TEKS Alignment Guide for Algebra 2

The following alignment guide provides a crosswalk between the OpenStax's *Algebra 2e with Corequisite Support* textbook and the Texas Essential Knowledge and Skills (TEKS) for Algebra 2 standard framework.

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College Algebra 2e with Corequisite Support TEKS Alignment

This "Standards Crosswalk" to the Texas Essential Knowledge and Skills (TEKS) supports usage of the OpenStax *College Algebra 2e with Corequisite Support* in the Algebra 2 secondary classroom. This textbook includes corequisite content (foundational Algebraic knowledge and skills), which provides learning and review opportunities to support the closing of learning gaps for your students.

Key:
P = Prerequisite: These concepts contain only material that is listed as a prerequisite to the CCSS Algebra 2 Standards Framework.
NT = Not in TEKS: These concepts contain material that is not in the Algebra 2 Texas Essential Knowledge and Skills

OpenStax *College Algebra with Corequisite Support 2e*	**Algebra II TEKS**
Chapter 1: Prerequisites	
1.1 Real Numbers: Algebra Essentials	P
1.2 Exponents and Scientific Notation	P
1.3 Radicals and Rational Exponents	7.G, 7.H
1.4 Polynomials	7.B
1.5 Factoring Polynomials	7.E
1.6 Rational Expressions	7.C, 7.E, 7.F
Chapter 2: Equations and Inequalities	
2.1 The Rectangular Coordinate Systems and Graphs	P
2.2 Linear Equations in One Variable	6.I, 6.J
2.3 Models and Applications	P
2.4 Complex Numbers	7.A
2.5 Quadratic Equations	4.F, 7.E
2.6 Other Types of Equations	4.F, 4.G, 6.B, 6.E, 7.D, 7.E, 7.F, 7.G, 7.H
2.7 Linear Inequalities and Absolute Value Inequalities	4.H, 6.F

Chapter 3: Functions	
3.1 Functions and Function Notation	2.A
3.2 Domain and Range	2.A, 6.K, 7.I
3.3 Rates of Change and Behavior of Graphs	2.A
3.4 Composition of Functions	2.D
3.5 Transformation of Functions	2.A, 4.C, 6.A, 6.C, 6.G
3.6 Absolute Value Functions	2.A, 6.C, 6.E
3.7 Inverse Functions	2.B, 2.C, 2.D, 7.I
Chapter 4 Linear Functions	
4.1 Linear Functions	P
4.2 Modeling with Linear Functions	P
4.3 Fitting Linear Models to Data	8.A, 8.B, 8.C
Chapter 5: Polynomial and Rational Functions	
5.1 Quadratic Functions	2.A, 4.A, 4.B, 4.D, 7.I
5.2 Power Functions and Polynomial Functions	2.A
5.3 Graphs of Polynomial Functions	2.A, 4.F, 7.E
5.4 Dividing Polynomials	7.C, 7.D
5.5 Zeros of Polynomial Functions	4.F, 7.D, 7.E
5.6 Rational Functions	2.A, 6.G, 6.H, 6.I, 6.J, 6.K, 7.E, 7.I
5.7 Inverses and Radical Functions	2.B, 2.C, 2.D, 7.I
5.8 Modeling Using Variation	6.H, 6.L
Chapter 6: Exponential and Logarithmic Functions	
6.1 Exponential Functions	2.A, 5.A, 5.B, 7.I, 8.C
6.2 Graphs of Exponential Functions	2.A, 5.A, 5.B, 7.I
6.3 Logarithmic Functions	5.C, 7.I
6.4 Graphs of Logarithmic Functions	2.A, 2.C, 5.A, 7.I
6.5 Logarithmic Properties	5.C, 5.D
6.6 Exponential and Logarithmic Equations	5.D, 5.E

6.7 Exponential and Logarithmic Models	5.B, 5.D, 5.E
6.8 Fitting Exponential Models to Data	5.B, 5.D, 5.E, 8.A, 8.B, 8.C
Chapter 7: Systems of Equations and Inequalities	
7.1 Systems of Linear Equations: Two Variables	3.A, 3.E
7.2 Systems of Linear Equations: Three Variables	3.A, 3.B
7.3 Systems of Nonlinear Equations and Inequalities: Two Variables	3.C, 3.D, 4.H
7.4 Partial Fractions	7.F
7.5 Matrices and Matrix Operations	3.B
7.6 Solving Systems with Gaussian Elimination	3.B
7.7 Solving Systems with Inverses	3.B
7.8 Solving Systems with Cramer's Rule	3.B
Chapter 8: Analytic Geometry	
8.1 The Ellipse	NT
8.2 The Hyperbola	NT
8.3 The Parabola	4.B, 4.D
8.4 Rotation of Axes	NT
8.5 Conic Sections in Polar Coordinates	NT
Chapter 9: Sequences, Probability, and Counting Theory	
9.1 Sequences and Their Notations	NT
9.2 Arithmetic Sequences	NT
9.3 Geometric Sequences	5.B
9.4 Series and Their Notations	NT
9.5 Counting Principles	NT
9.6 Binomial Theorem	NT
9.7 Probability	NT

TEKS Algebra II Correlation

Note: TEKS 1A–G are Mathematical Process Standards, which are not included in the correlation as they are covered throughout ***College Algebra with Corequisite Support 2e***.

