

# Mathematics Power Standards Grade 10 Algebra II

 Corvallis School District 509j

<b>H.3A Algebra: Use quadratic and exponential equations and functions to represent relationships.</b>
<ul style="list-style-type: none"> <li>H.3A.1 Given a quadratic or exponential function, identify or determine a corresponding table or graph.</li> <li>H.3A.2 Given a table or graph that represents a quadratic or exponential function, extend the pattern to make predictions.</li> <li>H.3A.3 Compare the characteristics of and distinguish among linear, quadratic, and exponential functions that are expressed in a table of values, a sequence, a context, algebraically, and/or graphically, and interpret the domain and range of each as it applies to a given context.</li> <li>H.3A.4 Given a quadratic or exponential function, interpret and analyze the relationship between the independent and dependent variables, and evaluate the function for specific values of the domain.</li> <li>H.3A.5 Given a quadratic equation of the form <math>x^2 + bx + c = 0</math> with integral roots, determine and interpret the roots, the vertex of the parabola that is the graph of <math>y = x^2 + bx + c</math>, and an equation of its axis of symmetry graphically and algebraically.</li> </ul>
<b>H.1S Data Analysis: Analyze and interpret empirical data.</b>
<ul style="list-style-type: none"> <li>H.1S.1 Given a context, determine appropriate survey methods, analyze the strengths and limitations of a particular survey, observational study, experiment, or simulation, and the display of its data.</li> <li>H.1S.2 Evaluate data-based reports by considering the source of the data, the design of the study, and the way the data was analyzed and displayed.</li> <li>H.1S.4 Use or construct a scatter plot for a given data set, determine whether there is a (n) linear, quadratic, exponential, or no trend. If linear, determine if there is a positive or negative correlation among the data; and, if appropriate, sketch a line of best fit, and use it to make predictions.</li> </ul>
<b>H.2S Probability: Apply basic principles of probability.</b>
<ul style="list-style-type: none"> <li>H.2S.3 Compute and interpret probabilities for independent, dependent, complementary, and compound events using various methods (e.g., diagrams, tables, area models, and counting techniques).</li> </ul>
<b>adv.A.1 Relations and Functions: Analyze functions and relations (e.g. polynomial, absolute value, rational, radical, logarithmic, exponential, algebraic, piece-wise, and step functions).</b>
<ul style="list-style-type: none"> <li>adv.A.1.1 Demonstrate an understanding of the concept of a function, use function notation, evaluate a function, determine whether or not a given relation is a function and determine whether or not a given function is one-to-one.</li> <li>adv.A.1.2 Determine the domain and range of a relation including those with restricted domains.</li> <li>adv.A.1.3 Represent a given relation in multiple ways and convert between each representation.</li> <li>adv.A.1.5 Analyze the effect on the graph of a relation by changing its parameters and perform a given transformation.</li> <li>adv.A.1.6 Determine, verify, and graph the inverse of a function or relation (if it exists) and understand the reversing roles of domain and range.</li> <li>adv.A.1.7 Determine the composition of inverse functions and whether or not it is one-to-one.</li> <li>adv.A.1.8 Perform arithmetic operations on functions and determine the composition of functions.</li> <li>adv.A.1.10 Collect and analyze data to make predictions and to investigate scatterplots and to determine the equation for a curve of best fit including linear, power, exponential, and logarithmic functions.</li> </ul>
<b>adv.A.2 Inequalities, Piece-wise Functions, and Absolute Value Functions: Model and analyze piece-wise and absolute value functions. Solve inequalities and absolute value equations.</b>
<ul style="list-style-type: none"> <li>adv.A.2.1 Graph, solve, and analyze inequalities in two variables.</li> <li>adv.A.2.3 Graph, solve, and analyze absolute value equations and inequalities.</li> </ul>
<b>adv.A.3 Quadratic functions and other Conic Sections: Model and analyze quadratic functions. Solve quadratic equations and problems involving conics.</b>
<ul style="list-style-type: none"> <li>adv.A.3.1 Perform operations on complex numbers and represent, apply and discuss the properties of complex numbers.</li> </ul>

<ul style="list-style-type: none"> <li>• adv.A.3.2 Derive the quadratic formula.</li> </ul>
<ul style="list-style-type: none"> <li>• adv.A.3.3 Solve quadratic equations using the zero product property, completing the square, the quadratic formula, and graphing.</li> </ul>
<ul style="list-style-type: none"> <li>• adv.A.3.4 Graph and analyze quadratic functions and relate the zeros to the discriminant.</li> </ul>
<b>adv.A.4 Polynomial Functions: Model and analyze polynomial functions. Solve polynomial equations.</b>
<ul style="list-style-type: none"> <li>• adv.A.4.1 Perform operations on polynomial expressions.</li> </ul>
<ul style="list-style-type: none"> <li>• adv.A.4.2 Analyze and calculate permutations, combinations, and other systematic counting methods.</li> </ul>
<ul style="list-style-type: none"> <li>• adv.A.4.3 Understand and apply the binomial theorem and/or Pascal's triangle to expand binomial expressions.</li> </ul>
<b>adv.A.5 Radical Functions: Model and analyze radical functions. Solve radical equations.</b>
<ul style="list-style-type: none"> <li>• adv.A.5.1 Find equivalent expressions using the properties of rational exponents.</li> </ul>
<ul style="list-style-type: none"> <li>• adv.A.5.2 Perform arithmetic operations to simplify radical expressions.</li> </ul>
<ul style="list-style-type: none"> <li>• adv.A.5.3 Solve radical equations.</li> </ul>
<b>adv.A.7 Logarithmic and Exponential Functions: Model and analyze logarithmic and exponential functions. Solve logarithmic and exponential equations.</b>
<ul style="list-style-type: none"> <li>• adv.A.7.1 Establish the inverse relationship between exponential and logarithmic functions.</li> </ul>
<ul style="list-style-type: none"> <li>• adv.A.7.2 Prove and apply the basic properties of logarithms.</li> </ul>
<ul style="list-style-type: none"> <li>• adv.A.7.3 Solve exponential and logarithmic equations.</li> </ul>
<ul style="list-style-type: none"> <li>• adv.A.7.4 Graph and analyze exponential and logarithmic functions.</li> </ul>
<b>adv.A.8 Matrices, Systems of Equations and Inequalities: Analyze and apply various methods to graph and solve systems of equations and inequalities.</b>
<ul style="list-style-type: none"> <li>• adv.A.8.1 Use matrix operations and properties of matrices to solve problems.</li> </ul>
<ul style="list-style-type: none"> <li>• adv.A.8.2 Solve systems of linear equations in two or three variables algebraically, graphically, and/or with matrix algebra.</li> </ul>
<ul style="list-style-type: none"> <li>• adv.A.8.3 Analyze an inconsistent system of equations.</li> </ul>
<ul style="list-style-type: none"> <li>• adv.A.8.4 Solve systems of linear inequalities by graphing.</li> </ul>
<ul style="list-style-type: none"> <li>• adv.A.8.5 Interpret, analyze, and solve linear programming problems.</li> </ul>