South Carolina College- and Career-Ready (SCCCR) Intermediate Algebra

Students who successfully complete Foundations in Algebra must subsequently enroll in Intermediate Algebra. Upon completion of this two-course sequence, students must take the Algebra 1 End-of-Course assessment (Algebra 1 EOCEP) administered at the completion of the second course, Intermediate Algebra. All students who take Algebra 1, Foundations in Algebra, and Intermediate Algebra will be responsible for learning the Algebra 1 standards assessed on the Algebra 1 EOCEP. Students who complete Foundations in Algebra and Intermediate Algebra will be responsible for the additional standards contained in this two-course integrated sequence as well.

South Carolina College- and Career-Ready (SCCCR) Algebra 1 Standards

Key Concepts	Standards	
Arithmetic with Polynomials and Rational Expressions	**The student will:**	
	A1.AAPR.1*	Add, subtract, and multiply polynomials and understand that polynomials are closed under these operations. (Limit to linear; quadratic.)
Creating Equations	**The student will:**	
	A1.ACE.1*	Create and solve equations and inequalities in one variable that model real-world problems involving linear, quadratic, simple rational, and exponential relationships. Interpret the solutions and determine whether they are reasonable. (Limit to linear; quadratic; exponential with integer exponents.)
	A1.ACE.2*	Create equations in two or more variables to represent relationships between quantities. Graph the equations on coordinate axes using appropriate labels, units, and scales. (Limit to linear; quadratic; exponential with integer exponents; direct and indirect variation.)
	A1.ACE.4*	Solve literal equations and formulas for a specified variable including equations and formulas that arise in a variety of disciplines.
Reasoning with Equations and Inequalities	**The student will:**	
	A1.AREI.1*	Understand and justify that the steps taken when solving simple equations in one variable create new equations that have the same solution as the original.
	A1.AREI.3*	Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.
	A1.AREI.4*	Solve mathematical and real-world problems involving quadratic equations in one variable. *(Note: A1.AREI.4a and 4b are not Graduation Standards.)* a. Use the method of completing the square to transform any quadratic equation in x into an equation of the form $(x-h)^2 = k$ that has the same solutions. Derive the quadratic formula from this form. b. Solve quadratic equations by inspection, taking square roots, completing the square, the quadratic formula and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as $a + bi$ for real numbers a and b. (Limit to non-complex roots.)
	A1.AREI.5	Justify that the solution to a system of linear equations is not changed when one of the equations is replaced by a linear combination of the other equation.
	A1.AREI.6*	Solve systems of linear equations algebraically and graphically focusing on pairs of linear equations in two variables. *(Note: A1.AREI.6a and 6b are not Graduation Standards.)* a. Solve systems of linear equations using the substitution method. b. Solve systems of linear equations using linear combination.
	A1.AREI.10*	Explain that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane.
	A1.AREI.11*	Solve an equation of the form $f(x) = g(x)$ graphically by identifying the x-coordinate(s) of the point(s) of intersection of the graphs of $y = f(x)$ and $y = g(x)$. (Limit to linear; quadratic; exponential.)
	A1.AREI.12*	Graph the solutions to a linear inequality in two variables.
Structure and Expressions	**The student will:**	
	A1.ASE.1*	Interpret the meanings of coefficients, factors, terms, and expressions based on their real-world contexts. Interpret complicated expressions as being composed of simpler expressions. (Limit to linear; quadratic; exponential.)
	A1.ASE.2*	Analyze the structure of binomials, trinomials, and other polynomials in order to rewrite equivalent expressions.

