COURSE DESCRIPTION

The MYP 5 Mathematics Extended in Grade 10 enables students to broaden their understanding of relationships and extend their multi-step problem-solving, communication, and algebraic skills through investigation, the effective use of technology, and abstract reasoning. The four main objectives support the IBDP learner profile, promoting the development of students who are knowledgeable, inquirers, communicators, and reflective learners. Overall, MYP Mathematics expects all students to appreciate the beauty and usefulness of mathematics as a remarkable cultural and intellectual legacy of humankind, and as a valuable instrument for, social and economic change in society. Students will further explore the concept of the functions, including linear, quadratic, trigonometric, and exponential functions, by extending their experiences with mathematical relations and through investigating the associated properties of functions numerically, algebraically, and graphically. This course further equips all students with the knowledge, understanding, and intellectual capabilities to address the expectations required for the IB Diploma Programme courses in mathematics in the subsequent years. Upon successful completion of this course, the student will earn two Ontario credits in Mathematics.

UNITS OF STUDY

UNIT 1: ALGEBRA
UNIT 2: EQUATIONS AND INEQUALITIES
UNIT 3: COORDINATE GEOMETRY
UNIT 4: INTRODUCTION TO TRIGONOMETRY
UNIT 5: ADVANCED TRIGONOMETRY
UNIT 6: FUNCTIONS AND TRANSFORMATIONS
UNIT 7: DESIGN CYCLE PROJECT
UNIT 8: SEQUENCES AND SERIES

EVALUATION

COURSEWORK: 70% APPLICATION, KNOWLEDGE AND UNDERSTANDING, THINKING INQUIRY, COMMUNICATION
EXAM: 30% PAPER 1 (NO CALCULATOR) & PAPER 2 (WITH CALCULATOR)

HOMEWORK: This is assigned each class. The average time spent between classes on homework should be 30 minutes. Students are required to do the assigned work to ensure their success in the course. This is an integral part of the learning process.

EXTRA HELP

A math teacher will be available every Monday, Wednesday, Friday during the lunch period as well as after school on Tuesdays and Thursdays. All are held on the second floor. Appointments and extra help sessions may be set up when the need arises.

TEXTBOOKS & RESOURCES

- FUNCTIONS II. MARIAN SMALL ET AL. NELSON, 2008.
- TI 84 GRAPHING CALCULATOR
- GEOGEBRA
- GEOMETER'S SKETCHPAD
- MATHTYPE
## MYP 5 Mathematics Extended Assessment Criteria

### A Knowledge & Understanding
- The student knows and demonstrates understanding of the concepts from the five branches of mathematics (number, algebra, geometry & trigonometry, statistics & probability, discrete mathematics)
- The student uses appropriate mathematical concepts and skills to solve problems in both familiar and unfamiliar situations, including those in real life contexts
- The student selects and applies general rules correctly to solve problems, including those in real life contexts

### B Investigating Patterns
- The student selects and applies appropriate inquiry and mathematical problem-solving techniques
- The student recognizes patterns
- The student describes patterns as relationships or general rules
- The student draws conclusions consistent with findings
- The student justifies or proves mathematical relationships and general rules

### C Communication in Mathematics
- The student uses appropriate mathematical language (notation, symbols, terminology) in both oral and written explanations
- The student uses different forms of mathematical representation (formulae, diagrams, tables, charts, graphs and models)
- The student communicates a complete and coherent mathematical line of reasoning using different forms of representation when investigating complex problems
- The student uses appropriate ICT tools to enhance communication

### D Reflection in Mathematics
- The student explains whether his/her results make sense in the context of the problem
- The student explains the importance of his/her findings in connection to real life
- The student justifies the degree of accuracy of his/her results where appropriate
- The student suggest improvements to the method when necessary

### Mathematics Assessment Criteria

<table>
<thead>
<tr>
<th>Criterion</th>
<th>Knowledge &amp; Understanding</th>
<th>Maximum 8</th>
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</thead>
<tbody>
<tr>
<td>Criterion B</td>
<td>Investigating Patterns</td>
<td>Maximum 8</td>
</tr>
<tr>
<td>Criterion C</td>
<td>Communication in Mathematics</td>
<td>Maximum 6</td>
</tr>
<tr>
<td>Criterion D</td>
<td>Reflection in Mathematics</td>
<td>Maximum 6</td>
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<tr>
<td><strong>Total</strong></td>
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<td><strong>Maximum 28</strong></td>
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### Grade Boundaries

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<tr>
<th>Level</th>
<th>Score</th>
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<tbody>
<tr>
<td>1</td>
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<td>2</td>
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<td>6</td>
<td>22 - 25</td>
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<td>7</td>
<td>26 - 28</td>
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### MYP 5 Mathematics Extended

#### Ontario Ministry Guidelines

**MPM2D – Principles of Mathematics**

<table>
<thead>
<tr>
<th>STRANDS</th>
<th>OVERALL EXPECTATIONS</th>
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</table>
| **Quadratic Relations of the Form**          | - Determine the basic properties of quadratic relations  
- Relate transformations of the graph of \( y = ax^2 + bx + c \) to the algebraic representation \( y = a(x-h)^2 + k \)  
- Solve quadratic equations and interpret the solutions with respect to the corresponding relations  
- Solve problems involving quadratic relations |
| **Analytic Geometry**                         | - Model and solve problems involving the intersection of two straight lines  
- Solve problems using analytic geometry involving properties of lines and line segments  
- Verify geometric properties of triangles and quadrilaterals, using analytic geometry |
| **Trigonometry**                              | - Use their knowledge of ratio and proportion to investigate similar triangles and solve problems related to similarity  
- Solve problems involving right triangles, using the primary trigonometric ratios and the Pythagorean theorem  
- Solve problems involving acute triangles, using the sine law and the cosine law |

**MCR3U – Functions**

<table>
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<tr>
<th>STRANDS</th>
<th>OVERALL EXPECTATIONS</th>
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</table>
| **Characteristics of Functions**             | - Demonstrate an understanding of functions, their representations, and their inverses, and make connections between the algebraic and graphical representations of functions using transformations  
- Determine the zeros and the maximum or minimum of a quadratic function, and solve problems involving quadratic functions, including those arising from real-world applications  
- Demonstrate an understanding of equivalence as it relates to simplifying polynomial, radical, and rational expressions |
| **Exponential Functions**                     | - Evaluate powers with rational exponents, simplify expressions containing exponents, and describe properties of exponential functions represented in a variety of ways  
- Make connections between the numeric, graphical, and algebraic representations of exponential functions  
- Identify and represent exponential functions, and solve problems involving exponential functions, including those arising from real-world applications |
| **Discrete Functions**                        | - Demonstrate an understanding of recursive sequences, represent recursive sequences in a variety of ways, and make connections to Pascal’s triangle  
- Demonstrate an understanding of the relationships involved in arithmetic and geometric sequences and series, and solve related problems  
- Make connections between sequences, series, and financial applications, and solve problems involving compound interest and ordinary annuities |
| **Trigonometric Functions**                   | - Determine the values of the trigonometric ratios for angles less than 360°; prove simple trigonometric identities; and solve problems using the primary trigonometric ratios, the sine law and the cosine law  
- Demonstrate an understanding of periodic relationships and sinusoidal functions, and make connections between the numeric, graphical, and algebraic representations of sinusoidal functions  
- Identify and represent sinusoidal functions, and solve problems involving sinusoidal functions, including those arising from real-world applications |