# Grade 9/10/11 Courseware Lessons

This is a complete list of all the CEMC Grade 9/10/111 mathematics courseware lessons. There are a total of 144 lessons divided into 29 units across the 7 strands. The lesson titles are hyperlinks.

## Number Sense and Algebraic Expressions

### Unit 1 - Exponents
Lesson 1: An Introduction to Exponents
Lesson 2: Multiplying and Dividing Monomials
Lesson 3: Power of a Power Exponent Rule
Lesson 4: Negative Bases and Integer Exponents
Lesson 5: Rational Exponents - Part 1
Lesson 6: Rational Exponents - Part 2
Lesson 7: Exponent Laws All Together

### Unit 2 - Manipulating Algebraic Expressions
Lesson 1: An Introduction to Polynomials
Lesson 2: Adding and Subtracting Polynomials
Lesson 3: Multiplying a Polynomial by a Monomial
Lesson 4: Multiplying a Polynomial by a Polynomial
Lesson 5: Simplifying Polynomials

### Unit 3 - Radicals and Rational Functions
Lesson 1: Introduction to Radicals
Lesson 2: Operations With Radicals
Lesson 3: Solving Radical Equations
Lesson 4: Introduction to Rational Expressions
Lesson 5: Multiplying and Dividing Rational Expressions
Lesson 6: Adding and Subtracting Rational Expressions

### Unit 4 - Prime Factorization
Lesson 1: Prime Factorization
Lesson 2: Using Prime Factorization to Determine the GCF and LCM

## Linear Relations and Analytic Geometry

### Unit 1 - Linear Equations
Lesson 1: Solving One- and Two-Step Equations
Lesson 2: Solving Multi-Step Linear Equations
Lesson 3: Applications of Solving Linear Equations
Lesson 4: Solving Problems With Rate, Ratio, Proportion, and Percent
Lesson 5: Rearranging Equations and Formulas
Lesson 6: Solving Linear Inequalities

### Unit 2 - Characteristics of Linear Relations
Lesson 1: Introduction to Linear Relations - Part 1
Lesson 2: Introduction to Linear Relations - Part 2
Lesson 3: Linear Relations - Direct and Partial Variation
Lesson 4: Slope and the y-Intercept
Lesson 5: Graphing Linear Relations

## Unit 3 - Connecting Various Representations of Linear Relations
Lesson 1: Finding Missing Values in a Linear Relation
Lesson 2: Connecting Various Forms of a Linear Relation
Lesson 3: Changing the Properties of a Linear Relation

## Unit 4- Properties of Slope
Lesson 1: The Slope Formula
Lesson 2: Working With $y = mx + b$
Lesson 3: Parallel and Perpendicular Lines
Lesson 4: Horizontal and Vertical Lines

## Unit 5 - Equations of Linear Relations and Problem Solving
Lesson 1: Alternate Forms of an Equation of a Line
Lesson 2: Comparing Linear and Non-Linear Relations
Lesson 3: Applications of Linear Relations
Lesson 4: Interpreting Stories and Graphs

## Unit 6 - Solving Linear Systems
Lesson 1: Solving Linear Systems of Equations Graphically
Lesson 2: Solving Systems of Equations Algebraically
Lesson 3: Applications of Linear Systems

## Unit 7 - Properties of Line Segments and Using Analytic Geometry to Verify Geometric Properties
Lesson 1: Determining the Midpoint and Length of a Line Segment
Lesson 2: Problem Solving With Slopes, Lengths, and Midpoints
Lesson 3: Investigating and Verifying Properties of Quadrilaterals
Lesson 4: Equation of a Circle

## Unit 8 - Data Management and Statistics
Lesson 1: Scatter Plots and Lines or Curves of Best Fit
Lesson 2: Investigating Relationships Between Two Variables
Lesson 3: Collecting Data, Sampling Bias, and Techniques
Lesson 4: Display of Data and Representation Bias
Lesson 5: Probability in Society

# Measurement, Geometry, and Trigonometry

## Unit 1 - Pythagorean Theorem, Measurement, and Optimization
Lesson 1: The Pythagorean Theorem
Lesson 2: Perimeter and Area of Composite Shapes
Lesson 3: Surface Area of Pyramids and Cones
Lesson 4: Volume of Pyramids and Cones
Lesson 5: Volume and Surface Area of Spheres
Lesson 6: Maximizing Area of Rectangles With Fixed Perimeter
Lesson 7: Determining the Optimal Perimeter of Rectangles
Lesson 8: Optimizing Surface Area of Cylinders and Square-Based Prisms
Lesson 9: Maximizing the Volume of Cylinders and Square-Based Prisms

## Unit 2 - Geometric Relationships
Lesson 1: Review of Basic Angle Properties
Lesson 2: Angle Properties of Triangles
Lesson 3: Angle Properties of Quadrilaterals and Other Polygons
Lesson 4: Midpoints and Diagonals of Triangles, Quadrilaterals, and Other Polygons
Lesson 5: Chords of Circles
Lesson 6: Inscribed and Central Angles of Circles
Lesson 7: Tangents to Circles

