

Grs. 10, 11 Algebra II Curriculum

Curriculum Standards	Student Learning Goals	Skills from FHS Rubric (Problem Solver)	Suggested Instructional Strategies	Suggested Assessment Techniques
<p>LS AII.N.1 Define complex numbers (e.g., $a + bi$) and operations on them, in particular, addition, subtraction, multiplication, and division. Relate the system of complex numbers to the systems of real and rational numbers. (12.N.1)</p>	<p>Explore complex numbers</p> <p>Reinforce understanding of operations using complex numbers (add, subtract, multiply divide, raise to a power, ...)</p> <p>Find complete solutions to quadratic equations</p>	<p>Skill 3 Independently creates and carries out to completion a complex multi-step task</p>	<ul style="list-style-type: none"> • Explain the meaning of complex numbers • Demonstrate the operations of complex numbers 	<ul style="list-style-type: none"> • Successful completion of classroom homework and quiz questions
<p>LS AII. N.2 Simplify numerical expressions with powers and roots, including fractional and negative exponents. (12.N.2)</p>	<p>Develop an understanding of the relationship between nth root and the nth power of real numbers.</p> <p>Understand the relationship between rational exponents and roots of real numbers.</p> <p>Demonstrate mastery of problem-solving techniques by applying operations with exponents and roots (including fractional and negative exponents)</p>	<p>Skill 3 Independently creates and carries out to completion a complex multi-step task</p>	<ul style="list-style-type: none"> • Review properties of exponents • Demonstrate the meaning of rational exponents by discussing index and power 	<ul style="list-style-type: none"> • Homework+D3k • Quizzes
<p>LS AII. P.1 Describe, complete, extend, analyze, generalize, and create a wide variety of patterns, including the use of patterns to develop the laws of</p>	<p>Understand the difference between arithmetic and geometric series and sequences. Be able to find a formula for sequences and series</p>	<p>Skill 2 Identifies a variety of possible important information; gathers sophisticated, apt, or valid information, organizes information in novel ways</p>	<ul style="list-style-type: none"> • Relate arithmetic series and sequences to linear functions and geometric series and sequences to exponential functions. 	<ul style="list-style-type: none"> • Homework • Quizzes

Grs. 10, 11 Algebra II Curriculum

Curriculum Standards	Student Learning Goals	Skills from FHS Rubric (Problem Solver)	Suggested Instructional Strategies	Suggested Assessment Techniques
exponents. (12.P.1)		Skill 5 Recognizes and analyzes unlikely or subtle similarities and differences		
LS AII. P.2 Identify arithmetic and geometric sequences and finite arithmetic and geometric series. Use the properties of such sequences and series to solve problems, including finding the formula for the general term and the sum, recursively and explicitly. (12.P.2)	Understand the difference between arithmetic and geometric series and sequences. Be able to find a formula for sequences and series	Skill 2 Identifies a variety of possible important information; gathers sophisticated, apt, or valid information, organizes information in novel ways Skill 5 Recognizes and analyzes unlikely or subtle similarities and differences	<ul style="list-style-type: none"> Relate arithmetic series and sequences to linear functions and geometric series and sequences to exponential functions 	<ul style="list-style-type: none"> Homework Quizzes
LS AII. P.3 Demonstrate an understanding of the binomial theorem and use it in the solution of problems. (12.P.3)	Will be able to expand binomial expressions using Pascal's Triangle	Skill 3 Independently creates and carries out to completion a complex multi-step task Skill 5 Recognizes and analyzes unlikely or subtle similarities and differences Skill 7 Selects, justifies, and evaluates a sophisticated solution	<ul style="list-style-type: none"> Demonstrate the pattern of Pascal's Triangle and show its use in expanding binomials. 	
LS AII. P.4 Demonstrate an understanding of the exponential and logarithmic functions.	Will be able to solve exponential and logarithmic equations and graph functions		<ul style="list-style-type: none"> Review laws of exponents Teach logarithmic as inverse of exponential functions 	<ul style="list-style-type: none"> Homework Projects Quizzes
LS AII. P.6 Given algebraic, numeric and/or graphical representations, recognize functions as polynomial,	Explore and describe phenomena, including polynomial, rational, and step functions	Skill 5 Recognizes and analyzes unlikely or subtle similarities and differences	<ul style="list-style-type: none"> Demonstrate the characteristics of each function through analytical, 	<ul style="list-style-type: none"> Practice worksheets Quizzes Tests

