

READINESS STANDARDS - Algebra II

(2A.1) **Foundations for functions.** The student uses properties and attributes of functions and applies functions to problem situations. The student is expected to

(A) identify the mathematical domains and ranges of functions and determine reasonable domain and range values for continuous and discrete situations	Domain, Range, Function, Continuous, Discrete, Independent, Dependent
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(B) collect and organize data, make and interpret scatterplots, fit the graph of a function to the data, interpret the results, and proceed to model, predict, and make decisions and critical judgments	Function, Data, Scatterplot, Model
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(2A.4) **Algebra and geometry.** The student connects algebraic and geometric representations of functions. The student is expected to

(B) extend parent functions with parameters such as a in $f(x) = a/x$ and describe the effects of the parameter changes on the graph of parent functions	Function, Parent Function, Parameter Changes, Translate, Stretch, Compress, Reflect
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(2A.3) **Foundations for functions.** The student formulates systems of equations and inequalities from problem situations, uses a variety of methods to solve them, and analyzes the solutions in terms of the situations. The student is expected to

(A) analyze situations and formulate systems of equations in two or more unknowns or inequalities in two unknowns to solve problems	Unknowns, Variables, Equations, System of Equations, Inequality, System of Inequalities
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(B) use algebraic methods, graphs, tables, or matrices, to solve systems of equations or inequalities	Unknown, Variable, Equation, System of Equations, Inequality, System of Inequalities, Solution (to a system), Algebraic Methods (Substitution, Elimination), Graphs, Intersection, Matrix, Rows, Columns, Inverse Matrix
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(C) interpret and determine the reasonableness of solutions to systems of equations or inequalities for given contexts	Unknown, Variable, Equation, System of Equations, Inequality, System of Inequalities, Solution (to a system), No solutions, Inconsistent systems, Infinitely many solutions, Consistent systems
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(2A.6) **Quadratic and square root functions.** The student understands that quadratic functions can be represented in different ways and translates among their various representations. The student is expected to

(A) determine the reasonable domain and range values of quadratic functions, as well as interpret and determine the reasonableness of solutions to quadratic equations and inequalities	Domain, Range, Quadratic Function, Vertex, Representations, Solutions
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READINESS STANDARDS - Algebra II

(2A.6) **Quadratic and square root functions.** The student understands that quadratic functions can be represented in different ways and translates among their various representations. The student is expected to

(B) relate representations of quadratic functions, such as algebraic, tabular, graphical, and verbal descriptions

Quadratic Functions, Representations, Algebraic, Tabular, Graphical, Verbal descriptions

(2A.8) **Quadratic and square root functions.** The student formulates equations and inequalities based on quadratic functions, uses a variety of methods to solve them, and analyzes the solutions in terms of the situation. The student is expected to

(A) analyze situations involving quadratic functions and formulate quadratic equations or inequalities to solve problems

Quadratic function, Quadratic equation, Inequality

Specific application problems may include terms such as: Perimeter, Area, Initial velocity, Initial height, Acceleration due to Gravity

(D) solve quadratic equations and inequalities using graphs, tables, and algebraic methods

Quadratic functions, Roots, Zeroes, X-intercepts, Factor, Complete the Square, Quadratic Formula, Real solutions, Non-real solutions, Imaginary numbers, Complex numbers

(2A.7) **Quadratic and square root functions.** The student interprets and describes the effects of changes in the parameters of quadratic functions in applied and mathematical situations. The student is expected to

(A) use characteristics of the quadratic parent function to sketch the related graphs and connect between the $y = ax^2 + bx + c$ and the $y = a(x - h)^2 + k$ symbolic representations of quadratic functions

Quadratic Functions, Quadratic Parent Function, Parameters, Coefficient, Parabola, Vertex, General Form, Vertex Form, Minimum, Maximum, Y-intercept, Expand, Factor, Perfect Square Trinomial, Completing the Square

(2A.9) **Quadratic and square root functions.** The student formulates equations and inequalities based on square root functions, uses a variety of methods to solve them, and analyzes the solutions in terms of the situation. The student is expected to

(F) analyze situations modeled by square root functions, formulate equations or inequalities, select a method, and solve problems

Equation, Inequality, Square Root Function, Radical

(2A.10) **Rational functions.** The student formulates equations and inequalities based on rational functions, uses a variety of methods to solve them, and analyzes the solutions in terms of the situation. The student is expected to

(F) analyze a situation modeled by a rational function, formulate an equation or inequality composed of a linear or quadratic function, and solve the problem

Functions, Rational functions, Equations, Inequalities, Linear, Quadratic, Numerator, Denominator, Domain, Undefined, Asymptote, Discontinuity, Factor, Simplify

(2A.11) **Exponential and logarithmic functions.** The student formulates equations and inequalities based on exponential and logarithmic functions, uses a variety of methods to solve them, and analyzes the solutions in terms of the situation. The student is expected to

(A) develop the definition of logarithms by exploring and describing the relationship between exponential functions and their inverses

Base, Exponent (power), Logarithm, Argument, Inverse

READINESS STANDARDS - Algebra II

(2A.11) **Exponential and logarithmic functions.** The student formulates equations and inequalities based on exponential and logarithmic functions, uses a variety of methods to solve them, and analyzes the solutions in terms of the situation. The student is expected to

(F) analyze a situation modeled by an exponential function, formulate an equation or inequality, and solve the problem

Base, Exponent (power), Logarithm, Argument, Inverse, Asymptote, Original Amount, Rate

Specific application problems may include terms such as: Principle, Rate, Interest, Investment, Compounding interval, population size, exponential decay, Elapsed time, etc.

