

IN Introductory Algebra Skills

Skills:

- IN1 I can simplify radical expressions.
- IN2 I can solve linear and absolute value equations.
- IN3 I can evaluate expressions using function notation.
- IN4 I can apply translations to linear and absolute value functions.
- IN5 I can apply reflections and dilations to linear and absolute value functions.
- IN6 I can apply multiple transformations to linear and absolute value functions.
- IN7 I can find and describe restricted domains and ranges for linear and absolute value functions.

Standards:

- A2.F.1.1** Use algebraic, interval, and set notations to specify the domain and range of functions of various types and evaluate a function at a given point in its domain.
- A2.F.1.2** Recognize the graphs of exponential, radical (square root and cube root only), quadratic, and logarithmic functions. Predict the effects of transformations [$f(x+c)$, $f(x)+c$, $f(cx)$ and $cf(x)$, where c is a positive or negative real-valued constant] algebraically and graphically, using various methods and tools that may include graphing calculators or other appropriate technology.

QC Quadratics and Cubic Functions and their Inverses

Skills:

- QC1 I can describe and sketch quadratic functions using transformations of the parent function.
- QC2 I can solve quadratic equations using square roots and use this to find intercepts.
- QC3 I can describe and sketch square root functions using transformations of the parent function.
- QC4 I can solve square root equations by squaring and use this to find intercepts.
- QC5 I can recognize quadratics and square roots as inverse functions and convert between the two forms.
- QC6 I can describe and sketch cubic functions using transformations and intercepts.
- QC7 I can describe and sketch cube root functions using transformations and intercepts.
- QC8 I can recognize cubics and cube roots as inverse functions and convert between the two forms.

Standards:

- A2.F.1.1** Use algebraic, interval, and set notations to specify the domain and range of functions of various types and evaluate a function at a given point in its domain.
- A2.F.1.2** Recognize the graphs of exponential, radical (square root and cube root only), quadratic, and logarithmic functions. Predict the effects of transformations [$f(x+c)$, $f(x)+c$, $f(cx)$ and $cf(x)$, where c is a positive or negative real-valued constant] algebraically and graphically, using various methods and tools that may include graphing calculators or other appropriate technology.
- A2.F.1.3** Graph a quadratic function. Identify the x- and y-intercepts, maximum or minimum value, axis of symmetry, and vertex using various methods and tools that may include a graphing calculator or appropriate technology.
- A2.F.1.7** Graph a radical function (square root and cube root only) and identify the x- and y-intercepts using various methods and tools that may include a graphing calculator or other appropriate technology.
- A2.F.2.3** Find and graph the inverse of a function, if it exists, in real-world and mathematical situations. Know that the domain of a function f is the range of the inverse function f^{-1} , and the range of the function f is the domain of the inverse function f^{-1} .

RF Simple Rational Functions

Skills:

- RF1 I can describe and sketch transformations of $\frac{1}{x}$ and $\frac{1}{x^2}$.
- RF2 I can solve simple rational equations and use this to find intercepts.
- RF3 I can recognize $\frac{1}{x}$ as its own inverse, and use this to find the inverse of other rational functions.
- RF4 I can rewrite $f(x) = \frac{ax + b}{cx + d}$ as a simple rational function, and use the result to graph the function.

Standards:

- A2.F.1.1** Use algebraic, interval, and set notations to specify the domain and range of functions of various types and evaluate a function at a given point in its domain.
- A2.F.1.2** Recognize the graphs of exponential, radical (square root and cube root only), quadratic, and logarithmic functions. Predict the effects of transformations [$f(x+c)$, $f(x)+c$, $f(cx)$ and $cf(x)$, where c is a positive or negative real-valued constant] algebraically and graphically, using various methods and tools that may include graphing calculators or other appropriate technology.
- A2.F.1.6** Graph a rational function and identify the x- and y-intercepts, vertical and horizontal asymptotes, using various methods and tools that may include a graphing calculator or other appropriate technology. (Excluding slant or oblique asymptotes and holes.)
- A2.F.2.3** Find and graph the inverse of a function, if it exists, in real-world and mathematical situations. Know that the domain of a function f is the range of the inverse function f^{-1} , and the range of the function f is the domain of the inverse function f^{-1} .

EF Exponential and Logarithmic Functions

Skills:

- EF1 I can use exponents to represent repeated multiplication and division, and radicals.
- EF2 I can describe and sketch exponential functions using transformations of the parent function.
- EF3 I can calculate logarithms as the inverse of exponents.
- EF4 I can describe and sketch exponential functions using transformations of the parent function.
- EF5 I can use inverse operations to solve exponential and logarithmic equations, and use this to find intercepts.
- EF6 I can recognize exponents and logarithms as inverse functions and convert between the two forms.

