

# Knowre Math: **Algebra 2** Curriculum

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## Chapter 1 Introduction to Algebra 2

Lesson	Topic	GA Standards for Excellence
1-1 Real Numbers and Order of Operations	A) Number Sets	MGSE9-12.A.SSE.2
	B) Absolute Value	
	C) Order of Operations	
1-2 Expressions	A) Writing Algebraic Expressions	MGSE9-12.A.SSE.1a, MGSE9-12.A.SSE.2
1-3 Equations	A) Solving Linear Equations	MGSE9-12.A.CED.1, MGSE9-12.A.CED.4
	B) Solving Literal Equations	
	C) Solving Absolute Value Equations	
1-4 Inequalities	A) Graphing Linear Inequalities	MGSE9-12.A.CED.1, MGSE9-12.A.CED.3
	B) Solving Linear Inequalities	
1-5 Compound Inequalities	A) Writing and Graphing Compound Inequalities	MGSE9-12.A.CED.1, MGSE9-12.A.CED.3
	B) Solving Compound Inequalities	
1-6 Absolute Value Inequalities	A) Writing and Graphing Absolute Value inequalities	MGSE9-12.A.CED.3
	B) Solving Absolute Value Inequalities	
1-7 The Coordinate Plane	A) Features of the Coordinate Plane	MGSE9-12.G.GPE.4
	B) Scale, Maximum, and Minimum of Coordinate Planes	

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## Chapter 2 Properties and Attributes of Functions

Lesson	Topic	GA Standards for Excellence
2-1 Relations	A) Relations and their Representations	MGSE9-12.F.IF.5
	B) Domain and Range of Relations	
2-2 Introduction to Functions	A) Identifying Functions	MGSE9-12.F.IF.5
	B) Domain and Range of Functions	
	C) Identifying Independent and Dependent Variables	
2-3 Interval Notation	A) Inequalities and Interval Notation	MGSE9-12.A.CED.3, MGSE9-12.F.IF.5
	B) Graphing Intervals on a Number Line	
	C) Domain and Range of Continuous Functions	
2-4 Function Notation	A) Identifying Inputs and Outputs of Functions	MGSE9-12.F.IF.2
	B) Writing Equations Using Function Notation	
	C) Evaluating Functions	

## Chapter 3 Linear Functions

Lesson	Topic	GA Standards for Excellence
3-1 Linear Equations and Functions	A) Identifying Linear Functions and Equations in Standard Form	MGSE9-12.A.CED.2, MGSE9-12.A.CED.4, MGSE9-12.F.IF.4
	B) Identifying the x- and y-intercepts	
	C) Graphing Linear Functions	
3-2 Rate of Change and Slope	A) Define Rate of Change	MGSE9-12.F.IF.4, MGSE9-12.F.IF.6, MGSE9-12.F.IF.9
	B) Finding Rate of Change and Slope	
3-3 Slope-Intercept Form	A) Define Slope-Intercept Form	MGSE9-12.A.CED.2, MGSE9-12.A.CED.4, MGSE9-12.F.IF.4, MGSE9-12.F.IF.6
	B) Graphing Equations in Slope-Intercept Form	
	C) Writing Equations in Slope-Intercept Form	
3-4 Point-Slope Form	A) Define Point-Slope Form	MGSE9-12.A.CED.2, MGSE9-12.A.CED.4, MGSE9-12.F.IF.4, MGSE9-12.F.IF.6, MGSE9-12.F.IF.9
	B) Graphing Equations in Point-Slope Form	
	C) Writing Equations in Point-Slope Form	

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3-5 Special Lines	A) Horizontal and Vertical Lines	MGSE9-12.A.CED.2, MGSE9-12.F.IF.4, MGSE9-12.F.IF.6
	B) Parallel and Perpendicular Lines	
3-6 Linear Inequalities	A) Graphing Linear Inequalities	MGSE9-12.A.CED.3

