MFM 1P
Course Outline - Specific Expectations

1) Number Sense and Algebra (35 hours)

Solving Problems Involving Proportional Reasoning

- illustrate equivalent ratios, using a variety of tool
- represent, using equivalent ratios and proportions, directly proportional relationships arising from realistic situations
- solve for the unknown value in proportion, using a variety of methods
- make comparisons using unit rates
- solve problems using ratios, rates and directly proportional relationships in various contexts
- solve problems requiring the expression of percents, fractions and decimals in their equivalent forms

Simplifying Expressions and Solving Equations

- simplify numerical expressions involving integers and rational numbers, with and without the use of technology
- squaring and square roots
- substitute into and evaluate algebraic expressions involving exponents
- add and subtract polynomials involving the same variable up to degree three
- multiply a polynomial by a monomial involving the same variable to give results up to degree three
- solve first-degree equations with non-fractional coefficients, using a variety of tools
- substitute into algebraic equations and solve for one variable in the first degree

2) Linear Relationships (34 hours)

Using Data Management to Investigate Relationships

- interpret the meanings of points on scatter plots or graphs that represent linear relations
- pose problems, identify variables, and formulate hypotheses associated with relationships between two variables
-describe trends and relationships observed in data, make inferences from data, compare inferences with hypothesis about data
- describe trends in relationships observed in data, make inferences from data, compare the inferences with hypothesis about data, and explain any differences between the inferences and the hypotheses

Determining Characteristics of Linear Relations

- construct tables of values, graphs and formulas to represent linear relations using a variety of tools
- construct tables of values, scatter plots and lines or curves of best fit as appropriate, using a variety of tools
- identify, through investigation, some properties of linear relations

Investigating Constant Rate of Change

- determine, through investigation, that the rate of change of a linear relation can be found by choosing two points on the line that represents the relation, finding the vertical change between the points
- determine, through investigation, connections among the representation of a constant rate of change of a linear relation
- compare the properties of direct variation and partial variation in applications, and identify the initial value
- express a linear relation as an equation in two variables, using the rate of change and the initial value
- describe the meaning of the rate of change and the initial value for a linear relation arising from a realistic situation

Connecting Various Representations of Linear Relations and Solving Problems Using the Representations

- determine values of a linear relation by using a table of values, by using the equation of the relation, and by interpolating or extrapolating from the graph of the relation
- describe a situation that would explain the events illustrated by a given graph of a relationship between two variables
- solve problems that can be modelled with first-degree equations, and compare the algebraic method to other solution methods
- describe the effects of a linear graph and make the corresponding changes to the linear equation when the conditions of the situation they represent are varied
- determine graphically the point of intersection of two linear relations, and interpret the intersection point in the context of the application
- select a topic involving a two-variable relationship, pose a question on the topic, collect data to answer the question, and present its solution using appropriate representations of the data

3) <u>Measurement and Geometry</u> (27 hours)

Investigating The Optimal Values of Measurements of Rectangles

- 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
- solve problems that require maximizing the area of a rectangle for a fixed perimeter or minimizing the perimeter of a rectangle for a fixed area

Solving Problems Involving Perimeter, Area and Volume

- relate the geometric representation of the Pythagorean theorem to the algebraic representation $a^2 + b^2 = c^2$
- solve problems using the Pythagorean theorem, as required in applications
- solve problems involving the perimeters and areas of composite two-dimensional shapes
- develop, through investigation, the formulas, for the volume of a pyramid, a cone, and a sphere
- solve problems involving the volumes of prisms, pyramids, cylinders, cones, and spheres

Investigating and Applying Geometric Relationships

- determine, through investigation using a variety of tools, and describe the properties and relationships of the interior and exterior angles of triangles, quadrilaterals and other polygons, and apply the results to problems involving the angles of polygons
- determine, through investigations using a variety of tools, and describe the properties and relationships of the angles formed by parallel lines cut by a transversal, and apply the results to problems involving parallel lines
- create an original dynamic sketch, paper folding design, or other illustration that incorporates some of the geometric properties from this section, or find and report on some real-life application

4) <u>EQAO Testing - Culminating Activity</u> (7 hours)

- three days to review
- two days of testing

5) <u>Final Exam Review</u> (7 hours)

- final exam written in exam timetable