

Key  
Concepts

Standards

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|                               | <p>Analyze the structure of binomials, trinomials, and other polynomials in order to rewrite equivalent expressions.</p> <p>A1.ASE.3* Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.</p> <p>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.</p> |
| <p>Building<br/>Functions</p> | <p>The student will:</p> <p>A1.FBF.3* Describe the effect of the transformations <math>f(x) + c</math>, <math>f(x) + G</math>, <math>f(x) + G</math>, and combinations of such transformations on the graph of <math>f(x)</math> for any real number <math>G</math>. Find the value of <math>G</math> given the graphs and write the equation of a transformed parent function given its graph. (Limit to linear; quadratic; exponential; integer exponents; vertical shift and vertical stretch.)</p>  |

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| Interpreting Functions | The student will: |  |
|                        | A1.FIF.1*         | Extend previous knowledge of a function to apply to general behavior and features of a function. <ul style="list-style-type: none"> <li>a. Understand that a function from one set (called the domain) to another set (called the range) assigns each element of the domain exactly one element of the range.</li> <li>b. Represent a function using function notation and explain that <math>f(x)</math> denotes the output of function <math>f</math> that corresponds to the input <math>x</math>.</li> <li>c. Understand that the graph of a function labeled <math>f</math> is the set of all ordered pairs <math>(x, y)</math> that satisfy the equation <math>y = f(x)</math>.</li> </ul> |
|                        | 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 situation.   |
|                        | A1.FIF.4*         | Interpret key features of a function that models the relationship between 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 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 $y = a(x-h)^2 + k$ .)   |
|                        | 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.) <ul style="list-style-type: none"> <li>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.</li> </ul>  |
|                        | A1.FIF.9*         | Compare properties of two functions given in different representations such as algebraic, graphical, tabular, or verbal. (Limit to linear; quadratic; exponential.)  |

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| 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.) <ul style="list-style-type: none"> <li>a. Prove that linear functions grow by equal differences over equal intervals and that exponential functions grow by equal factors over equal intervals.</li> </ul> |
|                                    | A1.FLQE.2*        | Create   |