## Chapter 4 Linear Systems

Lesson	Topic	GA Standards for Excellence
4-1 Solving by Graphing	A) Solutions of Systems of Equations	MGSE9-12.A.CED.2, MGSE9-12.A.REI.11
	B) Solving Systems by Graphing	
4-2 Solving by Substitution	A) Solving Systems with Substitution	MGSE9-12.A.CED.2
4-3 Solving by Elimination	A) Directly Eliminating $x$ or $y$	MGSE9-12.A.CED.2
	B) Elimination After Scalar Multiplication	
4-4 Systems of Inequalities	A) Solving Systems of Linear Inequalities	MGSE9-12.A.CED.3
4-5 Linear Programming	A) Defining the Feasible Region	MGSE9-12.A.CED.2, MGSE9-12.A.CED.3, MGSE9-12.F.IF.5
	B) Maximizing/Minimizing Using the Feasible Region	
4-6 System of Equations with Three Variables	A) Solving with Substitution	MGSE9-12.A.CED.2

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## Chapter 5 Exponents and Roots

Lesson	Topic	GA Standards for Excellence
5-1 Multiplication and Division Properties of Exponents	A) Product of Powers Property	MGSE9-12.A.SSE.2
	B) Quotient of Powers Property	
	C) Negative Exponents	
5-2 Power Properties of Exponents	A) Power of a Power Property	MGSE9-12.A.SSE.2
	B) Power of a Product Property	
5-3 Simplifying Radicals	A) Simplifying Square Roots	MGSE9-12.N.RN.2, MGSE9-12.A.SSE.2
	B) Square Roots of Variable Expressions	
5-4 Adding and Subtracting Radicals	A) Adding and Subtracting Square Roots	MGSE9-12.N.RN.2, MGSE9-12.A.SSE.1a, MGSE9-12.A.SSE.2
5-5 Multiplying and Dividing Radicals	A) Simplifying Products of Square Roots	MGSE9-12.N.RN.2, MGSE9-12.A.SSE.2
	B) Simplifying Quotients of Square Roots	
5-6 Rationalizing Radicals	A) Simplifying Square Roots by Rationalizing the Denominator	MGSE9-12.N.RN.2, MGSE9-12.A.SSE.2
5-7 Rational and nth Root Forms	A) Writing Rational Exponents in Radical Form	MGSE9-12.N.RN.1, MGSE9-12.N.RN.2, MGSE9-12.A.SSE.2
	B) Writing Radical Expressions in Rational Exponent Form	
5-8 Evaluating nth Roots and Rational Exponents	A) Simplifying nth Roots	MGSE9-12.N.RN.1, MGSE9-12.N.RN.2, MGSE9-12.A.SSE.2
	B) Writing Rational Exponents in Simplified Radical Form	
5-9 Simplifying nth Roots of Variable Expressions	A) Simplifying nth Roots of Variable Expressions	MGSE9-12.N.RN.1, MGSE9-12.N.RN.2, MGSE9-12.A.SSE.2

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## Chapter 6 Transformations of Parent Functions

Lesson	Topic	GA Standards for Excellence
6-1 Parent Functions	A) Graphing Parent Functions	MGSE9-12.A.CED.2, MGSE9-12.F.IF.4, MGSE9-12.F.IF.7b
	B) Equations of Parent Functions	
6-2 Translations	A) Identifying Translations	MGSE9-12.A.CED.2, MGSE9-12.F.IF.4, MGSE9-12.F.IF.7b, MGSE9-12.F.BF.3
	B) Graphing Translations of Parent Functions	
	C) Writing Equations of Translated Parent Functions	
6-3 Reflections	A) Identifying Reflections	MGSE9-12.A.CED.2, MGSE9-12.F.IF.7b, MGSE9-12.F.BF.3
	B) Graphing Reflections of Parent Functions	
	C) Writing Equations of Reflected Parent Functions	
6-4 Dilations	A) Identifying Dilations	MGSE9-12.A.CED.2, MGSE9-12.F.IF.7b, MGSE9-12.F.BF.3
	B) Graphing Dilations of Parent Functions	
	C) Writing Equations of Dilated Parent Functions	
6-5 Mixed Transformations	A) Identifying Transformations	MGSE9-12.A.CED.2, MGSE9-12.F.IF.7b, MGSE9-12.F.BF.3
	B) Graphing Transformations of Parent Functions	
	C) Writing Equations of Transformed Parent Functions	
6-6 Transformations on Function Notation	A) Writing Equations of Functions after Transformations	MGSE9-12.A.CED.2, MGSE9-12.F.BF.3
	B) Identifying the Transformation that Results when Terms are Replaced in Function Notation	
6-7 Piecewise-Defined Functions	A) Features of Piecewise Functions	MGSE9-12.F.IF.4, MGSE9-12.F.IF.5, MGSE9-12.F.IF.7b
	B) Graphing Functions on Intervals	
	C) Graphing Piecewise Functions	

