



ALGEBRA II

CURRICULUM GUIDE

Loudoun County Public Schools
2010-2011

Complete scope, sequence, pacing and resources are available on the CD and will be available on the LCPS Intranet.

INTRODUCTION TO LOUDOUN COUNTY'S MATHEMATICS CURRICULUM GUIDE

This CURRICULUM GUIDE is a merger of the Virginia Standards of Learning (SOL) and the Mathematics Achievement Standards for Loudoun County Public Schools. The CURRICULUM GUIDE includes excerpts from documents published by the Virginia Department of Education. Other statements, such as suggestions on the incorporation of technology and essential questions, represent the professional consensus of Loudoun's teachers concerning the implementation of these standards. In many instances the local expectations for achievement exceed state requirements. The GUIDE is the lead document for planning, assessment and curriculum work. It is a summarized reference to the entire program that remains relatively unchanged over several student generations. Other documents, called RESOURCES, are updated more frequently. These are published separately but teachers can combine them with the GUIDE for ease in lesson planning.

Mathematics Internet Safety Procedures

1. Teachers should review all Internet sites and links prior to using it in the classroom.
During this review, teachers need to ensure the appropriateness of the content on the site, checking for broken links, and paying attention to any inappropriate pop-ups or solicitation of information.
2. Teachers should circulate throughout the classroom while students are on the internet checking to make sure the students are on the appropriate site and are not minimizing other inappropriate sites.
Teachers should periodically check and update any web addresses that they have on their LCPS web pages.
3. Teachers should assure that the use of websites correlate with the objectives of lesson and provide students with the appropriate challenge.
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Algebra II Nine Weeks Overview

1 st Quarter	2 nd Quarter	3 rd Quarter	4 th Quarter
AII.1 a, b, c AII.3 AII.4 AII.6 AII.4 AII.7 38 days	AII.5 <i>AII.11 (2001 SOL)</i> <i>AII.12 (2001 SOL)</i> <i>AII.13 (2001 SOL)</i> AII.9 AII.10 Aii.11 AII.1 AII.4 AII.8 AII.9 47 days	AII.1 AII.4 AII.8 AII.9 jAII.6 AII.7 AII.4 AII.7 47 days	AII.6 AII.7 AII.9 AII.2 <i>AII.18 (2001 SOL)</i> 44 days

Number of Blocks	Topics and Essential Questions	Standards of Learning	Additional Instructional Resources / Comments
<p>Quarter 1:</p>	<p>Unit 1: Number Sense</p> <ul style="list-style-type: none"> • Complex number system • Solving and graphing absolute value equations and inequalities • Integer and rational exponents • Simplifying algebraic expressions containing radicals in the denominator <p>➤ Compare and contrast the different number systems.</p> <p>➤ Explain the relationship between rational exponents and n^{th} roots</p>	<p>AII.1 a, b, c AII.3 AII.4</p>	<ul style="list-style-type: none"> ✓ NO CALCULATORS IN THIS UNIT ✓ Stress mastery of fractions ✓ Do not get too complicated with rationalization ✓ Include the absolute value piece with even numbered roots ✓ Simplifying radicals should not contain anything greater than fifth roots ✓ Do not include AII.1d at this time <p><i>Resources:</i> http://education.ti.com/educationportal/activityexchange/Activity.do?cid=US&aId=10887 http://www.ditutor.com/natural_number/types_numbers.html</p>
	<p>Unit 2: Functions</p> <ul style="list-style-type: none"> • Domain and range • Parent functions and transformations on parent functions including the following: linear, quadratic, cubic, absolute value, step, square root, cube root • Composition • Inverses (linear and quadratic) <p>➤ Explain how the graphical transformations of a given parent function are evident in the equation of the function.</p> <p>➤ Compare and contrast the domain and range of the parent functions discussed.</p>	<p>AII.6 AII.4 AII.7</p>	<ul style="list-style-type: none"> ✓ No rational functions at this time ✓ Use context pieces for parent functions (real-world examples for each type of function) ✓ Graph the inverse of a function and algebraically verify inverses of functions using composition. <p><i>Resources:</i> http://www.regentsprep.org/Regents/math/algtrig/ATP9/funresource.htm http://www.purplemath.com/modules/fcntrans.htm http://illuminations.nctm.org/LessonDetail.aspx?ID=L725 http://dnet01.ode.state.oh.us/IMS.ItemDetails/LessonDetail.aspx?id=0907f84c80531456 X:\Algebra 2\Using Models to Build an Understanding of Functions.pdf</p>

