



# **Algebra II Assessment**

## **Eligible Texas Essential Knowledge and Skills**

# STAAR Algebra II Assessment

## Reporting Category 1: Properties and Attributes of Functions

**The student will demonstrate an understanding of the foundational properties and attributes of functions.**

- (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; and **Readiness Standard**
  - (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.  
**Readiness Standard**
- (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 ( $f(x) = a^x$ ), and logarithmic ( $f(x) = \log_a x$ ) functions, absolute value of  $x$  ( $f(x) = |x|$ ), square root of  $x$  ( $f(x) = \sqrt{x}$ ), and reciprocal of  $x$  ( $f(x) = 1/x$ );  
**Supporting Standard**
  - (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; and **Readiness Standard**
  - (C) describe and analyze the relationship between a function and its inverse. **Supporting Standard**

## Reporting Category 2: Representational Tools to Solve Problems

**The student will demonstrate an understanding of the use of representational tools to solve problems.**

- (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; and  
**Supporting Standard**
  - (B) use complex numbers to describe the solutions of quadratic equations. **Supporting Standard**
- (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;  
**Readiness Standard**
  - (B) use algebraic methods, graphs, tables, or matrices, to solve systems of equations or inequalities; and **Readiness Standard**
  - (C) interpret and determine the reasonableness of solutions to systems of equations or inequalities for given contexts. **Readiness Standard**

## Reporting Category 3: Properties of Quadratic Functions

The student will demonstrate an understanding of the properties of quadratic functions.

- (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;  
**Readiness Standard**
  - (B) relate representations of quadratic functions, such as algebraic, tabular, graphical, and verbal descriptions; and  
**Readiness Standard**
  - (C) determine a quadratic function from its roots (real and complex) or a graph. **Supporting Standard**
- (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;  
**Readiness Standard**
  - (B) analyze and interpret the solutions of quadratic equations using discriminants and solve quadratic equations using the quadratic formula; **Supporting Standard**
  - (C) compare and translate between algebraic and graphical solutions of quadratic equations; and **Supporting Standard**
  - (D) solve quadratic equations and inequalities using graphs, tables, and algebraic methods. **Readiness Standard**

## Reporting Category 4: Multiple Representations of Quadratic Relations

The student will demonstrate an understanding of the connections between algebraic and geometric representations of quadratic functions and relations.

- (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;  
**Supporting Standard**
  - (B) sketch graphs of conic sections to relate simple parameter changes in the equation to corresponding changes in the graph;  
**Supporting Standard**
  - (C) identify symmetries from graphs of conic sections;  
**Supporting Standard**
  - (D) identify the conic section from a given equation; and  
**Supporting Standard**
  - (E) use the method of completing the square. **Supporting Standard**
- (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; and **Readiness Standard**
  - (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.  
**Supporting Standard**

## Reporting Category 5: Properties of Square Root Functions

The student will demonstrate an understanding of the properties of square root functions.

(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;  
**Supporting Standard**
- (B) relate representations of square root functions, such as algebraic, tabular, graphical, and verbal descriptions; **Supporting Standard**
- (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;  
**Supporting Standard**
- (D) determine solutions of square root equations using graphs, tables, and algebraic methods; **Supporting Standard**
- (E) determine solutions of square root inequalities using graphs and tables; **Supporting Standard**
- (F) analyze situations modeled by square root functions, formulate equations or inequalities, select a method, and solve problems; and  
**Readiness Standard**
- (G) connect inverses of square root functions with quadratic functions.  
**Supporting Standard**

## Reporting Category 6: Properties of Rational Functions

**The student will demonstrate an understanding of the properties of rational functions.**

- (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; **Supporting Standard**
  - (B) analyze various representations of rational functions with respect to problem situations; **Supporting Standard**
  - (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; **Supporting Standard**
  - (D) determine the solutions of rational equations using graphs, tables, and algebraic methods; **Supporting Standard**
  - (E) determine solutions of rational inequalities using graphs and tables; **Supporting Standard**
  - (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; and **Readiness Standard**
  - (G) use functions to model and make predictions in problem situations involving direct and inverse variation. **Supporting Standard**

## Reporting Category 7: Properties of Exponential and Logarithmic Functions

The student will demonstrate an understanding of the properties of exponential and logarithmic functions.

- (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; **Readiness Standard**
  - (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; **Supporting Standard**
  - (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; **Supporting Standard**
  - (D) determine solutions of exponential and logarithmic equations using graphs, tables, and algebraic methods; **Supporting Standard**
  - (E) determine solutions of exponential and logarithmic inequalities using graphs and tables; and **Supporting Standard**
  - (F) analyze a situation modeled by an exponential function, formulate an equation or inequality, and solve the problem. **Readiness Standard**