Standards:

- A2.F.1.1** Use algebraic, interval, and set notations to specify the domain and range of functions of various types and evaluate a function at a given point in its domain.
- A2.F.1.2** Recognize the graphs of exponential, radical (square root and cube root only), quadratic, and logarithmic functions. Predict the effects of transformations [$f(x+c)$, $f(x)+c$, $f(cx)$ and $cf(x)$, where c is a positive or negative real-valued constant] algebraically and graphically, using various methods and tools that may include graphing calculators or other appropriate technology.
- A2.F.1.4** Graph exponential and logarithmic functions. Identify asymptotes and x- and y-intercepts using various methods and tools that may include graphing calculators or other appropriate technology. Recognize exponential decay and growth graphically and algebraically.
- A2.F.2.3** Find and graph the inverse of a function, if it exists, in real-world and mathematical situations. Know that the domain of a function f is the range of the inverse function f^{-1} , and the range of the function f is the domain of the inverse function f^{-1} .
- A2.F.2.4** Apply the inverse relationship between exponential and logarithmic functions to convert from one form to another.

QU Quadratic Expressions and Equations

Skills:

- QU1 I can distribute products of polynomials and simplify by collecting like terms.
- QU2 I can factor polynomials by identifying a greatest common factor.
- QU3 I can apply zero product property to solve equations.
- QU4 I can distribute and factor quadratics using differences of squares and perfect squares.
- QU5 I can solve quadratic equations by factoring.
- QU6 I can solve quadratic equations by completing the square.
- QU7 I can solve quadratic equations using the quadratic formula.

Standards:

- A2.A.1.1** Represent real-world or mathematical problems using quadratic equations and solve using various methods (including graphing calculator or other appropriate technology), factoring, completing the square, and the quadratic formula. Find non-real roots when they exist.
- A2.A.2.3** Recognize that a quadratic function has different equivalent representations [$f(x) = ax^2 + bx + c$, $f(x) = a(x - h)^2 + k$ and $f(x) = (x - h)(x - k)$]. Identify and use the representation that is most appropriate to solve real-world and mathematical problems.
- A2.F.1.3** Graph a quadratic function. Identify the x- and y-intercepts, maximum or minimum value, axis of symmetry, and vertex using various methods and tools that may include a graphing calculator or appropriate technology.

PO Polynomials

Skills:

- PO1 I can distribute and factor cubics using sum and difference of cubes, and perfect cubes.
- PO2 I can perform polynomial division and use the remainder theorem to verify results.
- PO3 I can factor polynomial expressions and solve polynomial equations.
- PO4 I can analyze polynomial functions and identify features of a polynomial curve.
- PO5 I can find i^n and for any whole number n , and find the square root of negative numbers.
- PO6 I can add, subtract and multiply complex numbers.
- PO7 I can divide complex numbers and write the result as $a + bi$.
- PO8 I can solve quadratic equations with non-real solutions.

Standards:

- A2.N.1.1** Find the value of i^n for any whole number n .
- A2.N.1.2** Simplify, add, subtract, multiply, and divide complex numbers.
- A2.A.1.4** Solve polynomial equations with real roots using various methods and tools that may include factoring, polynomial division, synthetic division, graphing calculators or other appropriate technology.
- A2.A.2.1** Factor polynomial expressions including but not limited to trinomials, differences of squares, sum and difference of cubes, and factoring by grouping using a variety of tools and strategies.
- A2.A.2.2** Add, subtract, multiply, divide, and simplify polynomial and rational expressions.
- A2.F.1.5** Analyze the graph of a polynomial function by identifying the domain, range, intercepts, zeros, relative maxima, relative minima, and intervals of increase and decrease.

RE Rational Expressions and Equations

Skills:

RE1 I can multiply, divide and simplify rational expressions.

RE2 I can add and subtract rational expressions.

RE3 I can simplify expressions with complex fractions.

RE4 I can solve rational equations and check for extraneous solutions.

Standards:

A2.A.1.3 Solve one-variable rational equations and check for extraneous solutions.

A2.A.2.2 Add, subtract, multiply, divide, and simplify polynomial and rational expressions.

A2.F.1.6 Graph a rational function and identify the x- and y-intercepts, vertical and horizontal asymptotes, using various methods and tools that may include a graphing calculator or other appropriate technology. (Excluding slant or oblique asymptotes and holes.)

