Foundations of Mathematics 20

The table below lists the correspondence between the general outcomes of the Saskatchewan Foundations of Mathematics 20 (MAF20) curriculum the CEMC Grade 9/10/11 courseware.

Each section of the table is labelled with a dark heading containing a MAF20 general outcome. The left-hand entries in a section are corresponding CEMC Grade 9/10/11 courseware strands and units. The right-hand side entries are all relevant courseware lessons within this courseware strand and unit.

The CEMC Grade 9/10/11 courseware has been designed with curricula from across Canada in mind. It is not an exact match to the current curriculum in any specific jurisdiction. In order to help teachers and students determine any discrepancies relevant to them, the table below also includes all of the courseware lesson goals for any cited courseware lesson. Additionally, some italicized notes point out topics that are not covered by the courseware or covered in an earlier or later part of the CEMC courseware suite.

<table>
<thead>
<tr>
<th>FM 20.1 and FM 20.2</th>
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<tbody>
<tr>
<td>The General Curriculum Outcomes FM 20.1 (“Demonstrate understanding of the mathematics involved in an historical event or an area of interest.”) and FM 20.2 (“Demonstrate understanding of inductive and deductive reasoning including: analyzing conjectures, analyzing spatial puzzles and games, providing conjectures, and solving problems.”) are not addressed in the CEMC courseware.</td>
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<thead>
<tr>
<th>FM 20.3</th>
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<tr>
<td>The General Curriculum Outcome FM 20.3 (“Expand and demonstrate understanding of proportional reasoning related to rates, scale diagrams, scale factor, area, surface area, and volume”) is addressed in the CEMC’s Grade 7&amp;8 courseware. Specifically, see the unit “Ratios, Rates, and Proportions” Lessons 5-8, 10.</td>
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<tr>
<th>FM20.4 and FM20.5</th>
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| **Lesson 5: The Sine Law**  
  - State and prove the sine law.  
  - Use the sine law to compute one unknown side length or angle in an acute triangle.  
  - Use the sine law to determine all side lengths and angles in an acute triangle. |

| **Lesson 6: The Cosine Law**  
  - State and prove the cosine law.  
  - Use the cosine law to compute an unknown side length in an acute triangle.  
  - Use the cosine law to determine the interior angles of an acute triangle. |

| **Lesson 7: Applications with Acute Triangles**  
  - Identify when to apply the sine and cosine laws given incomplete information about the side lengths and angles in an acute triangle.  
  - Solve a multistep problem that involves  
    - two or more applications of the sine or cosine laws,  
    - interior and exterior angle properties of triangles, or  
    - two or more acute triangles. |

| **Lesson 8: Oblique Triangles**  
  - Compute the sine, cosine, and tangent ratios for obtuse angles.  
  - Determine the oblique angle or angles corresponding to a given trigonometric ratio.  
  - Solve an oblique triangle using the sine and cosine laws and correctly handle the ambiguous case of the sine law when encountered. |

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<thead>
<tr>
<th>FM20.6 and FM20.7</th>
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<tr>
<td>The General Curriculum Outcomes FM 20.6 (“Demonstrate an understanding of normal distribution, including standard deviation and z-scores”) and FM 20.7 (“Demonstrate understanding of the interpretation of statistical data, including: confidence intervals, confidence levels, and margin of error.”) are not addressed in the CEMC courseware.</td>
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| FM20.8 and FM20.9 |
### Quadratic Relations
#### Unit 3: Algebraic Skills

**Lesson 2: Factoring – Common and Trinomials**
- Factor an expression using common factoring.
- Factor a trinomial of the form $x^2 + bx + c$.
- Factor a trinomial of the form $ax^2 + bx + c$ with $a \neq 1$ by decomposition of by inspection.

**Lesson 3: Factoring – Difference of Squares and Perfect Squares**
- Factor difference of squares.
- Factor perfect squares.
- Determine which type of factoring applies to a given expression.
- Factor expressions requiring more than one type of factoring.

### Introduction to Functions
#### Unit 4: Inequalities, Absolute Values, and Reciprocals

**Lesson 4: Graphing Absolute Value Functions**
- Evaluate the absolute value of a number.
- Graph absolute value functions of the form $f(x) = a |b(x-h)| +k$ using transformations.
- Graph the absolute value of a linear function.
- Graph the absolute value of a quadratic function.

**Lesson 5: Solving Absolute Value Equations**
- Solve an absolute value equation graphically.
- Solve an equation involving the absolute value of a linear function algebraically.
- Solve an equation involving the absolute value of a quadratic function algebraically.

### Quadratic Relations
#### Unit 2: Algebraic Representations of Quadratic Relations

**Lesson 3: Exploring Vertex Form**
- Determine the vertex of a quadratic relation given the vertex form equation.
- Determine the vertex form equation of a quadratic relation given the vertex.
- Convert the factored form equation of a quadratic relation to the vertex form equation.

(Parts of this lesson may be beyond the scope of this course.)

### Quadratic Relations
#### Unit 5: Solving Problems Involving Quadratic Relations

**Lesson 1: Solving Quadratic Equations**
- Recognize quadratic equations.
- Solve quadratic equations in various forms by graphing, by applying inverse operations and by factoring.
- Check solutions to quadratic equations by graphing or by performing a formal check.
- Solve application problems that involve solving a quadratic equation.

**Lesson 2: Introduction to the Quadratic Formula**
- Derive the quadratic formula.
- Determine the roots of a quadratic equation using the quadratic formula.
- Determine the zeros of a quadratic relation using the quadratic formula.
- Apply the quadratic formula in a variety of contexts.

**Lesson 5: Applications**
- Use partial factoring to determine the vertex of a quadratic relation.
- Solve problems involving substitution into a quadratic relation.
- Solve problems that require solving a quadratic equation.
- Solve problems that involve finding the maximum or minimum of a quadratic relation.
- Select an appropriate computational strategy depending on the problem.

Solving quadratic-quadratic systems is not covered by the courseware.

### Introduction to Functions
#### Unit 1: Representing Functions

**Lesson 3: Domain and Range**
- Determine the domain and range of a function containing only a few points.
- Use set notation to describe the domain and range of a given function.
- Determine the domain and range of quadratic functions.
### Introduction to Functions

#### Unit 4: Representing Functions

<table>
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<th>Lesson 1: Solving Single-Variable Inequalities</th>
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<tr>
<td>• Express a set of real numbers using interval notation.</td>
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<tr>
<td>• Solve linear inequalities, including compound or simultaneous inequalities, using inverse operations.</td>
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<tr>
<td>• Use different strategies to solve quadratic inequalities, such as graphing, case analysis, or sign analysis.</td>
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<tr>
<td>• Solve applications involving linear and quadratic inequalities.</td>
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<td><em>(Parts of this lesson may be beyond the scope of this course.)</em></td>
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<th>Lesson 2: Inequalities in Two Variables</th>
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<td>• Determine if an ordered pair is a solution to a two-variable inequality.</td>
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<tr>
<td>• Sketch the graph of a linear or quadratic inequality in two variables.</td>
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<tr>
<td>• Solve application problems that involve a linear or quadratic inequality in two variables.</td>
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