**MPM2D1/2D3 Course Outline**

**2016-2017**

This Course Outline is based upon the Ministry of Education and Training Ontario Curriculum for Grade 10 Academic Mathematics as per the revised document of 2005.

Board: Toronto District School Board School: East York Collegiate Institute Curriculum Leader: R. Singh

Developing Teachers: R. Ahmed & P. Wiles

Date of Revision: June 2016

Course Title: Principles of Mathematics – Grade 10 Academic

Grade: 10.

Code MPM2D1/D3 Credit Value: 1.0.

Pre-requisite: Grade 9 Academic Mathematics (MPM1D)

Text Book: Principles of Mathematics 10, McGraw-Hill Ryerson (2007) Resources: MathPower 10, McGraw-Hill Ryerson (2000)

Mathematics 10, Nelson (2001)

Manipulatives, Graphing Calculators and Geometer’s Sketchpad

Teacher-made Worksheets

Algebra with Pizzazz

**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. Throughout the course, students will engage in the following processes: Problem Solving, Reasoning and Proving, Reflecting, Selecting Tools and Computational Strategies, Connecting, Representing, Communicating.

**Strands**

Trigonometry 24 periods Linear Systems 17 periods Quadratic Relations of the Form ***y = ax2 + bx + c*** 34 periods Analytic Geometry 26 periods

**Program Planning Considerations**

***Exceptional Students****:* Additional time will be allowed for tests. Additional accommodations will be provided in consultation with the Guidance, Special Education and ESL departments.

***Technology:*** Manipulatives, Graphing Calculators, and Geometer’s Sketchpad will be utilized for hands-on and technology-related applications.

***Career Education:*** Links to related fields will be established throughout the course. ***Co-operative Education****:* These will be provided in association with Guidance Department. ***Mathematics Anxiety****:* Attention will be addressed according to the following:

• Cultural perspectives

• Positive reinforcements

• Variety of assessment techniques

• Group structures

• Consideration for Learning Styles

**Learning Skills**

Assessment of the learning skills will be done on an ongoing basis throughout the academic year by observations of students at work, checklists and interviews. This will include:

Classwork/homework (Work habits, homework and organization) Completed work and seeking assistance (Organization and initiative)

Persistence and independence at tasks (Working independently and initiative) Extension of task (Organization and initiative**)** Achievement of group goals (Team work)

**Assessment Strategies**

A variety of teaching/assessment strategies to address students’ needs will be used during the school year. Formative assessments will be ongoing through out the academic year. These may include:

• Diagnostic assessment

• Formative assessment

• Performance assessment

• Portfolio assessment

• Rubrics

• Checklists

**Term Summative Evaluations (70% Term Work)**

• Tests, quizzes, tasks and other forms of term summative evaluations will occur throughout the academic year at the end of units of work as outlined in the accompanying course outline.

• Students will be provided with reasonable opportunities to master skills relating to the achievement of the curriculum expectations before assessment and evaluation occurs.

• Major evaluations will be announced at least one week in advance.

• Accommodations will be made for school activities, statutory holidays, religious days, cultural days, sports events and other occurrences that may impact on any scheduled evaluation. It is the student’s responsibility to notify teachers of such absences in advance and to make up missed work.

• Absence on the day of an evaluation must be documented. If a student must miss an evaluation, s/he is expected to:

a) see the teacher before the absence to arrange for an alternative date to make up the evaluation; or

b) in case of illness or unexpected absence, present a note to the teacher, signed by a parent or guardian, immediately upon their return to explain the absence. An alternate evaluation will then be scheduled at a mutually convenient time.

• The East York Late Policy applies to all assignments and evaluations. See your Agenda book.

• Cheating will not be tolerated in any form and will be dealt with appropriately.

**Final Mark Calculation**

Calculation of the Term Mark will be based upon the ***Categories*** of the ***Achievement Chart***. This chart is meant to assist teachers in planning instruction and learning activities for the achievement of the curriculum expectations. It is also used in designing assessment and evaluation tools and in providing feedback to students. Each mathematical topic will contain each category in the chart due to the integrated nature of the discipline in mathematics. Final marks will be calculated as follows:

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| **Term Work:** |  | **70%** | ***Levels of Achievement:*** |
| Knowledge and Understanding: | 35% |  | Level 1: 50 – 59% |
| Application: | 14% |  | Level 2: 60 – 69% |
| Thinking and Inquiry: | 14% |  | Level 3: 70 – 79% |
| Communication: | 7% |  | Level 4: 80 – 100% |

**Final January/June Evaluation(s): 30% Final Exam**

**Communication**

***Access to extra help and mark records***. Students are encouraged to consult their teachers on a regular basis for extra help and guidance as it relates to improving their academic performance. Students are also expected to discuss strategies for improving their grades with their teachers. Students are expected to view their report cards as an indication of their current achievement and discuss with teachers for clarification.