	A1.ASE.3*	Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. a. Find the zeros of a quadratic function by rewriting it in equivalent factored form and explain the connection between the zeros of the function, its linear factors, the x-intercepts of its graph, and the solutions to the corresponding quadratic equation.
Building Functions	**The student will:**	
	A1.FBF.3*	Describe the effect of the transformations $kf(x)$, $f(x)+k$, $f(x+k)$, and combinations of such transformations on the graph of $y=f(x)$ for any real number k. Find the value of k given the graphs and write the equation of a transformed parent function given its graph. (Limit to linear; quadratic; exponential with integer exponents; vertical shift and vertical stretch.)
Interpreting Functions	**The student will:**	
	A1.FIF.1*	Extend previous knowledge of a function to apply to general behavior and features of a function. a. Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. b. Represent a function using function notation and explain that $f(x)$ denotes the output of function f that corresponds to the input x. c. Understand that the graph of a function labeled as f is the set of all ordered pairs (x, y) that satisfy the equation $y=f(x)$.
	A1.FIF.2*	Evaluate functions and interpret the meaning of expressions involving function notation from a mathematical perspective and in terms of the context when the function describes a real-world situation.
	A1.FIF.4*	Interpret key features of a function that models the relationship between two quantities when given in graphical or tabular form. Sketch the graph of a function from a verbal description showing key features. Key features include intercepts; intervals where the function is increasing, decreasing, constant, positive, or negative; relative maximums and minimums; symmetries; end behavior and periodicity. (Limit to linear; quadratic; exponential.)
	A1.FIF.5*	Relate the domain and range of a function to its graph and, where applicable, to the quantitative relationship it describes. (Limit to linear; quadratic; exponential.)
	A1.FIF.6*	Given a function in graphical, symbolic, or tabular form, determine the average rate of change of the function over a specified interval. Interpret the meaning of the average rate of change in a given context. (Limit to linear; quadratic; exponential.)
	A1.FIF.7*	Graph functions from their symbolic representations. Indicate key features including intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior and periodicity. Graph simple cases by hand and use technology for complicated cases. (Limit to linear; quadratic; exponential only in the form $y=a^x+k$.)
	A1.FIF.8*	Translate between different but equivalent forms of a function equation to reveal and explain different properties of the function. (Limit to linear; quadratic; exponential.) *(Note: A1.FIF.8a is not a Graduation Standard.)* a. Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a context.
	A1.FIF.9*	Compare properties of two functions given in different representations such as algebraic, graphical, tabular, or verbal. (Limit to linear; quadratic; exponential.)
Linear, Quadratic, and Exponential	**The student will:**	
	A1.FLQE.1*	Distinguish between situations that can be modeled with linear functions or exponential functions by recognizing situations in which one quantity changes at a constant rate per unit interval as opposed to those in which a quantity changes by a constant percent rate per unit interval. *(Note: A1.FLQE.1a is not a Graduation Standard.)* a. Prove that linear functions grow by equal differences over equal intervals and that exponential functions grow by equal factors over equal intervals.
	A1.FLQE.2*	Create symbolic representations of linear and exponential functions, including arithmetic and geometric sequences, given graphs, verbal descriptions, and tables. (Limit to linear; exponential.)
	A1.FLQE.3*	Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or more generally as a polynomial function.
	A1.FLQE.5*	Interpret the parameters in a linear or exponential function in terms of the context. (Limit to linear.)
Quantities	**The student will:**	
	A1.NQ.1*	Use units of measurement to guide the solution of multi-step tasks. Choose and interpret appropriate labels, units, and scales when constructing graphs and other data displays.
	A1.NQ.2*	Label and define appropriate quantities in descriptive modeling contexts.
	A1.NQ.3*	Choose a level of accuracy appropriate to limitations on measurement when reporting quantities in context.

Real Number System	**The student will:**	
	A1.NRNS.1*	Rewrite expressions involving simple radicals and rational exponents in different forms.
	A1.NRNS.2*	Use the definition of the meaning of rational exponents to translate between rational exponent and radical forms.
	A1.NRNS.3	Explain why the sum or product of rational numbers is rational; that the sum of a rational number and an irrational number is irrational; and that the product of a nonzero rational number and an irrational number is irrational.
Interpreting Data	**The student will:**	
	A1.SPID.6*	Using technology, create scatterplots and analyze those plots to compare the fit of linear, quadratic, or exponential models to a given data set. Select the appropriate model, fit a function to the data set, and use the function to solve problems in the context of the data.
	A1.SPID.7*	Create a linear function to graphically model data from a real-world problem and interpret the meaning of the slope and intercept(s) in the context of the given problem.
	A1.SPID.8*	Using technology, compute and interpret the correlation coefficient of a linear fit.

Additional South Carolina College- and Career-Ready (SCCCR) Foundations in Algebra Standards

Key Concepts	Standards	
Interpreting Data	**The student will:**	
	FA.SPID.5*	Analyze bivariate categorical data using two-way tables and identify possible associations between the two categories using marginal, joint, and conditional frequencies.
Making Inferences and Justifying Conclusions	**The student will:**	
	FA.SPMJ.1*	Understand statistics and sampling distributions as a process for making inferences about population parameters based on a random sample from that population.
	FA.SPMJ.2*	Distinguish between experimental and theoretical probabilities. Collect data on a chance event and use the relative frequency to estimate the theoretical probability of that event. Determine whether a given probability model is consistent with experimental results.
Using Probability to Make Decisions	**The student will:**	
	FA.SPMD.4*	Use probability to evaluate outcomes of decisions by finding expected values and determine if decisions are fair.
	FA.SPMD.5*	Use probability to evaluate outcomes of decisions. Use probabilities to make fair decisions.
	FA.SPMD.6*	Analyze decisions and strategies using probability concepts.