Algebra II Texas Essential Knowledge and Skills		**OpenStax *College Algebra with Corequisite Support 2e***
2 - Attributes of Functions and their Inverses The student applies mathematical processes to understand that functions have distinct key attributes and understand the relationship between a function and its inverse.		
2.A	The student is expected to graph the functions $f(x) = \sqrt{x}$, $f(x)=1/x$, $f(x)=x^3$, $f(x)=\sqrt[3]{x}$, $f(x)=b^x$, $f(x)=\lvert x\rvert$, and $f(x)=\log_b(x)$ where b is 2, 10, and e, and, when applicable, analyze the key attributes such as domain, range, intercepts, symmetries, asymptotic behavior, and maximum and minimum given an interval.	Lessons 3.1, 3.2, 3.3, 3.5, 3.6, 5.1, 5.2, 5.3, 5.6, 6.1, 6.2, 6.4
2.B	The student is expected to graph and write the inverse of a function using notation such as $f^{-1}(x)$.	Lessons 3.7, 5.7
2.C	The student is expected to describe and analyze the relationship between a function and its inverse (quadratic and square root, logarithmic and exponential), including the restriction(s) on domain, which will restrict its range.	Lessons 3.7, 5.7, 6.4
2.D	The student is expected to use the composition of two functions, including the necessary restrictions on the domain, to determine if the functions are inverses of each other.	Lessons 3.4, 3.7, 5.7
3 - Systems of Equations and Inequalities The student applies mathematical processes to formulate systems of equations and inequalities, use a variety of methods to solve, and analyze reasonableness of solutions.		
3.A	The student is expected to formulate systems of equations, including systems consisting of three linear equations in three variables and systems consisting of two equations, the first linear and the second quadratic.	Lessons 7.1, 7.2
3.B	The student is expected to solve systems of three linear equations in three variables by using Gaussian elimination, technology with matrices, and substitution.	Lessons 7.2, 7.5, 7.6, 7.7, 7.8
3.C	The student is expected to solve, algebraically, systems of two equations in two variables consisting of a linear equation and a quadratic equation.	Lessons 7.3

3.D	The student is expected to determine the reasonableness of solutions to systems of a linear equation and a quadratic equation in two variables.	Lesson 7.3
3.E	The student is expected to formulate systems of at least two linear inequalities in two variables.	Lesson 7.1
3.F	The student is expected to solve systems of two or more linear inequalities in two variables.	Not Covered
3.G	The student is expected to determine possible solutions in the solution set of systems of two or more linear inequalities in two variables.	Not Covered
4 - Quadratic and Square Root Functions, Equations, and Inequalities The student applies mathematical processes to understand that quadratic and square root functions, equations, and quadratic inequalities can be used to model situations, solve problems, and make predictions.		
4.A	The student is expected to write the quadratic function given three specified points in the plane.	Lesson 5.1
4.B	The student is expected to write the equation of a parabola using given attributes, including vertex, focus, directrix, axis of symmetry, and direction of opening.	Lessons 5.1, 8.3
4.C	The student is expected to determine the effect on the graph of $f(x) = \sqrt{x}$ when $f(x)$ is replaced by $af(x)$, $f(x) + d$, $f(bx)$, and $f(x - c)$ for specific positive and negative values of a, b, c, and d.	Lesson 3.5
4.D	The student is expected to transform a quadratic function $f(x) = ax^2 + bx + c$ to the form $f(x) = a(x - h)^2 + k$ to identify the different attributes of $f(x)$.	Lessons 5.1, 8.3
4.E	The student is expected to formulate quadratic and square root equations using technology given a table of data.	Not Covered
4.F	The student is expected to solve quadratic and square root equations.	Lessons 2.5, 2.6, 5.3, 5.5
4.G	The student is expected to identify extraneous solutions of square root equations.	Lesson 2.6
4.H	The student is expected to solve quadratic inequalities.	Lessons 2.7, 7.3
5 - Exponential and Logarithmic Functions and Equations The student applies mathematical processes to understand that exponential and logarithmic functions can be used to model situations and solve problems.		