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## Chapter 7 Polynomials

Lesson	Topic	GA Standards for Excellence
7-1 Introduction to Polynomials	A) Classifying Polynomials	MGSE9-12.A.SSE.1a, MGSE9-12.A.SSE.2, MGSE9-12.A.APR.4
	B) Standard Form	
7-2 Adding, Subtracting, and Multiplying Polynomials	A) Addition of Polynomials	MGSE9-12.A.SSE.1a, MGSE9-12.A.SSE.2, MGSE9-12.A.APR.1, MGSE9-12.A.APR.4
	B) Subtraction of Polynomials	
	C) Multiplication of Polynomials	
7-3 Factoring	A) Factoring a GCF	MGSE9-12.A.SSE.1a, MGSE9-12.A.SSE.2
	B) Factoring by Grouping	
	C) Factoring Trinomials	
7-4 Factoring - Special Cases	A) Factoring Perfect Square Trinomials	MGSE9-12.A.SSE.1a, MGSE9-12.A.SSE.2, MGSE9-12.A.APR.4
	B) Factoring a Difference of Squares	
	C) Factoring a Sum or Difference of Cubes	
7-5 Imaginary Unit $i$	A) Defining $i$	MGSE9-12.N.CN.1, MGSE9-12.N.CN.2, MGSE9-12.A.SSE.2
	B) Powers of $i$	
	C) Simplifying Expressions that Contain Imaginary Numbers	
7-6 Complex Numbers	A) Defining Complex Numbers	MGSE9-12.N.CN.1, MGSE9-12.N.CN.2, MGSE9-12.N.CN.3, MGSE9-12.N.CN.8, MGSE9-12.A.SSE.1a, MGSE9-12.A.SSE.1b, MGSE9-12.A.SSE.2
	B) Operations with Complex Numbers	
	C) Conjugates of Complex Numbers	

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## Chapter 8 Quadratic Functions

Lesson	Topic	GA Standards for Excellence
8-1 Parabolas	A) Graphs of Quadratic Functions	MGSE9-12.A.CED.1, MGSE9-12.A.CED.3, MGSE9-12.F.IF.4
	B) Features of Parabolas	
	C) Using the Vertex and the Intercepts to Graph Quadratic Functions	
8-2 Standard Form of Quadratic Functions	A) Standard Form of a Quadratic Function	MGSE9-12.A.SSE.1a, MGSE9-12.F.IF.4, MGSE9-12.F.IF.9
	B) Using Key Features to Graph a Quadratic Functions in Standard Form	
	C) Writing Quadratic Equations in Standard Form	
8-3 Solving Quadratic Equations by Graphing	A) Solutions and x-intercepts	MGSE9-12.A.CED.2, MGSE9-12.A.CED.3, MGSE9-12.A.REI.4b, MGSE9-12.F.IF.4
8-4 Solving Quadratic Equations by Factoring	A) The Zero Product Property	MGSE9-12.N.CN.2, MGSE9-12.A.SSE.2, MGSE9-12.A.APR.3, MGSE9-12.A.CED.1, MGSE9-12.A.CED.2, MGSE9-12.A.REI.2, MGSE9-12.A.REI.4b, MGSE9-12.F.IF.4
	B) Solving Quadratic Equations by Factoring	
	C) Writing Quadratic Functions in Factored Form	
8-5 Solving Quadratic Equations by Completing the Square	A) Using Square Roots to Solve Quadratic Equations	MGSE9-12.N.CN.7, MGSE9-12.A.SSE.1a, MGSE9-12.A.APR.4, MGSE9-12.A.CED.1, MGSE9-12.A.CED.2, MGSE9-12.A.CED.4, MGSE9-12.A.REI.2, MGSE9-12.A.REI.4b, MGSE9-12.F.IF.4
	B) Solving Quadratic Equations by Completing the Square	
	C) Graphing Quadratic Functions in Vertex Form	
	D) Writing Quadratic Functions in Vertex Form	
8-6 Solving Quadratic Equations Using the Quadratic Formula	A) Using the Quadratic Formula to Solve Quadratic Equations	MGSE9-12.N.CN.7, MGSE9-12.A.CED.1, MGSE9-12.A.REI.2, MGSE9-12.A.REI.4b, MGSE9-12.A.REI.11, MGSE9-12.F.IF.4
	B) Solutions and the Discriminant	
	C) Using the Quadratic Formula to Write Quadratic Equations in Factored Form	

