student's work is incomplete and no grade will be assigned.

At the semester end, where summative assessments are incomplete, a mark of zero may be assigned and used to calculate the student's final grade.

## Assessment Strategies:

- Give students feedback with formative instruction before final summative assessment.
- Address both what students learn and how well they learn.
- Accommodate students with special education needs, consistent with the student's IEP.
- Ensure each student is given clear directions for improvement.
- Include the use of samples that provide evidence of their achievement.
- Are communicated clearly to students and parents at the beginning of the course.
- Are fair to all students.

## Achievement Categories

Knowledge/Understanding	
50%	
Thinking/Inquiry	20%
Communication	10%
Application	20%

## Curriculum strands:

Number Sense and Algebra  
Linear Relations  
Analytical Geometry  
Measurement and Geometry

## Learning Skills:

- Works Independently
- Team work
- Organization
- Work Habits
- Initiative

## Evaluation:

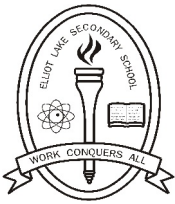
The year's work will be based on the following assessment tools that will include one or more of the four Achievement Categories striving to meet the overall percentages established for each category:

- Quizzes
- Tests
- Assignments
- Projects
- Presentations
- Portfolios

## FINAL MARK:

**Term Work: 70%**  
**Final Summative Evaluation: 30%**

All grade 9 academic students in Ontario are required to write the EQAO grade 9 academic mathematics assessment and this will count as their final exam.



**COURSE OUTLINE**

Unit of Study	Curriculum Strands	Category of Achievement	Evaluation
<b>Unit 1</b> - Number Sense and Algebra  <b>Elliot Lake</b>	- exponent rules - numeric and polynomial expressions - first degree equations	- multiplication and division of exponents, and apply them to simplify expressions; - manipulate numerical and polynomial expressions, and solve first-degree equations.	<b>MPM 1D</b> 15 %
<b>Unit 2</b> - Linear Relations  <b>Secondary</b>	- investigate relationships between two variables. - characteristics of a linear relation - various representations of a linear relation	- interpret the meanings of points on scatter plots or graphs that represent linear relations. - design and carry out an investigation or experiment involving relationships between two variables. - describe trends and relationships observed in data, make inferences from data.	20 %
<b>Unit 3</b> - Analytic Geometry	- relationship between the form of an equation and the shape of its graph with respect to linearity and non-linearity. - determine, through I investigation, the properties of the slope and $y$ -intercept of a linear relation. - solve problems involving linear relations.	- determine, through investigation, the characteristics that distinguish the equation of a straight line from the equations of nonlinear relations. - identify, through investigation, the equation of a line in any of the forms $y = mx + b$ , $Ax + By + C = 0$ , $x = a$ , $y = b$ . - determine, through investigation, various formulas for the slope of a line segment or a line. - identify, through investigation with technology, the geometric significance of $m$ and $b$ in the equation $y = mx + b$ ; - the representations of a constant rate of change of a linear relation. - identify, through investigation, properties of the slopes of lines and line segments.	20 %
<b>Unit 4</b> - Measurement and Geometry	- determine, through investigation, the optimal values of various measurements. - solve problems involving the measurements of two-dimensional shapes and the surface areas and volumes of three-dimensional figures. - verify, through investigation facilitated by dynamic geometry software, geometric properties and relationships involving two-dimensional shapes.	- determine the maximum area of a rectangle with a given perimeter by constructing a variety of rectangles, using a variety of tools. - determine the minimum perimeter of a rectangle with a given area by constructing a variety of rectangles, using a variety of tools. - explain the significance of optimal area, surface area, or volume in various applications. - relate the geometric representation of the Pythagorean theorem and the algebraic representation $a^2 + b^2 = c^2$ - solve problems involving the areas and perimeters of composite two-dimensional shapes. - solve problems involving the surface areas and volumes of prisms, pyramids, cylinders, cones, and spheres, including composite figures - describe the properties and relationships of the interior and exterior angles of triangles, quadrilaterals, and other polygons	15 %
<b>Summative Assessment</b> - EQAO Exam			30 %

**Note: The above units may not be completed in order that the units are listed.**