***Communication with Parents/Guardians***. Comments pertaining to academic achievement and learning skills are placed on the report cards are primarily to provide feedback for parents/guardians as well as students. Parent/guardian nights can be used for one to one discussion. At times it may be necessary to contact parents/guardians by telephone to discuss a student’s performance. Parents/guardians are also encouraged to contact teachers as and when the need arises.

**Mathematics Department**

**MPM2D Daily Course Outline 2016-2017**

**Textbook: Math Power 10, McGraw-Hill Ryerson (2007)**

**Strand #1: Trigonometry (24 periods)**

**Overall Expectations**:

• To use knowledge of ratio and proportion to investigate similar triangles and solve problems related to similarity;

• To solve problems involving right triangles, using primary trigonometric ratios and the Pythagorean Theorem;

• To solve problems involving acute triangles, using Sine Law and Cosine Law.

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| **PER** | **TOPIC** | **Section** | **ASSIGNMENT** | **NOTES** |
| **UNIT #1: TRIGONOMETRY OF RIGHT TRIANGLES (16 periods)** | | | | |
| 1 | Angle Properties | Get Ready | p. 326, #1-4 & Additional Exercises |  |
| 2 | Pythagorean Theorem & Slope | Get Ready | p. 327, #1-8 & Additional Exercises |  |
| 3 | Equivalent Ratios & Transformations | Get Ready | p. 328-329, #9-14 |  |
| 4 | Properties of Similar Triangles | 7.1 | p. 333, #5-9 |  |
| 5 | Applications of Similar Triangles I | 7.2 | p. 348, #5-8 |  |
| 6 | Applications of Similar Triangles II | 7.2 | p. 349, #9-14, 19, 20, 23 (17, 28) |  |
| 7 & 8 | **Mini-Test**  The Tangent Ratio | 7.3 | Investigate pp. 352-356 p. 362, 3-8 |  |
| 9 | Applications of the Tangent Ratio | 7.3 | p. 363, #9-11, 13, 17 (25, 26) |  |
| 10 | The Sine and Cosine Ratios | 7.4 | Investigation pp. 366-367 p. 372, #1-9 |  |
| 11 & 12 | Applications of Sine & Cosine | 7.4 | p. 374, #12-33 (select) |  |
| 13 & 14 | Applications of Right Triangles | 7.5 | p. 380, #5-7, 9, 11 / 13, 14, 19-22, 23, 30 |  |
| 15 | Review |  | pp. 386-391 |  |
| 16 | **TEST** |  |  |  |
| **UNIT #2: TRIGONOMETRY OF ACUTE ANGLES (8 periods)** | | | | |
| 1 | The Sine Law | 8.1 | Investigation p. 396 p. 402, #2, 3, 5-7 |  |
| 2 | Applications of the Sine law | 8.1 | p. 402, #9-13, 16, 17 |  |
| 3 | The Cosine Law | 8.2 | Investigation pp. 405-406 p. 409, #2-5 |  |
| 4 | Applications of the Cosine Law | 8.2 | p. 410, #7-15, 18 |  |
| 5 | Finding Angles Using the Cosine Law | 8.3 | Investigation p. 412  p. 418, #2, 3, 5, 6, 9-11, 15, 16 |  |
| 6 | Solve Problems Using Trigonometry | 8.4 | p. 427, #3, 6, 7, 13-16 |  |
| 7 | Review |  | pp. 430-433 |  |
| 8 | **TEST** |  |  |  |

**Strand #2: Linear Systems (17 periods)**

**Overall Expectations**:

• To model and solve problems involving the intersection of two straight lines.