Number of Blocks	Topics and Essential Questions	Standards of Learning	Additional Instructional Resources / Comments
<p>Quarter 2:</p>	<p>Unit 3: Systems of Equations and Inequalities</p> <ul style="list-style-type: none"> • Systems of equations and inequalities • <i>Matrices</i> – basic operations and using matrices to solve systems of 3 equations in 3 unknowns • Quadratic systems – finding the solutions algebraically and graphically • <i>Linear programming</i> <p>➤ Explain how the algebraic solutions to a system are evident from the graph of the system.</p> <p>➤ How can real life problem situations be modeled and solved using systems?</p>	<p>AII.5</p> <p>2001 AII.11 2001 AII.12 2001 AII.13</p>	<p>✓ Linear programming and matrices are being removed from the curriculum next year.</p> <p>Resources: http://dnet01.ode.state.oh.us/ims.itemdetails/lessondetail.aspx?id=0907f84c805321e6 X:\Algebra 2\Building Lego Furniture.pdf X:\Algebra 2\High Step Shoes.pdf</p>
	<p>Unit 4: Data Analysis Collect and analyze real-world data using the following:</p> <ul style="list-style-type: none"> • Normal distributions • Z-scores • Standard deviations • Standard normal probability • Combinatorics (permutations, combinations, counting principle) • Regression – include linear, quadratic, cubic, and exponential/logarithmic • Variation – direct, inverse, and joint • Explain how the graphical transformations of a given parent function are evident in the equation of the function. 	<p>AII.9 AII.10 AII.11 AII.12</p>	<p>✓ Z-scores will be covered in the Algebra 1 curriculum in the future, but students have not yet seen it.</p> <p>✓ Be sure to include correct notation, including Σ and σ.</p> <p>✓ The 10 days noted does not include the days for exam review, BMA's, and PSAT.</p> <p>Resources: http://www.regentsprep.org/Regents/math/algtrig/math-algtrig.htm#m9 X:\Algebra 2\Life Expectancy.doc</p>

	<ul style="list-style-type: none"> ➤ Explain when you would use each statistical measurement in analyzing data. ➤ Compare and contrast the different statistical measurements discussed in this unit. ➤ When looking at a graphical display of a data set, how do you determine which regression model is the best fit for the data? 		
	<p>Unit 5: <i>Quadratics</i></p> <ul style="list-style-type: none"> • Factoring (ALL factoring, including quadratic, difference of squares, sum and difference of cubes, grouping, GCF, and special patterns). • Solving quadratics, including a discussion of the following: quadratic formula, completing the square, discriminant, complex solutions, zeros, graphing quadratics in all forms <ul style="list-style-type: none"> ➤ What is the difference between a factor and a zero? ➤ What is the importance of finding the discriminant? ➤ Identify all forms of a quadratic equation and explain the advantages and disadvantages to graphing the function from each form. ➤ How can real life problem situations be modeled using quadratics? 	<p>AII.1 AII.4 AII.8 AII.9</p>	<ul style="list-style-type: none"> ✓ Hit all topics but do not spend too much time here. Students will eventually be coming in with an understanding of quadratics so only the complex solutions will need to be covered. ✓ Be sure that students can convert between the different forms of quadratic equations. ✓ This unit will overlap into Quarter 3. <p>Resources: http://www.webgraphing.com/quadratic/quadraticformula.jsp X:\Algebra 2\Quadratic CBR Exploration.docx</p>
	<p>Assessment, Enrichment, and Remediation</p>		