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## Chapter 9 Polynomial Functions

Lesson	Topic	GA Standards for Excellence
9-1 Dividing Polynomials Using Long Division	A) Polynomial Long Division	MGSE9-12.A.SSE.1a, MGSE9-12.A.SSE.2, MGSE9-12.A.APR.6
9-2 Dividing Polynomials Using Synthetic Division	A) Polynomial Synthetic Division	MGSE9-12.A.SSE.1a, MGSE9-12.A.SSE.2, MGSE9-12.A.APR.6, MGSE9-12.A.CED.4
9-3 Polynomial Equations	A) Solutions of Polynomial Equations	MGSE9-12.N.CN.9, MGSE9-12.A.SSE.2, MGSE9-12.A.APR.2, MGSE9-12.A.APR.3, MGSE9-12.A.APR.6, MGSE9-12.A.CED.1, MGSE9-12.A.CED.2, MGSE9-12.A.CED.3, MGSE9-12.F.IF.4, MGSE9-12.F.IF.7c
	B) Writing Polynomial Functions given the Zeros	
	C) Finding all Roots of Polynomial Functions	
9-4 Graphs of Polynomial Functions	A) Classifying Functions Based on their Graphs	MGSE9-12.N.CN.9, MGSE9-12.A.SSE.1a, MGSE9-12.A.SSE.2, MGSE9-12.A.APR.3, MGSE9-12.A.CED.2, MGSE9-12.F.IF.4, MGSE9-12.F.IF.7c
	B) End Behavior	
	C) Relating Graphs of Polynomial Functions to their Equations	



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## Chapter 10 Radical Functions and Inverses

Lesson	Topic	GA Standards for Excellence
10-1 nth Root Functions	A) Domain and Range of Square Root Functions	MGSE9-12.F.IF.4, MGSE9-12.F.IF.5, MGSE9-12.F.IF.7b
	B) Graphing Square Root Functions	
	C) Domain and Range of nth Root Functions	
10-2 Solving Radical Equations	A) Solving Square Root and nth Root Equations	MGSE9-12.A.CED.1, MGSE9-12.A.CED.4, MGSE9-12.A.REI.2
10-3 Operations on Functions	A) Performing Operations on Functions	MGSE9-12.F.IF.5, MGSE9-12.F.BF.1b
	B) Domain and Range of Functions that Result from Operations	
10-4 Composition of Functions	A) Evaluating Compositions of Functions	MGSE9-12.F.BF.1c, MGSE9-12.F.BF.4a
	B) Writing Compositions of Functions	
10-5 Inverse Functions and Relations	A) Inverses of Relations	MGSE9-12.F.IF.4, MGSE9-12.F.IF.5, MGSE9-12.F.BF.1c, MGSE9-12.F.BF.4a, MGSE9-12.F.BF.4b, MGSE9-12.F.BF.4c
	B) Determining the Inverse of Function Equations	
	C) Composition and Inverse Functions	

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## Chapter 11 Exponential and Logarithmic Functions

Lesson	Topic	GA Standards for Excellence
11-1 Exponential Functions	A) Writing and Graphing Exponential Functions	MGSE9-12.A.SSE.3c, MGSE9-12.A.CED.2, MGSE9-12.F.IF.4, MGSE9-12.F.IF.5, MGSE9-12.F.IF.7b, MGSE9-12.F.IF.7e, MGSE9-12.F.IF.8b
	B) Domain and Range of Exponential Functions	
11-2 Solving Exponential Equations	A) Solving Exponential Equations with a Common Base	MGSE9-12.A.CED.1, MGSE9-12.A.CED.4
	B) Solving Exponential Equations by Finding a Common Base	
11-3 Evaluating Logarithms	A) Defining Logarithms	MGSE9-12.A.SSE.1a, MGSE9-12.A.SSE.1b, MGSE9-12.F.BF.5, MGSE9-12.F.LE.4
	B) Evaluating Logarithms	
11-4 Solving Logarithmic Equations	A) Solving Logarithmic Equations	MGSE9-12.A.CED.1, MGSE9-12.A.CED.4, MGSE9-12.F.BF.5, MGSE9-12.F.LE.4
11-5 Logarithmic Functions	A) Domain and Range of Logarithmic Functions	MGSE9-12.A.CED.2, MGSE9-12.F.IF.4, MGSE9-12.F.IF.5, MGSE9-12.F.IF.7e, MGSE9-12.F.BF.3, MGSE9-12.F.BF.4a, MGSE9-12.F.LE.4
	B) Inverses of Logarithmic and Exponential Functions	
	C) Graphing Logarithmic Functions	
11-6 Exponential Growth and Decay	A) Identifying Percent Change	MGSE9-12.A.SSE.1b, MGSE9-12.A.SSE.3c, MGSE9-12.A.CED.1, MGSE9-12.A.CED.2, MGSE9-12.F.IF.4, MGSE9-12.F.IF.7e, MGSE9-12.F.IF.8b
	B) Writing Exponential Growth and Decay Equations	
	C) Modeling Exponential Growth and Decay	