Additional South Carolina College- and Career-Ready (SCCCR) Intermediate Algebra Standards

Key Concepts	Standards	
Arithmetic with Polynomials and Rational Expressions	**The student will:**	
	IA.AAPR.1*	Add, subtract, and multiply polynomials and understand that polynomials are closed under these operations.
Creating Equations	**The student will:**	
	IA.ACE.1*	Create and solve equations and inequalities in one variable that model real-world problems involving linear, quadratic, simple rational, and exponential relationships. Interpret the solutions and determine whether they are reasonable.
	IA.ACE.2*	Create equations in two or more variables to represent relationships between quantities. Graph the equations on coordinate axes using appropriate labels, units, and scales.
	The student will:	
	IA.AREI.2*	Solve simple rational and radical equations in one variable and understand how extraneous solutions may arise.

Reasoning with Equations and Inequalities	IA.AREI.4*	Solve mathematical and real-world problems involving quadratic equations in one variable. *(Note: IA.AREI.4b is not a Graduation Standard.)* b. Solve quadratic equations by inspection, taking square roots, completing the square, the quadratic formula and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as $a + bi$ for real numbers a and b.
	IA.AREI.11*	Solve an equation of the form $f(x) = g(x)$ graphically by identifying the x-coordinate(s) of the point(s) of intersection of the graphs of $y = f(x)$ and $y = g(x)$.
Structure and Expressions	**The student will:**	
	IA.ASE.1*	Interpret the meanings of coefficients, factors, terms, and expressions based on their real-world contexts. Interpret complicated expressions as being composed of simpler expressions.
	IA.ASE.3*	Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. b. Determine the maximum or minimum value of a quadratic function by completing the square.
Building Functions	**The student will:**	
	IA.FBF.1*	Write a function that describes a relationship between two quantities. *(Note: IA.FBF.1a is not a Graduation Standard.)* a. Write a function that models a relationship between two quantities using both explicit expressions and a recursive process and by combining standard forms using addition, subtraction, multiplication and division to build new functions. b. Combine functions using the operations addition, subtraction, multiplication, and division to build new functions that describe the relationship between two quantities in mathematical and real-world situations.
	IA.FBF.2*	Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms.
	IA.FBF.3*	Describe the effect of the transformations $kf(x)$, $f(x) + k$, $f(x + k)$, and combinations of such transformations on the graph of $y = f(x)$ for any real number k. Find the value of k given the graphs and write the equation of a transformed parent function given its graph.
Interpreting Functions	**The student will:**	
	IA.FIF.3*	Define functions recursively and recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers.
	IA.FIF.4*	Interpret key features of a function that models the relationship between two quantities when given in graphical or tabular form. Sketch the graph of a function from a verbal description showing key features. Key features include intercepts; intervals where the function is increasing, decreasing, constant, positive, or negative; relative maximums and minimums; symmetries; end behavior and periodicity.
	IA.FIF.5*	Relate the domain and range of a function to its graph and, where applicable, to the quantitative relationship it describes.
	IA.FIF.6*	Given a function in graphical, symbolic, or tabular form, determine the average rate of change of the function over a specified interval. Interpret the meaning of the average rate of change in a given context.
	IA.FIF.7*	Graph functions from their symbolic representations. Indicate key features including intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior and periodicity. Graph simple cases by hand and use technology for complicated cases.
	IA.FIF.8*	Translate between different but equivalent forms of a function equation to reveal and explain different properties of the function. *(Note: IA.FIF.8b is not a Graduation Standard.)* b. Interpret expressions for exponential functions by using the properties of exponents.
	IA.FIF.9*	Compare properties of two functions given in different representations such as algebraic, graphical, tabular, or verbal.
Linear, Quadratic, and Exponential	**The student will:**	
	IA.FLQE.2*	Create symbolic representations of linear and exponential functions, including arithmetic and geometric sequences, given graphs, verbal descriptions, and tables.
	IA.FLQE.5*	Interpret the parameters in a linear or exponential function in terms of the context.
Complex Number System	**The student will:**	
	IA.NCNS.1*	Know there is a complex number i such that $i^2 = -1$, and every complex number has the form $a + bi$ with a and b real.
	IA.NCNS.7*	Solve quadratic equations in one variable that have complex solutions.