Number of Blocks	Topics and Essential Questions	Standards of Learning	Additional Instructional Resources / Comments
Quarter 3:	FINISH UNIT 5: QUADRATICS		
	<p>Unit 6: <i>Polynomial Functions</i></p> <ul style="list-style-type: none"> • Fundamental Theorem of Algebra • Synthetic division and long division • Rational Root Theorem • Factor Theorem • End Behavior • Polynomial Models • Zeros <p>➤ What does the Fundamental Theorem of Algebra tell us about a polynomial function?</p> <p>➤ How do you determine the end behavior of an n^{th} degree polynomial function?</p> <p>➤ How can real-life problem situations be modeled by polynomial functions?</p>	<p>AII.8 AII.6 AII.7</p>	<p>✓ Do not do AII.7e until the next unit. ✓ Make sure you discuss the multiplicity of roots.</p> <p>Resources: http://algebralab.org/lessons/lesson.aspx?file=algebra_poly_graphs.xml http://illuminations.nctm.org/LessonDetail.aspx?ID=L282</p>
	<p>Unit 7: <i>Rational Expressions and Equations</i></p> <ul style="list-style-type: none"> • Add, subtract, multiply, and divide rational expressions. • Simplify complex fractions • Solve rational equations • Graph rational functions • Domain and range • Asymptotes and discontinuity <p>➤ What does discontinuity mean and how does it affect the graph of a function?</p> <p>➤ Compare and contrast polynomial</p>	<p>AII.1 AII.4 AII.7 AII.6</p>	<p>✓ The SOL refers to solving rational equations with monomial and binomial denominators only. ✓ Discuss horizontal and vertical asymptotes only – no slant asymptotes. ✓ Make sure the students can graph rational functions in any form.</p> <p>Resources: http://www.analyze-math.com/Graphing/GraphRationalFunction.html</p>

Quarter 3: Academic Year 2010-2011

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	and rational functions. ➤ How can real-life problem situations be modeled by rational functions?		
	Assessment, Enrichment, and Remediation		✓

Number of Blocks	Topics and Essential Questions	Standards of Learning	Additional Instructional Resources / Comments
<p>Quarter 4:</p>	<p>Unit 8: Logs and Exponentials</p> <ul style="list-style-type: none"> • Log and exponential equations • Convert between logarithmic and exponential form <p>➤ Explain how the logarithmic and exponential functions are inverses of each other.</p> <p>➤ How can real life problem situations be modeled by exponential and logarithmic functions?</p>	<p>AII.6 AII.7 AII.9</p>	<ul style="list-style-type: none"> ✓ Do not do AII.7e until the next unit. ✓ Make sure you discuss the multiplicity of roots. <p>Resources: http://www.regentsprep.org/Regents/math/algtrig/ATP8b/indexATP8b.htm X:\Algebra 2\M & M Decay.doc X:\Algebra 2\starbucks expansion.pdf X:\Algebra 2\Who wants to be a millionaire.doc</p>
	<p>Unit 9: Sequences, Series, and Conic Sections</p> <ul style="list-style-type: none"> • Arithmetic and geometric sequences and series, including infinite geometric series • n^{th} terms and sums of series • Identifying the graph of <i>conic sections</i> from equations using a transformational approach <p>➤ Explain how to classify sequences and series as arithmetic, geometric, or neither.</p> <p>➤ How can real-life problem situations be modeled using sequences and series?</p>	<p>AII.2 2001 AII.18</p>	<ul style="list-style-type: none"> ✓ Conics will be leaving the curriculum next year. <p>Resources: http://teachers.henrico.k12.va.us/math/hcpsalgebra2/7-7.htm</p>
	<p>Assessment, Enrichment, and Remediation</p>		

	Advanced Algebra Preparation <i>If time allows, review the following topics:</i> <ul style="list-style-type: none">➤ Special right triangles➤ Basic trigonometry		Resources: http://www.onlinemathlearning.com/special-right-triangles.html
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Other recommended sites that may be helpful for multiple topics:

<http://www.wtamu.edu/academic/anns/mps/math/mathlab/>

<http://www.regentsprep.org/>

<http://www.purplemath.com/modules/>

<http://ims.ode.state.oh.us/ODE/IMS/Lessons/default.asp>

<http://www.algebra-lab.org/activities/activity.aspx>

<http://www.math.armstrong.edu/MathTutorial/>

<http://illuminations.nctm.org/>

http://education.ti.com/educationportal/activityexchange/activity_list.do?cid=us