Algebra I “Student-Friendly” Standards

Unit 3 Modeling & Analyzing Quadratic Functions

| **Standard Code** | **Mastery Level** | **Standard** |
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| **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. |
| **A.REI.1** |  | Justify each step when solving a one-solution equation, explaining the progression of properties used. |
| **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 ± bi*, where *a* and *b* are real numbers. |
|  | Explain how complex solutions affect the graph of a quadratic equation. |
| **F.IF.1** |  | Identify and explain how a function is one-to-one, meaning that each element of the domain has exactly one output value. |
| **F.IF.2** |  | Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context. |
| **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. |
|  | 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. |