Grs. 10, 11 Algebra II Curriculum

Curriculum Standards	Student Learning Goals	Skills from FHS Rubric (Problem Solver)	Suggested Instructional Strategies	Suggested Assessment Techniques
rational, logarithmic, or exponential. (12.P.6)	<p>Demonstrate understanding by solving problems using square root and absolute value</p> <p>Demonstrate mastery by applying knowledge in solving real life problems using acquired skills</p>	<p>Skill 7 Selects, justifies, and evaluates a sophisticated solution</p>	<ul style="list-style-type: none"> graphical, and algebraic approaches. Identify and solve problems that can best be modeled using the appropriate function choice. 	<ul style="list-style-type: none"> Graphing calculator activities
<p>LS AII. P.7 Find solutions to quadratic equations (with real coefficients and real or complex roots) and apply to the solutions of problems. (12.P7)</p>	<p>Will be able to solve quadratic equations by factoring, completing the square, and using the quadratic formula</p>	<p>Skill 3 Independently creates and carries out to completion a complex multi-step task</p> <p>Skill 5 Recognizes and analyzes unlikely or subtle similarities and differences</p>	<ul style="list-style-type: none"> Teach factoring hierarchy Use algebra tiles and sing quadratic formula Derive quadratic formula 	<ul style="list-style-type: none"> Homework Quizzes Tests Journals.
<p>LS AII. P.8 Solve a variety of equations and inequalities using algebraic, graphical, and numerical methods, including the quadratic formula; use technology where appropriate. Include polynomial, exponential, and logarithmic functions; expressions involving the absolute values; and simple rational expressions. (12.P.8)</p>	<p>Demonstrate mastery of identifying similarities and differences in various functional relationships</p> <p>Identify appropriate methods and practices in solving a variety of equations and inequalities</p> <p>Utilize systems of equations where appropriate</p> <p>Incorporate technology as a toll in problem solving and as a means for determining reasonableness of solutions</p>	<p>Skill 3 Independently creates and carries out to completion a complex multi-step task</p> <p>Skill 6 Chooses most challenging learning experiences, participates in a way that advances critical thinking, learns from mistakes</p> <p>Skill 7 Selects, justifies, and evaluates a sophisticated solution</p> <p>Skill 8 Tests, analyzes, and adapts solutions</p>	<ul style="list-style-type: none"> Review relationships of various functions Demonstrate skills and best practices in problem solving Demonstrate relationships in graphs, tables, and equation form Model real life data and situations using various functions. 	<ul style="list-style-type: none"> Projects involving research and modeling of real life situations Use of graphing calculator in determining regression equations Class work Quizzes Tests