EL Exponents, Logarithms and Radicals

Skills:

- EL1 I can multiply radical expressions using the distributive property.
- EL2 I can divide radical expressions and rationalize denominators as necessary.
- EL3 I can solve equations involving radicals and check for extraneous solutions.
- EL4 I can simplify expressions using the exponent rules.
- EL5 I can simplify logarithmic expressions using the logarithm rules.
- EL6 I can solve exponential and logarithmic equations using the exponent and logarithm rules.

Standards:

- A2.N.1.4** Understand and apply the relationship of rational exponents to integer exponents and radicals to solve problems.
- A2.A.1.2** Represent real-world or mathematical problems using exponential equations, such as compound interest, depreciation, and population growth, and solve these equations graphically (including graphing calculator or other appropriate technology) or algebraically.
- A2.A.1.5** Solve square root equations with one variable and check for extraneous solutions.
- A2.A.1.5** Solve square root equations with one variable and check for extraneous solutions.
- A2.A.2.4** Rewrite expressions involving radicals and rational exponents using the properties of exponents.

CF Combining Functions

Skills:

CF1 I can describe and graph piecewise functions.

CF2 I can create new functions by adding, subtracting, multiplying and dividing.

CF3 I can create new functions by composition.

Standards:

A2.F.1.8 Graph piecewise functions with no more than three branches (including linear, quadratic, or exponential branches) and analyze the function by identifying the domain, range, intercepts, and intervals for which it is increasing, decreasing, and constant.

A2.F.2.1 Add, subtract, multiply, and divide functions using function notation and recognize domain restrictions.

A2.F.2.2 Combine functions by composition and recognize that $g(x) = f^{-1}(x)$, the inverse function of $f(x)$, if and only if $f(g(x)) = g(f(x)) = x$.

SQ Sequences and Series

Skills:

- SQ1 I can identify arithmetic and geometric sequences from tables, graphs and patterns.
- SQ2 I can use recursion to find the n th term of an arithmetic or geometric sequence.
- SQ3 I can find an explicit formula to directly find the n th term of an arithmetic or geometric sequence.
- SQ4 I can use a formula to find the sum of the first n terms of an arithmetic or geometric series.

Standards:

- A2.A.1.7** Solve real-world and mathematical problems that can be modeled using arithmetic or finite geometric sequences or series given the n th terms and sum formulas. Graphing calculators or other appropriate technology may be used.

SY Systems and Matrices

Skills:

- SY1** I can solve systems of linear equations involving two variables.
- SY2** I can solve systems of linear equations involving three variables.
- SY3** I can solve systems involving non-linear equations.
- SY4** I can solve systems of linear inequalities.
- SY5** I can organize data using a matrix.
- SY6** I can add and subtract matrices, and multiply matrices by scalars.

Standards:

- A2.N.1.3** Use matrices to organize and represent data. Identify the order (dimension) of a matrix, add and subtract matrices of appropriate dimensions, and multiply a matrix by a scalar to create a new matrix to solve problems.
- A2.A.1.8** Represent real-world or mathematical problems using systems of linear equations with a maximum of three variables and solve using various methods that may include substitution, elimination, and graphing (may include graphing calculators or other appropriate technology).
- A2.A.1.9** Solve systems of equations containing one linear equation and one quadratic equation using tools that may include graphing calculators or other appropriate technology.

ST Statistics

Skills:

- ST1 I can fit a data set to the normal distribution using the mean and standard deviation.
- ST2 I can collect data, represent it using scatterplots, and describe relationships between variables.
- ST3 I can determine the regression equation for a set of data and use it to make predictions.
- ST4 I can create a graph for a set of data by choosing between discrete and continuous graphical representations appropriately.
- ST5 I can examine media reports and evaluate the reliability of the data and conclusions that are presented.
- ST6 I can recognize and analyze data distortions in data displays and show distortions can be used to support different points of view.
- ST7 I can explain misleading uses of data and identify examples of misused data.

Standards:

- A2.D.1.1** Use the mean and standard deviation of a data set to fit it to a normal distribution (bell-shaped curve).
- A2.D.1.2** Collect data and use scatterplots to analyze patterns and describe linear, exponential or quadratic relationships between two variables. Using graphing calculators or other appropriate technology, determine regression equation and correlation coefficients; use regression equations to make predictions and correlation coefficients to assess the reliability of those predictions.
- A2.D.1.3** Based upon a real-world context, recognize whether a discrete or continuous graphical representation is appropriate and then create the graph.
- A2.D.2.1** Evaluate reports based on data published in the media by identifying the source of the data, the design of the study, and the way the data are analyzed and displayed. Given spreadsheets, tables, or graphs, recognize and analyze distortions in data displays. Show how graphs and data can be distorted to support different points of view.
- A2.D.2.2** Identify and explain misleading uses of data. Recognize when arguments based on data confuse correlation and causation.