



COURSE 3

Core-Plus Mathematics

Contemporary Mathematics in Context

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STANDARDS		PAGE REFERENCES
Standard 1: Number and Operation		
Goal 1.1: Understand numbers, ways of representing numbers, relationships among numbers, and number system.		
Objective(s): By the end of Algebra II, the student will be able to:		
<p>All.1.1.1 Compare and contrast the properties of numbers and number systems within the complex number system to include rational, irrational, and imaginary numbers and factorials.</p> <p>Skill Statements:</p> <ol style="list-style-type: none"> Define and explain the meaning of i as a solution to the equation $x^2 = -1$. Identify expressions of the form $a + bi$ as complex numbers. Identify complex conjugates. Demonstrate the meaning of $x!$. 	<p>Student Edition: 354-355 #5 <i>Connections</i> 20 #10, 359 #13, 360 #14, 362 #25 <i>Summarize the Mathematics</i> 356</p> <p>Teacher Guide: MT T356; SAS T355; TN T355</p>	
<p>All.1.1.2 Demonstrate meaning of complex numbers as solutions to polynomial equations that do not have real solutions.</p> <p>Skill Statements:</p> <ol style="list-style-type: none"> Identify real and imaginary roots for polynomial equations. 	<p>Student Edition: 355 #6, 358 #6 <i>Check Your Understanding</i> 356 <i>Connections</i> 359 #11, 361 #19</p> <p>Teacher Guide: MT T356; SAS T355; TN T355</p>	

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<p>All.1.1.3 Recognize matrices as a method of arranging data.</p> <p>Skill Statement:</p> <p>a. Identify the dimensions of a matrix.</p>	<p>At this level of study, it is expected that students will already have mastered this objective. The following references demonstrate higher-level usage of this objective:</p> <p>Student Edition: 497 #3, 541 #6 <i>Applications</i> 501-502 #7, 502 #8 <i>Connections</i> 444 #15, 474 #10 <i>Extensions</i> 556 #28, 557 #29 <i>Review</i> 557 #32</p> <p>Teacher Guide: S T542</p>
<p>All.1.1.4 Develop an understanding of the properties of logarithmic expressions and expressions with rational exponents.</p> <p>Skill Statements:</p> <p>a. Identify a logarithmic function as the inverse of an exponential function.</p> <p>b. Convert between expressions containing radical form and those containing rational exponents.</p>	<p>Student Edition: 561 #3 <i>Applications</i> 568 #1, #3, #4 <i>Summarize the Mathematics</i> 562, 564, 567</p> <p>Teacher Guide: I2 T563; I3 T564A-T564B; MT T562, T564, T565</p>
<p>Goal 1.2: Understand meanings of operations and how they relate to one another.</p>	
<p>Objective(s): By the end of Algebra II, the student will be able to:</p>	
<p>All.1.2.1 Develop an understanding of the properties of, and representations for, the addition, subtraction, and multiplication of matrices.</p> <p>Skill Statement:</p> <p>a. Identify which real number properties apply to matrices.</p>	<p>At this level of study, it is expected that students will already have mastered this objective. The following references demonstrate higher-level usage of this objective:</p> <p>Student Edition: <i>Applications</i> 471 #6, 501-502 #7, 502 #8 <i>Connections</i> 444 #15, 474 #10 <i>Extensions</i> 557 #29 <i>Reflections</i> 506 #19 <i>Summarize the Mathematics</i> 542</p> <p>Teacher Guide: A T506; SM T498</p>

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Goal 1.3: Compute fluently and make reasonable estimates.

Objective(s): By the end of Algebra II, the student will be able to:

<p>All.1.3.1 Simplify expressions within the complex number system.</p> <p>Skill Statements:</p> <ol style="list-style-type: none"> Simplify rational expressions, expressions with rational exponents, and logarithmic expressions. Simplify and estimate radical expressions having various indices. Express the square root of a negative number in the form bi, where b is real. Simplify complex fractions. Convert between radical expressions and expressions with rational exponents. Use properties of logarithms to evaluate and simplify logarithmic expressions. 	<p>Student Edition: 355 #6, 358 #6 <i>Applications</i> 568 #1, #3, #4 <i>Check Your Understanding</i> 356 <i>Connections</i> 359 #11, 361 #19</p> <p>Teacher Guide: I2 T370, T563; I3 T372; MT T356; SAS T355; TN T355</p>
<p>All.1.3.2 Perform computations on expressions with matrices within the complex number system.</p> <p>Skill Statements:</p> <ol style="list-style-type: none"> Perform operations with matrices to include scalar multiplication, addition, subtraction, and matrix multiplication (2 by 2). Add, subtract, and multiply radical expressions and expressions containing rational exponents. Use long division or synthetic division to divide a polynomial by a lower degree polynomial. Add, subtract, multiply, and divide rational expressions. Perform computations in the complex number system. 	<p>Matrix computations using imaginary numbers are covered in later coursework. The following references cover matrix computations within real number space:</p> <p>Student Edition: 497 #3, 541 #6 <i>Applications</i> 471 #6, 501-502 #7, 502 #8 <i>Connections</i> 444 #15, 474 #10 <i>Extensions</i> 557 #29 <i>Reflections</i> 506 #19 <i>Review</i> 557 #32 <i>Summarize the Mathematics</i> 542</p> <p>Teacher Guide: A T506; S T542; SM T498</p>