Grs. 10, 11 Algebra II Curriculum

Curriculum Standards	Student Learning Goals	Skills from FHS Rubric (Problem Solver)	Suggested Instructional Strategies	Suggested Assessment Techniques
<p>LS AII. P.9 Use matrices to solve systems of linear equations. Apply to the solution of everyday problems. 12.9</p>	<p>Develop finite graphs</p> <p>Apply knowledge of matrices to solve equations</p> <p>Double check against tests</p>	<p>Skill 3 Independently creates and carries out to completion a complex multi-step task</p> <p>Skill 7 Selects, justifies, and evaluates a sophisticated solution</p> <p>Skill 8 Tests, analyzes, and adapts solutions</p>	<ul style="list-style-type: none"> • Graph linear systems to estimate solutions • Use Cramer's Rule to determine solutions • Show specific examples • Review addition, subtraction, multiplication of matrices. 	<ul style="list-style-type: none"> • Homework • Quizzes • Journals
<p>LS AII. P.10 Use symbolic, numeric, and graphical methods to solve systems of equations and/or inequalities involving algebraic, exponential, and logarithmic expressions. Also use technology where appropriate. Describe the relationships among the methods. (12.P.10)</p>	<p>Will be able to solve quadratic and linear systems</p> <p>Will be able to graph solutions of linear and quadratic inequalities</p> <p>Will be able to graph and identify solutions using graphing calculators.</p>	<p>Skill 3 Independently creates and carries out to completion a complex multi-step task</p> <p>Skill 5 Recognizes and analyzes unlikely or subtle similarities and differences</p>	<ul style="list-style-type: none"> • Substitution and elimination • Demonstrate finding solutions using graphing calculator. 	<ul style="list-style-type: none"> • Homework • Quizzes • Journals
<p>LS AII. P.11 Solve everyday problems that can be modeled using polynomial, rational, exponential, logarithmic, and step functions, absolute values and square roots. Apply appropriate graphical, tabular, or symbolic methods to the solution. Include growth and decay; logistic growth; joint (e.g., $I = Prt$, $y = k(w_1 + w_2)$), and</p>	<p>Reinforce understanding of problem solving</p> <p>Apply counting strategies in problem solving</p> <p>Demonstrate mastery of similarities and differences of functions using graphs, tables, formulas, and verbal description</p>	<p>Skill 3 Independently creates and carries out to completion a complex multi-step task</p> <p>Skill 5 Recognizes and analyzes unlikely or subtle similarities and differences</p> <p>Skill 6 Chooses most challenging learning experiences, participates in a way that advances critical</p>	<ul style="list-style-type: none"> • Demonstrate skills and methods for determining relationships of various functions • Provide practice opportunities • Use of graphing calculators • Use of real life data 	<ul style="list-style-type: none"> • Projects • Quizzes • Tests

Grs. 10, 11 Algebra II Curriculum

Curriculum Standards	Student Learning Goals	Skills from FHS Rubric (Problem Solver)	Suggested Instructional Strategies	Suggested Assessment Techniques
combined ($F = G(m_1m_2)/d^2$) variation.		thinking, learns from mistakes Skill 8 Tests, analyzes, and adapts solutions		
LS AII. P.12 Identify maximum and minimum values of functions in simple situations. Apply to the solution of problems. (12.P.12)	Demonstrate mastery of maximum and minimum values in finding vertices of quadratic functions Demonstrate mastery of maximum and minimum values by finding vertices in polygonal region in linear programming		<ul style="list-style-type: none"> • Equate max/min of previously studied quadratic functions to other polynomial and trigonometric functions • Modeling of real life data. 	<ul style="list-style-type: none"> • Homework • Quizzes • Tests • Journals
LS AII. P.13 Describe the translations and scale changes of a given function $f(x)$ resulting from substitutions for the various parameters a , b , c , and d in $y = af(b(x + c/b)) + d$. In particular, describe the effect of such changes on polynomial, rational, exponential, and logarithmic functions. (12.P.13)	Explore and demonstrate mastery in changes of functions based on associated changes in equations.	Skill 3 Independently creates and carries out to completion a complex multi-step task Skill 5 Recognizes and analyzes unlikely or subtle similarities and differences	<ul style="list-style-type: none"> • Demonstrate how changes can be applied to each variable in any basic functional relationship and how these changes transform the resulting graph • Reinforce the consistency of these changes across each of the functional relationships • Discuss the "leading coefficient test" for polynomial functions and the affect the leading coefficient has on the subsequent graph 	<ul style="list-style-type: none"> • Teacher observation of student performance using the "Green Globbs" computer program, illustrating translations of functions • Graphing calculator projects • Homework • Quizzes

