SNAPSHOT

ALGEBRA II

Mathematical Process Standards

2A.1	**Mathematical process standards.** The student uses mathematical processes to acquire and demonstrate mathematical understanding.

Tools to Know

2A.1(A)	apply mathematics to problems arising in everyday life, society, and the workplace
2A.1(B)	use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution
2A.1(C)	select tools, including real objects, manipulatives, paper and pencil, and technology as appropriate, and techniques, including mental math, estimation, and number sense as appropriate, to solve problems

Absolute Value Functions
Connected Knowledge and Skills 2A.7

2A.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.
2A.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.

Readiness Standards	Supporting Standards
2A.2(A) graph the functions $f(x)=\sqrt{x}$, $f(x)=1/x$, $f(x)=x^3$, $f(x)=\sqrt[3]{x}$, $f(x)=b^x$, $f(x)=|x|$, 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 2A.6(E) solve absolute value linear equations	2A.6(C) analyze the effect on the graphs of $f(x) = |x|$ 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 2A.6(D) formulate absolute value linear equations 2A.6(F) solve absolute value linear inequalities 2A.7(I) write the domain and range of a function in interval notation, inequalities, and set notation

Systems of Equations and Inequalities

2A.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.

2A.3(B) solve systems of three linear equations in three variables by using Gaussian elimination, technology with matrices, and substitution	2A.3(E) formulate systems of at least two linear inequalities in two variables 2A.3(F) solve systems of two or more linear inequalities in two variables 2A.3(G) determine possible solutions in the solution set of systems of two or more linear inequalities in two variables

Quadratic and Square Root Functions
Connected Knowledge and Skills 2A.3, 2A.7

2A.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.
2A.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.
2A.8	**Data.** The student applies mathematical processes to analyze data, select appropriate models, write corresponding functions, and make predictions.

Readiness Standards	Supporting Standards
2A.2(A) graph the functions $f(x)=\sqrt{x}$, $f(x)=1/x$, $f(x)=x^3$, $f(x)=\sqrt[3]{x}$, $f(x)=b^x$, $f(x)=|x|$, 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	**2A.2(B)** graph and write the inverse of a function using notation such as $f^{-1}(x)$
2A.2(C) 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	**2A.2(D)** use the composition of two functions, including the necessary restrictions on the domain, to determine if the functions are inverses of each other
	2A.3(C) solve, algebraically, systems of two equations in two variables consisting of a linear equation and a quadratic equation
2A.3(A) 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	**2A.3(D)** determine the reasonableness of solutions to systems of a linear equation and a quadratic equation in two variables
2A.4(B) write the equation of a parabola using given attributes, including vertex, focus, directrix, axis of symmetry, and direction of opening	**2A.4(A)** write the quadratic function given three specified points in the plane
	2A.4(D) 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 $f(x)$
2A.4(C) 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	**2A.4(E)** formulate quadratic and square root equations using technology given a table of data
2A.4(F) solve quadratic and square root equations	**2A.4(G)** identify extraneous solutions of square root equations
2A.8(C) predict and make decisions and critical judgments from a given set of data using linear, quadratic, and exponential models	**2A.4(H)** solve quadratic inequalities
	2A.7(A) add, subtract, and multiply complex numbers
	2A.7(I) write the domain and range of a function in interval notation, inequalities, and set notation
	2A.8(A) analyze data to select the appropriate model from among linear, quadratic, and exponential models
	2A.8(B) use regression methods available through technology to write a linear function, a quadratic function, and an exponential function from a given set of data

Cube Root, Cubic, and Other Polynomial Functions
Connected Knowledge and Skills 2A.6

2A.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.
2A.7	**Number and algebraic methods.** The student applies mathematical processes to simplify and perform operations on expressions and to solve equations.

Readiness Standards	Supporting Standards
2A.2(A) graph the functions $f(x)=\sqrt{x}$, $f(x)=1/x$, $f(x)=x^3$, $f(x)=\sqrt[3]{x}$, $f(x)=b^x$, $f(x)=|x|$, 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	**2A.2(B)** graph and write the inverse of a function using notation such as $f^{-1}(x)$
2A.2(C) 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	**2A.2(D)** use the composition of two functions, including the necessary restrictions on the domain, to determine if the functions are inverses of each other
	2A.6(A) 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
2A.7(E) 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	**2A.6(B)** solve cube root equations that have real roots
	2A.7(B) add, subtract, and multiply polynomials
2A.7(H) solve equations involving rational exponents	**2A.7(C)** 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
	2A.7(D) determine the linear factors of a polynomial function of degree three and of degree four using algebraic methods
	2A.7(G) rewrite radical expressions that contain variables to equivalent forms

Exponential and Logarithmic Functions
Connected Knowledge and Skills 2A.7

2A.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.
2A.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.
2A.8	**Data.** The student applies mathematical processes to analyze data, select appropriate models, write corresponding functions, and make predictions.

Readiness Standards

2A.2(A) graph the functions $f(x)=\sqrt{x}$, $f(x)=1/x$, $f(x)=x^3$, $f(x)=\sqrt[3]{x}$, $f(x)=b^x$, $f(x)=|x|$, 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

2A.2(C) 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

2A.5(A) 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

2A.5(D) 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

2A.8(C) predict and make decisions and critical judgments from a given set of data using linear, quadratic, and exponential models

Supporting Standards

2A.2(B) graph and write the inverse of a function using notation such as $f^{-1}(x)$

2A.5(B) formulate exponential and logarithmic equations that model real-world situations, including exponential relationships written in recursive notation

2A.5(C) rewrite exponential equations as their corresponding logarithmic equations and logarithmic equations as their corresponding exponential equations

2A.5(E) determine the reasonableness of a solution to a logarithmic equation

2A.7(I) write the domain and range of a function in interval notation, inequalities, and set notation

2A.8(A) analyze data to select the appropriate model from among linear, quadratic, and exponential models

2A.8(B) use regression methods available through technology to write a linear function, a quadratic function, and an exponential function from a given set of data

Rational Functions
Connected Knowledge and Skills 2A.2

2A.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.
2A.7	**Number and algebraic method.** The student applies mathematical processes to understand that exponential and logarithmic functions can be used to model situations and solve problems.

2A.2(A) graph the functions $f(x)=\sqrt{x}$, $f(x)=1/x$, $f(x)=x^3$, $f(x)=\sqrt[3]{x}$, $f(x)=b^x$, $f(x)=|x|$, 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

2A.6(I) solve rational equations that have real solutions

2A.6(L) formulate and solve equations involving inverse variation

2A.7(F) determine the sum, difference, product, and quotient of rational expressions with integral exponents of degree one and of degree two

2A.6(G) 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

2A.6(H) formulate rational equations that model real-world situations

2A.6(J) determine the reasonableness of a solution to a rational equation

2A.6(K) determine the asymptotic restrictions on the domain of a rational function and represent domain and range using interval notation, inequalities, and set notation

2A.7(C) 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

Mathematical Process Standards

2A.1	**Mathematical process standards.** The student uses mathematical processes to acquire and demonstrate mathematical understanding.

Ways to Show

2A.1(D) communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate

2A.1(E) create and use representations to organize, record, and communicate mathematical ideas

2A.1(F) analyze mathematical relationships to connect and communicate mathematical ideas

2A.1(G) display, explain, and justify mathematical ideas and arguments using precise mathematical language in written or oral communication

NOTE: The classification of standards on this Snapshot represents the reviewed and synthesized input of a sample of Texas Math teachers. This Snapshot DOES NOT represent a publication of the Texas Education Agency. District curriculum may reflect other classifications.