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| **PER** | **TOPIC** | **Section** | **ASSIGNMENT** | **NOTES** |
| **UNIT #3: LINEAR SYSTEMS (17 periods)** | | | | |
| 1 | Review – Simplifying Polynomials  & Solving Equations | Get Ready | p. 4, #1-3; p. 469-470, #1-2;  p. 471-472, #1-3 | Lessons #1-5 are review of MPM1D. |
| 2 | Graphing Lines using y=mx+b | Get Ready | p. 5, #5, 6; p. 465, #3 |
| 3 | Graphing Lines using Intercepts & Solving Systems Graphically - by hand | Get Ready  1.1 | p. 5, #7, 8; p. 464, #2, 4;  p. 17, #7-9, 19-21 |
| 4 | Solving Linear Systems using TI-83 & Applications of Linear Systems | 1.1 | p. 17, #10-15, 17, 18 | Use TI-83  p. 14 - Instructions |
| 5 & 6 | Method of Substitution | 1.2 | p. 26, #1-5, 12-14, 17, 19, 20 |  |
| 7 | Investigate Equivalent Linear Relations  & Systems | 1.3 | Investigations A & B (pp. 29-31)  p. 32, #1-9 (select) |  |
| 8 & 9 | The Method of Elimination | 1.4 | p. 40, #1-7, 12-14, 20 |  |
| 10 | Review |  | p. 48, #4, 8, 9, 10, 12 p. 50, #3-9, 16 |  |
| 11 | **TEST #1** |  |  |  |

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| **PER** | **TOPIC** | **Section** | **ASSIGNMENT** | **NOTES** |
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| 12 | Applications of the Substitution Method | 1.2 | p. 27, #6-11, 15, 16, 18 |  |
| 13 | Applications of the Elimination Method | 1.4 | p. 40, #8, 9, 15-17 |  |
| 14 & 15 | Solving Problems Using Linear Systems | 1.5 | p. 46, #1-16 |  |
| 16 | Review |  | pp. 48, #1, 5-7, 13-17 p. 50, #1, 10-15, 17-19 |  |
| 17 | **TEST #2** |  |  |  |
| **1 & 2** | **Cumulative Review** |  |  |  |
| **3** | **CUMULATIVE TEST #1** |  |  |  |

**Strand #3: Quadratic Relations of the Form *y = ax2 + bx + c* (34 periods)**

**Overall Expectations**:

• To determine the basic properties of quadratic relations;

• To relate transformations of the graph of y= x2 to the algebraic representation of y=a(x-h)2+k;

• To solve quadratic equations and interpret the solutions with respect to the corresponding relations;

• Solve problems involving quadratic relations.

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| **PER** | **TOPIC** | **Section** | **ASSIGNMENT** | **NOTES** |
| **UNIT #4: QUADRATIC RELATIONS (8 periods)** | | | | |
| 1 | Investigate Non-Linear Relations | 4.1 | Investigations pp. 164-165 p. 166, #1-7 |  |
| 2 | Quadratic Relations | 4.2 | Investigations pp. 168-169 p. 172, #1-6 |  |
| 3 | Investigate Transformations of  Quadratics using TI-83 | 4.3 | Investigation pp. 174-175 p. 178, #1-14 |  |
| 4 | Graph y = a(x-h)2 + k | 4.4 | Investigation pp. 180-181 p. 185, #1-9 |  |
| 5 | Applications of y = a(x-h)2 + k | 4.4 | p. 186, #10-20 |  |
| 6 | Quadratic Relations of the Form y = a(x-r)(x-s) | 4.5 | Investigation p. 189  p. 192, #1-4 (select), #6-13 |  |
| 7 | Review |  | pp. 202-205 |  |
| 8 | **TEST** |  |  |  |
| **UNIT #5: QUADRATIC EXPRESSIONS (12 periods)** | | | | |
| 1 & 2 | Negative and Zero Exponents | 4.6 | Investigations pp. 194-196 p. 199, #1-15 | This is an introduction; Will revisit in Gr. 11. |
| 3 | Multiply Polynomials | 5.1 | p. 217, #3-7 |  |
| 4 | Special Products | 5.2 | p. 225, #2-7, 19; p. 218, #8 |  |
| 5 | Applications of Multiplying Polynomials | 5.1 & 5.2 | p. 218, #9-18; p. 226, #8-13, 16 |  |
| 6 | Common Factors | 5.3 | p. 234, #3-15 |  |
| 7 | Factor x2 + bx + c | 5.4 | p. 240, #3-16 |  |
| 8 | Factor ax2 + bx + c | 5.5 | p. 246, #1-5, 8-11 |  |
| 9 | More Trinomial Factoring | 5.5 | p. 246, #7-19 |  |
| 10 | Factoring x2 - y2 and (x + y)2 | 5.6 | p. 253, #1-20 |  |
| 11 | Review |  | pp. 256-259 |  |
| 12 | **TEST** |  |  |  |
| **UNIT #6: QUADRATIC EQUATIONS (14 periods)** | | | | |
| 1 | Completing the Square | 6.1 | p. 270, #3-8 |  |
| 2 & 3 | Applications of Maxima and Minima | 6.1 | p. 271, #10-24 |  |
| 4 | Solve Quadratic Equations by Factoring | 6.2 | p. 279, #1-6 |  |
| 5 | Applications of Quadratic Equations | 6.2 | p. 280, #7-20 |  |
| 6 | Graphing Quadratics Using Intercepts | 6.3 | p. 288, #1-7 |  |
| 7 | Applications of Graphing Quadratics | 6.3 | p. 290, #8-20 |  |
| 8 | The Quadratic Formula | 6.4 | p. 300, #1-5, 9 |  |
| 9 | Applications of the Quadratic Formula | 6.4 | p. 301, #6-8, 10-15 |  |
| 10 , 11  & 12 | Solving Problems Using Quadratics | 6.5 | p. 311, #1-26 |  |
| 13 | Review |  | pp. 316-319 |  |
| 14 | **TEST** |  |  |  |