5.A	The student is expected to determine the effects on the key attributes on the graphs of $f(x) = b^x$ and $f(x) = \log_b(x)$ where b is 2, 10, and e when $f(x)$ is replaced by $af(x)$, $f(x) + d$, and $f(x - c)$ for specific positive and negative real values of a, c, and d.	Lessons 6.1, 6.2, 6.4
5.B	The student is expected to formulate exponential and logarithmic equations that model real-world situations, including exponential relationships written in recursive notation.	Lessons 6.1, 6.2, 6.7, 6.8, 9.3
5.C	The student is expected to rewrite exponential equations as their corresponding logarithmic equations and logarithmic equations as their corresponding exponential equations.	Lessons 6.3, 6.5
5.D	The student is expected to solve exponential equations of the form $y = ab^x$ where a is a nonzero real number and b is greater than zero and not equal to one and single logarithmic equations having real solutions.	Lessons 6.5, 6.6, 6.7, 6.8
5.E	The student is expected to determine the reasonableness of a solution to a logarithmic equation.	Lessons 6.6, 6.7, 6.8
6 - Cubic, Cube Root, Absolute Value and Rational Functions, Equations, and Inequalities The student applies mathematical processes to understand that cubic, cube root, absolute value and rational functions, equations, and inequalities can be used to model situations, solve problems, and make predictions.		
6.A	The student is expected to analyze the effect on the graphs of $f(x) = x^3$ and $f(x) = \sqrt[3]{x}$ when $f(x)$ is replaced by $af(x)$, $f(bx)$, $f(x - c)$, and $f(x) + d$ for specific positive and negative real values of a, b, c, and d.	Lessons 3.5
6.B	The student is expected to solve cube root equations that have real roots.	Lesson 2.6
6.C	The student is expected to analyze the effect on the graphs of $f(x) = \lvert x \rvert$ when $f(x)$ is replaced by $af(x)$, $f(bx)$, $f(x - c)$, and $f(x) + d$ for specific positive and negative real values of a, b, c, and d.	Lesson 3.5, 3.6
6.D	The student is expected to formulate absolute value linear equations.	Not Covered
6.E	The student is expected to solve absolute value linear equations.	Lesson 2.6, 3.6
6.F	The student is expected to solve absolute value linear inequalities.	Lesson 2.7

6.G	The student is expected to analyze the effect on the graphs of $f(x) = 1/x$ when $f(x)$ is replaced by $af(x)$, $f(bx)$, $f(x - c)$, and $f(x) + d$ for specific positive and negative real values of a, b, c, and d.	Lessons 3.5, 5.6
6.H	The student is expected to formulate rational equations that model real-world situations.	Lesson 5.6, 5.8
6.I	The student is expected to solve rational equations that have real solutions.	Lessons 2.2, 5.6
6.J	The student is expected to determine the reasonableness of a solution to a rational equation.	Lessons 2.2, 5.6
6.K	The student is expected to determine the asymptotic restrictions on the domain of a rational function and represent domain and range using interval notation, inequalities, and set notation.	Lessons 3.2, 5.6
6.L	The student is expected to formulate and solve equations involving inverse variation.	Lesson 5.8
7 - Number and Algebraic Methods The student applies mathematical processes to simplify and perform operations on expressions and to solve equations.		
7.A	The student is expected to add, subtract, and multiply complex numbers.	Lesson 2.4
7.B	The student is expected to add, subtract, and multiply polynomials.	Lessons 1.4
7.C	The student is expected to determine the quotient of a polynomial of degree three and of degree four when divided by a polynomial of degree one and of degree two.	Lessons 1.6, 5.4
7.D	The student is expected to determine the linear factors of a polynomial function of degree three and of degree four using algebraic methods.	Lessons 2.6, 5.4, 5.5
7.E	The student is expected to determine linear and quadratic factors of a polynomial expression of degree three and of degree four, including factoring the sum and difference of two cubes and factoring by grouping.	Lessons 1.5, 1.6, 2.5, 2.6, 5.3, 5.5, 5.6
7.F	The student is expected to determine the sum, difference, product, and quotient of rational expressions with integral exponents of degree one and of degree two.	Lessons 1.6, 2.6, 7.4
7.G	The student is expected to rewrite radical expressions that contain variables to equivalent forms.	Lessons 1.3, 2.6

7.H	The student is expected to solve equations involving rational exponents.	Lessons 1.3, 2.6
7.I	The student is expected to write the domain and range of a function in interval notation, inequalities, and set notation.	Lessons 3.2, 3.7, 5.1, 5.6, 5.7, 6.1, 6.2, 6.3, 6.4
8 - Data The student applies mathematical processes to analyze data, select appropriate models, write corresponding functions, and make predictions.		
8.A	The student is expected to analyze data to select the appropriate model from among linear, quadratic, and exponential models.	Lessons 4.3, 6.8
8.B	The student is expected to use regression methods available through technology to write a linear function, a quadratic function, and an exponential function from a given set of data.	Lessons 4.3, 6.8
8.C	The student is expected to predict and make decisions and critical judgments from a given set of data using linear, quadratic, and exponential models.	Lessons 4.3, 6.1, 6.8