"Student-Friendly" Standards for CCGPS Analytic Geometry

Unit 5 | Quadratic Functions

Standard Code	Mastery Level	Standard
A.SSE.1.a		Identify the different parts of the expression and explain their meaning within the context of a problem.
A.SSE.1.b		Decompose expressions and make sense of the multiple factors and terms by explaining the meaning of the individual parts.
A.SSE.2		Rewrite algebraic expressions in different equivalent forms such as factoring or combining like terms.
		Use factoring techniques such as common factors, grouping, the difference of two squares, the sum or difference of two cubes, or a combination of methods to factor completely.
		Simplify expressions including combining like terms, using the distributive property and other operations with polynomials.
A.SSE.3.a		Write expressions in equivalent forms by factoring to find the zeros of a quadratic function.
		Explain the meaning of the zeros of a quadratic function.
		Given a quadratic expression, explain the meaning of the zeros graphically. That is, for an expression $(x - a)(x - c)$, a and c correspond to the x-intercepts (if a and c are real).
A.SSE.3.b		Write expressions in equivalent forms by completing the square to • convey the vertex form; • find the maximum or minimum value of a quadratic function; and • explain the meaning of the vertex.
A.CED.1		Create linear and quadratic equations and inequalities in one variable and use them in a contextual situation to solve problems.
A.CED.2		Create equations in two or more variables to represent relationships between quantities. Graph equations in two variables on a coordinate plane and label the axes and scales.
A.CED.4		Solve multi-variable formulas or literal equations, for a specific variable.

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A.REI.4.a		Transform a quadratic equation written in standard form to an equation in vertex form $(x - p)^2 = q$ by completing the square.
		Derive the quadratic formula by completing the square on the standard form of a quadratic equation.
A.REI.4.b		Solve quadratic equations in one variable by simple inspection, taking the square root, factoring, and completing the square.
		Understand why taking the square root of both sides of an equation yields two solutions.
		Use the quadratic formula to solve any quadratic equation, recognizing the formula produces all complex solutions. Write the solutions in the form $a \pm bi$, where a and b are real numbers.
		Explain how complex solutions affect the graph of a quadratic equation.
N.CN.7		Solve quadratic equations with real coefficients that have solutions of the form $a + bi$ and $a - bi$.
A.REI.7		Solve a system containing a linear equation and a quadratic equation in two variables (conic sections possible) graphically and symbolically.
F.IF.4		Given a function, identify key features in graphs and tables including: • intercepts; • intervals where the function is increasing, decreasing, positive, or negative; • relative maximums and minimums; • symmetries; and • end behavior.
		Given the key features of a function, sketch the graph.
F.IF.5		Given the graph of a function, determine the practical domain of the function as it relates to the numerical relationship it describes.
F.IF.6		Calculate the average rate of change over a specified interval of a function presented symbolically or in a table.
		Estimate the average rate of change over a specified interval of a function from the function's graph.

Equivalent standards

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		Interpret, in context, the average rate of change of a function over a specified interval.
F.IF.7.a		Graph quadratic functions expressed symbolically, and show key features of the graph including intercepts and maxima or minima. *Graph simple cases by hand, and use technology to show more complicated cases.*
F.IF.8.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.
F.IF.9		Compare the key features of two functions represented in different ways. *For example, compare the end behavior of two functions, one of which is represented graphically and the other is represented symbolically.*
F.BF.1.a		From context, be able to • write an explicit expression, • define a recursive process, or • describe the calculations needed to model a function between two quantities.
F.BF.1.b		Combine standard function types, such as linear and exponential, using arithmetic operations.
F.BF.3		Identify, through experimenting with technology, the effect on the graph of a function by replacing $f(x)$ with • $f(x) + k$, $kf(x)$, • $f(kx)$, and • $f(x + k)$ for specific values of k (both positive and negative).
		Given the graphs of the original function and a transformation, determine the value of (k).
		Recognize even and odd functions from their graphs and equations.
F.LE.3		Make the connection, using graphs and tables, that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or any other polynomial function.

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S.ID.6.a		Create a scatter plot from two quantitative variables. Describe the form, strength and direction of the relationship. • Categorize data as linear or not. Use algebraic methods and technology to fit a linear function to the data. Use the function to predict values. • Explain the meaning of the slope and y-intercept in context. • Categorize data as quadratic. Use algebraic methods and technology to fit a quadratic function to the data. Use the function to predict values. • Explain the meaning of the constant and coefficients in context.