**Strand #4: Analytic Geometry (26 periods)**

**Overall Expectations**:

• To solve problems using analytic geometry involving the properties of lines and line segments;

• To verify geometric properties of triangles and quadrilaterals, using analytic geometry.

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| **PER** | **TOPIC** | **Section** | **ASSIGNMENT** | **NOTES** |
| **UNIT #7: ANALYTIC GEOMETRY (14 periods)** | | | | |
| 1 | Review – Slope of a Line Segment | Get Ready | p. 54, #3, 4; p. 470, #1, 2 | Lessons #1-2 are review of MPM1D. |
| 2 & 3 | Review – Finding the Equation of a Line | Get Ready | p. 55, #5-8 & Additional Exercises |
| 4 | Midpoint of a Line Segment | 2.1 | Investigation pp. 56-60 p. 66, #1-6 | Laptop available for GSP  demos. |
| 5 | Applications of the Midpoint | 2.1 | p. 67, #8, 10, 12-17, 19, 23, 28, 29 |  |
| 6 | Length of a Line Segment | 2.2 | Investigation pp. 70-73 p. 77, #1-6 |  |
| 7 | Applications of the Length | 2.2 | p. 78, #7, 8, 10, 12-15, 17, 19-23 |  |
| 8 | Distance from a Point to a Line | 2.3 | Investigation pp. 80-82  p. 89, #1, 4, 10-14, 23-25 |  |
| 9 & 10 | Apply Slope, Midpoint & Length  Formulas | 2.3 | p. 89, #2, 3, 5-9, 16-18, 20-21, 27, 28, 31 |  |
| 11 | Equation for a Circle | 2.4 | Investigation pp. 92-94 p. 96, #1-4, 6-8 |  |
| 12 | Applications of the Circle | 2.4 | p. 97, #9-11, 13-20, 22 |  |
| 13 | Review |  | pp. 100-103 |  |
| 14 | **TEST** |  |  |  |
| **UNIT #8: GEOMETRIC PROPERTIES (12 periods)** | | | | |
| 1 & 2 | Investigate Properties of Triangles using  GSP | 3.1 | Investigation pp. 110-112 p. 114, #1-15, 19-22 | Computer lab for GSP |
| 3 & 4 | Verify Properties of Triangles using  Algebra | 3.2 | Investigation pp. 117-119 p. 124, #1-15, 18 |  |
| 5 & 6 | Investigate Properties of Quadrilaterals using GSP | 3.3 | Investigation pp. 128-131 p. 134, #1-11, 14-16 |  |
| 7 & 8 | Verify Properties of Quadrilaterals using  Algebra | 3.4 | Investigation pp. 137-139 p. 142, #1-14, 17 |  |
| 9 & 10 | Properties of Circles | 3.5 | Investigation pp. 145-146 p. 150, #1-14 |  |
| 11 | Review |  | pp. 152-155 |  |
| 12 | **TEST** |  |  |  |
| **1, 2 & 3** | **Year – End Review (Units #1-8)** |  | pp. 438-447 |  |
|  | **FINAL SUMMATIVE EVALUATION(S)** | | | |