## Unit 3 - Trigonometry
Lesson 1: Similarity and Congruence
Lesson 2: Similar Triangles
Lesson 3: Tangent Ratio
Lesson 4: Sine and Cosine Ratios
Lesson 5: The Sine Law
Lesson 6: The Cosine Law
Lesson 7: Applications With Acute Triangles
Lesson 8: Oblique Triangles
Lesson 9: Applications in Three-Dimensional Settings

## Unit 4 - Angles in Standard Position and Trigonometric Identities
Lesson 1: Trigonometric Ratios of Angles in Standard Position
Lesson 2: Related and Coterminal Angles
Lesson 3: Trigonometric Ratios of Special Angles
Lesson 4: Reciprocal Trigonometric Ratios
Lesson 5: Trigonometric Identities

## Quadratic Relations

### Unit 1 - Basic Properties of Quadratic Relations
Lesson 1: Recognizing Quadratic Relations From Tables of Values
Lesson 2: Exploring Second Differences
Lesson 3: Properties of Parabolas
Lesson 4: Comparing $y = x^2$ and $y = 2^x$

### Unit 2 - Algebraic Representations of Quadratic Relations
Lesson 1: Introduction to Standard, Factored, and Vertex Forms
Lesson 2: Exploring Factored Form
Lesson 3: Exploring Vertex Form

### Unit 3 - Algebraic Skills
Lesson 1: Expanding and Simplifying
Lesson 2: Factoring - Common and Trinomials
Lesson 3: Factoring - Difference of Squares and Perfect Squares
Lesson 4: Completing the Square

### Unit 4 - Graphing Quadratic Relations
Lesson 1: Transformations of $y = x^2$
Lesson 2: Graphing and Equations in Vertex Form
Lesson 3: Graphing and Equations in Factored Form
Lesson 4: Graphing and Equations in Standard Form

## Unit 5 - Solving Problems Involving Quadratic Relations
Lesson 1: Solving Quadratic Equations
Lesson 2: Introduction to the Quadratic Formula
Lesson 3: The Number of Zeros of a Quadratic Relation
Lesson 4: Intersections of Linear and Quadratic Relations
Lesson 5: Applications

# Introduction to Functions

## Unit 1 - Representing Functions
Lesson 1: Introduction to Functions
Lesson 2: Function Notation
Lesson 3: Domain and Range
Lesson 4: Domain and Range of Two New Functions

## Unit 2 - Transforming and Graphing Functions
Lesson 1: Graphing Three Common Functions
Lesson 2: Functions and Translations
Lesson 3: Horizontal Stretches, Compressions, and Reflections
Lesson 4: Vertical Stretches, Compressions, and Reflections
Lesson 5: Combining Transformations

## Unit 3 - Inverses of Functions
Lesson 1: Introduction to Inverses
Lesson 2: Determining Inverses of Linear Functions Algebraically
Lesson 3: Inverses of Quadratic Functions

## Unit 4 - Inequalities, Absolute Values, and Reciprocals
Lesson 1: Solving Single-Variable Inequalities
Lesson 2: Inequalities in Two Variables
Lesson 3: Graphing Reciprocal Functions
Lesson 4: Graphing Absolute Value Functions
Lesson 5: Solving Absolute Value Equations

# Sequences, Series and Financial Literacy

## Unit 1 - Representing Sequences
Lesson 1: Introducing Sequences
Lesson 2: Pascal's Triangle and Binomial Expansions

## Unit 2 - Arithmetic and Geometric Sequences and Series and Financial Applications
Lesson 1: Arithmetic Sequences
Lesson 2: Banking and Simple Interest
Lesson 3: Geometric Sequences
Lesson 4: Compound Interest
Lesson 5: Arithmetic Series
Lesson 6: Geometric Series
Lesson 7: Solving Annuity Problems as Geometric Series
Lesson 8: Solving Annuity Problems With Technology
Lesson 9: Other Financial Topics

# Exponential and Trigonometric Functions

**Unit 1 - Exponential Functions**
  Lesson 1: Introduction to Exponential Functions
  Lesson 2: Properties of Basic Exponential Functions
  Lesson 3: Identifying Exponential Functions
  Lesson 4: Transformations of Exponential Functions
  Lesson 5: Comparing Exponential Functions
  Lesson 6: Modelling With Exponential Functions

**Unit 2 - Sinusoidal Functions**
  Lesson 1: Periodic Functions
  Lesson 2: The Sine and Cosine Functions
  Lesson 3: Investigate Transformations of Sinusoidal Functions
  Lesson 4: Graphing Sinusoidal Functions
  Lesson 5: Modelling Periodic Behaviour
  Lesson 6: Applications of Sinusoidal Functions