Grs. 10, 11 Algebra II Curriculum

Curriculum Standards	Student Learning Goals	Skills from FHS Rubric (Problem Solver)	Suggested Instructional Strategies	Suggested Assessment Techniques
			<ul style="list-style-type: none"> Investigate changes in terms between the first and last term of any polynomial function and how these terms affect changes in direction of any polynomial curve Discuss the "Leading coefficient test" for rational functions and the construction of the graph, primarily in the existence of asymptotes or the existence of " 2 functions that agree at all but one point" 	
<p>LS AII. G2 Basic trigonometric identities (e.g., $\sin^2q + \cos^2q = 1$, $\tan^2q + 1 = \sec^2q$) and the laws of sines and cosines. (12.G.2)</p>	<p>Demonstrate the ability to manipulate trig. identities</p> <p>Demonstrate the ability to use the Law of Sines and Cosine to solve triangles</p>	<p>Skill 2 Identifies a variety of possible important information; gathers sophisticated, apt. or valid information, organizes information in novel ways</p> <p>Skill 3 Independently creates and carries out to completion a complex multi-step task</p> <p>Skill 5 Recognizes and analyzes unlikely or subtle similarities and differences</p> <p>Skill 7 Selects, justifies, and evaluates a sophisticated solution</p>	<ul style="list-style-type: none"> Review trigonometric ratios (SOHCAHTOH) How to use calculators correctly Solve proportions and use applications calling to calculate distances of far away objects 	<ul style="list-style-type: none"> Homework Journals

Grs. 10, 11 Algebra II Curriculum

Curriculum Standards	Student Learning Goals	Skills from FHS Rubric (Problem Solver)	Suggested Instructional Strategies	Suggested Assessment Techniques
<p>LS AII. G.3 Relate geometric and algebraic representations of lines, simple curves, and conic sections. (12.G.4)</p>	<p>Explore and demonstrate mastery using algebraic forms to locate centers, radii, eccentricity, and intercepts for geometric curves and conic sections</p>	<p>Skill 5 Recognizes and analyzes unlikely or subtle similarities and differences</p>	<ul style="list-style-type: none"> • Use distance formula and definitions to produce forms of each equation • Use string models to model distance definitions and develop relationships of shapes to various elements such as foci, center, etc. 	<ul style="list-style-type: none"> • Homework • Graphing calculator activity • Journals
<p>LS AII. D.1 Select an appropriate graphical representation for a set of data and use appropriate statistics (e.g., quartile or percentile distribution) to communicate information about the data</p>	<p>Explore data sets and appropriate use of statistical representations</p> <p>Determine reasonable data collection methods and appropriateness of audience</p>		<ul style="list-style-type: none"> • Use real life data collection methods to generate student-driven data • Provide students with scenarios that provide analysis of appropriate and inappropriate audiences in data collection methods • Allow students to generate and evaluate various statistical models • Use of technology as appropriate 	<ul style="list-style-type: none"> • Homework • Graphing calculator activity • Journals
<p>LS AII. D.2 Use combinatorics (e.g., “fundamental counting principle,” permutations, and combinations) to solve problems, in particular, to compute probabilities of compound events. Use technology as appropriate.</p>	<p>Calculate the total possible outcomes of events and apply it to probability and outcome</p>	<p>Skill 2 Identifies a variety of possible important information; gathers sophisticated, apt. or valid information, organizes information in novel ways</p> <p>Skill 3 Independently creates and carries out to</p>	<ul style="list-style-type: none"> • Model problems with tree diagrams • Show students a systematic way to list all the possibilities to look for patterns • Introduce formulas based on these patterns 	<ul style="list-style-type: none"> • Homework • Journals

Grs. 10, 11 Algebra II Curriculum

Curriculum Standards	Student Learning Goals	Skills from FHS Rubric (Problem Solver)	Suggested Instructional Strategies	Suggested Assessment Techniques
(12.D.6)		completion a complex multi-step task Skill 5 Recognizes and analyzes unlikely or subtle similarities and differences		