SUPPORTING STANDARDS - Algebra II

(2A.4) **Algebra and geometry.** The student connects algebraic and geometric representations of functions. The student is expected to

(A) identify and sketch graphs of parent functions, including linear ($f(x) = x$), quadratic ($f(x) = x^2$), exponential ($f(x) = ax$), and logarithmic ($f(x) = \log ax$) functions, absolute value of x ($f(x) = |x|$), square root of x ($f(x) = \sqrt{x}$), and reciprocal of x ($f(x) = 1/x$)

Linear, Square Root, Quadratic, Absolute Value, Exponential, Reciprocal, Logarithmic, Parent Function

(C) describe and analyze the relationship between a function and its inverse.

Function, Inverse, Domain, Range

(2A.2) **Foundations for functions.** The student understands the importance of the skills required to manipulate symbols in order to solve problems and uses the necessary algebraic skills required to simplify algebraic expressions and solve equations and inequalities in problem situations. The student is expected to

(A) use tools including factoring and properties of exponents to simplify expressions and to transform and solve equations

Commutative, Associative, Distributive, Equality, Expressions, Equation, Equivalent, Factor, Solution, Exponents, Identities, Inverses

(B) use complex numbers to describe the solutions of quadratic equations

Quadratic function, Roots, Zeros, X-intercepts, Solutions, Real solutions, Non-real solutions, Imaginary numbers, Complex numbers

(2A.6) **Quadratic and square root functions.** The student understands that quadratic functions can be represented in different ways and translates among their various representations. The student is expected to

(C) determine a quadratic function from its roots (real and complex) or a graph

Quadratic function, Roots, Zeros, X-intercepts, Solutions, Real solutions, Non-real solutions, Imaginary numbers, Complex numbers

(2A.8) **Quadratic and square root functions.** The student formulates equations and inequalities based on quadratic functions, uses a variety of methods to solve them, and analyzes the solutions in terms of the situation. The student is expected to

(B) analyze and interpret the solutions of quadratic equations using discriminants and solve quadratic equations using the quadratic formula

Discriminant, Quadratic function, Roots, Zeros, X-intercepts, Solutions, Real solutions, Non-real solutions, Imaginary numbers, Complex numbers

SUPPORTING STANDARDS - Algebra II

(2A.8) **Quadratic and square root functions.** The student formulates equations and inequalities based on quadratic functions, uses a variety of methods to solve them, and analyzes the solutions in terms of the situation. The student is expected to

(C) compare and translate between algebraic and graphical solutions of quadratic equations

Quadratic function, Roots, Zeros, X-intercepts, Solutions

(2A.5) **Algebra and geometry.** The student knows the relationship between the geometric and algebraic descriptions of conic sections. The student is expected to

(A) describe a conic section as the intersection of a plane and a cone

Conic Section, Intersection, Plane, Cone, Circle, Ellipse, Parabola, Hyperbola

(B) sketch graphs of conic sections to relate simple parameter changes in the equation to corresponding changes in the graph

Conic Section, Translate, Parameter changes, Circle, Ellipse, Parabola, Hyperbola, Center, Radius, Vertex, Directrix, Foci, Minor and major axis, Asymptote

(C) identify symmetries from graphs of conic sections

Symmetry, Vertical, Horizontal, Reflection

(D) identify the conic section from a given equation

Conic Section, Circle, Parabola, Ellipse, Hyperbola, Axis

(E) use the method of completing the square

Perfect square, General form, Vertex form

(2A.7) **Quadratic and square root functions.** The student interprets and describes the effects of changes in the parameters of quadratic functions in applied and mathematical situations. The student is expected to

(B) use the parent function to investigate, describe, and predict the effects of changes in a , h , and k on the graphs of $y = a(x - h)^2 + k$ form of a function in applied and purely mathematical situations.