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## Chapter 12 Sequences and Series

Lesson	Topic	GA Standards for Excellence
12-1 Sequences	A) Common Ratio and Difference	MGSE9-12.F.IF.6
	B) Writing Terms of Arithmetic and Geometric Sequences	
	C) Sequences and their Graphs	
12-2 Arithmetic Sequences	A) Recursive Formulas of Arithmetic Sequences	MGSE9-12.A.SSE.1a, MGSE9-12.A.SSE.1b, MGSE9-12.A.CED.1, MGSE9-12.A.CED.3
	B) Explicit Formulas of Arithmetic Sequences	
12-3 Geometric Sequences	A) Recursive Formulas of Geometric Sequences	MGSE9-12.A.SSE.1a, MGSE9-12.A.SSE.1b, MGSE9-12.A.CED.1, MGSE9-12.A.CED.3
	B) Explicit Formulas of Geometric Sequences	
12-4 Arithmetic Series	A) Defining Arithmetic Series	MGSE9-12.A.CED.1
	B) Partial Sums of Arithmetic Series	
12-5 Geometric Series	A) Defining Geometric Series	MGSE9-12.A.SSE.1a, MGSE9-12.A.SSE.1b, MGSE9-12.A.SSE.4, MGSE9-12.A.CED.1
	B) Partial Sums of Geometric Series	
	C) Infinite Geometric Series	
12-6 Sigma Notation	A) Introduction to Sigma Notation	MGSE9-12.A.SSE.1a, MGSE9-12.A.SSE.4
	B) Writing Series in Sigma Notation	
	C) Evaluating Arithmetic and Geometric Series in Sigma Notation	

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## Chapter 13 Rational Functions

Lesson	Topic	GA Standards for Excellence
13-1 Simplifying Rational Expressions	A) Undefined Values of Rational Expressions	MGSE9-12.A.APR.6, MGSE9-12.A.APR.7
	B) Simplifying Rational Expressions	
13-2 Multiplying and Dividing Rational Expressions	A) Multiplying Rational Expressions	MGSE9-12.A.APR.7
	B) Dividing Rational Expressions	
13-3 Adding and Subtracting Rational Expressions	A) Common Denominators of Rational Expressions	MGSE9-12.A.SSE.1a, MGSE9-12.A.APR.7, MGSE9-12.F.BF.1b
	B) Adding and Subtracting Rational Expressions	
13-4 Reciprocal Functions	A) Defining Reciprocal Functions	MGSE9-12.A.APR.6, MGSE9-12.A.CED.2, MGSE9-12.F.IF.4, MGSE9-12.F.IF.5, MGSE9-12.F.IF.7b, MGSE9-12.F.IF.7d, MGSE9-12.F.BF.3
	B) Domain and Range of Reciprocal Functions	
	C) Graphing Reciprocal Functions	
13-5 Rational Functions	A) Defining Rational Functions	MGSE9-12.A.SSE.1b, MGSE9-12.A.CED.2, MGSE9-12.F.IF.4, MGSE9-12.F.IF.5, MGSE9-12.F.IF.7d
	B) Asymptotes and Holes	
	C) Graphing Rational Functions	
13-6 Solving Rational Equations	A) Solving Rational Equations	MGSE9-12.A.CED.1, MGSE9-12.A.REI.2
13-7 Direct and Inverse Variation	A) Direct Variation	MGSE9-12.A.CED.1, MGSE9-12.A.CED.2, MGSE9-12.F.IF.6, MGSE9-12.F.BF.3
	B) Inverse Variation	