Parent function, Parameter changes, Translate, Compress, Stretch

(2A.9) **Quadratic and square root functions.** The student formulates equations and inequalities based on square root functions, uses a variety of methods to solve them, and analyzes the solutions in terms of the situation. The student is expected to

(A) use the parent function to investigate, describe, and predict the effects of parameter changes on the graphs of square root functions and describe limitations on the domains and ranges

Parent function, Parameter changes, Translate, Compress, Stretch

(B) relate representations of square root functions, such as algebraic, tabular, graphical, and verbal descriptions

Square root function, Table, Graph, Verbal description

(C) determine the reasonable domain and range values of square root functions, as well as interpret and determine the reasonableness of solutions to square root equations and inequalities

Square root function, Domain, Range

(D) determine solutions of square root equations using graphs, tables, and algebraic methods

Square root function, Solution

SUPPORTING STANDARDS - Algebra II

(2A.9) **Quadratic and square root functions.** The student formulates equations and inequalities based on square root functions, uses a variety of methods to solve them, and analyzes the solutions in terms of the situation. The student is expected to

(E) determine solutions of square root inequalities using graphs and tables

Square root inequality, Solutions

(G) connect inverses of square root functions with quadratic functions

Quadratic function, Square root function, Domain, Range

(2A.10) **Rational functions.** The student formulates equations and inequalities based on rational functions, uses a variety of methods to solve them, and analyzes the solutions in terms of the situation. The student is expected to

(A) use quotients of polynomials to describe the graphs of rational functions, predict the effects of parameter changes, describe limitations on the domains and ranges, and examine asymptotic behavior

Polynomial, Quotient, Rational function, Asymptote, Translate, Compress, Stretch, Reflect, Domain, Range, Discontinuity, Undefined, Factor, Simplify

(B) analyze various representations of rational functions with respect to problem situations

Rational function, Domain, Range, Discontinuity, Asymptote

(C) determine the reasonable domain and range values of rational functions, as well as interpret and determine the reasonableness of solutions to rational equations and inequalities

Rational function, Domain, Range, Discontinuity, Asymptote

(D) determine the solutions of rational equations using graphs, tables, and algebraic methods

Rational function, Solution

(E) determine solutions of rational inequalities using graphs and tables equations and inequalities

Rational inequality, Solution

(G) use functions to model and make predictions in problem situations involving direct and inverse variation

Direct variation, Inverse variation, Joint variation, Constant of variation

(2A.11) **Exponential and logarithmic functions.** The student formulates equations and inequalities based on exponential and logarithmic functions, uses a variety of methods to solve them, and analyzes the solutions in terms of the situation. The student is expected to

(B) use the parent functions to investigate, describe, and predict the effects of parameter changes on the graphs of exponential and logarithmic functions, describe limitations on the domains and ranges, and examine asymptotic behavior

Logarithmic function, Exponential function, Domain, Range, Asymptote, Inverse

(C) determine the reasonable domain and range values of exponential and logarithmic functions, as well as interpret and determine the reasonableness of solutions to exponential and logarithmic equations and inequalities

Exponential function, Logarithmic function, Domain, Range

(D) determine solutions of exponential and logarithmic equations using graphs, tables, and algebraic methods

Exponential equation, Logarithmic equation, Solution

(E) determine solutions of exponential and logarithmic inequalities using graphs and tables

Exponential inequality, Logarithmic inequality, Solution

SUPPORTING STANDARDS - Algebra II

(2A.8) **Quadratic and square root functions.** The student formulates equations and inequalities based on quadratic functions, uses a variety of methods to solve them, and analyzes the solutions in terms of the situation. The student is expected to

(C) compare and translate between algebraic and graphical solutions of quadratic equations	Quadratic function, Roots, Zeros, X-intercepts, Solutions
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(2A.5) **Algebra and geometry.** The student knows the relationship between the geometric and algebraic descriptions of conic sections. The student is expected to

(A) describe a conic section as the intersection of a plane and a cone	Conic Section, Intersection, Plane, Cone, Circle, Ellipse, Parabola, Hyperbola
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(B) sketch graphs of conic sections to relate simple parameter changes in the equation to corresponding changes in the graph	Conic Section, Translate, Parameter changes, Circle, Ellipse, Parabola, Hyperbola, Center, Radius, Vertex, Directrix, Foci, Minor and major axis, Asymptote
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(C) identify symmetries from graphs of conic sections	Symmetry, Vertical, Horizontal, Reflection
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(D) identify the conic section from a given equation	Conic Section, Circle, Parabola, Ellipse, Hyperbola, Axis
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(E) use the method of completing the square	Perfect square, General form, Vertex form
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(2A.7) **Quadratic and square root functions.** The student interprets and describes the effects of changes in the parameters of quadratic functions in applied and mathematical situations. The student is expected to

(B) use the parent function to investigate, describe, and predict the effects of changes in a , h , and k on the graphs of $y = a(x - h)^2 + k$ form of a function in applied and purely mathematical situations	Parent function, Parameter changes, Translate, Compress, Stretch
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(A) use the parent function to investigate, describe, and predict the effects of parameter changes on the graphs of square root functions and describe limitations on the domains and ranges	Parent function, Parameter changes, Translate, Compress, Stretch
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(B) relate representations of square root functions, such as algebraic, tabular, graphical, and verbal descriptions	Square root function, Table, Graph, Verbal description
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(C) determine the reasonable domain and range values of square root functions, as well as interpret and determine the reasonableness of solutions to square root equations and inequalities	Square root function, Domain, Range
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(D) determine solutions of square root equations using graphs, tables, and algebraic methods	Square root function, Solution
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