STANDARDS	PAGE REFERENCES
Standard 2: Concepts and Principles of Measurement	
Goal 2.1: Understand measurable attributes of objects and the units, systems, and processes of measurement.	
Objective(s): By the end of Algebra II, the student will be able to:	
<p>All.2.1.1 Recognize the relationship between radian and degree measures.</p> <p>Skill Statements:</p> <p>a. Convert between degree and radian measures.</p>	<p>Student Edition: 427-429 #1, #2, #3, #4, #5 <i>Check Your Understanding</i> 432 <i>Summarize the Mathematics</i> 431</p> <p>Teacher Guide: I3 T427; MN T427; MT T431</p>
Goal 2.2: Apply appropriate techniques, tools, and formulas to determine measurements.	
No objectives at this course level.	
Goal 3.1: Understand patterns, relations, and functions.	
Objective(s): By the end of Algebra II, the student will be able to:	
<p>All.3.1.1 Represent patterns and functional relationships in a table and as a graph.</p> <p>Skill Statements:</p> <p>a. Graph absolute value functions. b. Graph quadratic equations and inequalities. c. Graph polynomial functions. d. Graph exponential functions. e. Graph circles.</p>	<p>Student Edition: 365-368 #2, #3, #4, #6, #7 <i>Check Your Understanding</i> 352 <i>Connections</i> 359 #10, 383 #14, 384 #17, #18, #19 <i>Summarize the Mathematics</i> 369</p> <p>Teacher Guide: I1 T365</p>
<p>All.3.1.2 Describe the graphs of polynomial and absolute value functions and discuss their attributes in terms of the basic concepts of maximum, minimum, intercepts, and roots.</p> <p>Skill Statements:</p> <p>a. Determine the nature of the roots of an equation by using the discriminant. b. Recognize contexts in which quadratic models are appropriate. c. Identify the graphs of absolute value functions and identify their key characteristics. d. Identify a polynomial function by its degree. e. Identify the graphs of polynomial functions. f. Relate the solutions of polynomial functions to the points where the graphs cross the x-axis.</p>	<p>Student Edition: 113 #3, #4, 330-331 #5, #6, 355, 332-334 #1, #3, #5 <i>Review</i> 125 #25, #28 <i>Reflections</i> 342 #16 <i>Summarize the Mathematics</i> 330, 356</p> <p>Teacher Guide: MT T356</p>

STANDARDS	PAGE REFERENCES
Goal 3.2: Represent and analyze mathematical situations and structures using algebraic symbols.	
Objective(s): By the end of Algebra II, the student will be able to:	
<p>All.3.2.1 Write equations and inequalities in multiple forms.</p> <p>Skill Statement:</p> <p>a. Rewrite equations of parabolas and circles in standard form.</p>	<p>Student Edition: <i>Connections</i> 340 #9, 359 #10 <i>Reflections</i> 342 #15, #16</p> <p>Teacher Guide: TATS T397</p>
<p>All.3.2.2 Recognize and generate equivalent forms of algebraic expressions and solve equations, inequalities, and systems of equations and inequalities.</p> <p>Skill Statements:</p> <p>a. Solve systems of linear equations and linear inequalities. b. Solve radical equations and inequalities. c. Solve rational equations. d. Solve logarithmic equations. e. Solve equations containing a variable in the exponent. f. Use the quadratic formula, factoring, and completing the square to solve any quadratic equations. g. Find all roots of polynomials functions using various methods.</p>	<p>Student Edition: 113 #5, 116 #3, 561 #3 <i>Applications</i> 119 #4 <i>Review</i> 227 #43 <i>Summarize the Mathematics</i> 114, 562, 564, 567 <i>Think About This Situation</i> 109, 560</p> <p>Teacher Guide: PMD T109A-T109B</p>
Goal 3.3: Use mathematical models to represent and understand quantitative relationships.	
No objectives at this course level.	
Goal 3.4: Analyze change in various contexts.	
Objective(s): By the end of Algebra II, the student will be able to:	
<p>All.3.4.1 Interpret how changes to an equation affect the parent graph of the equation.</p> <p>Skill Statements:</p> <p>a. Compare and contrast the graphs of $f(x) = x^2$ to $f(x) = a(x-h)^2 + k$. b. Recognize graphs of the following and how changes impact them: $y = x$, $y = x^2$, $y = x^3$, $y = 1/x$, $y = \sqrt{x}$, and $y = x$</p>	<p>At this level of study, it is expected that students will already have mastered this objective. The following references demonstrate higher-level usage of this objective:</p> <p>Student Edition: 368 #7, 373 #3 <i>Connections</i> 472 #7 <i>Extensions</i> 478-479 #19, #20 <i>Reflections</i> 573 #28 <i>Review</i> 363 #30 <i>Summarize the Mathematics</i> 352, 567</p> <p>Teacher Guide: MT T369</p>

STANDARDS	PAGE REFERENCES
Standard 4: Concepts and Principles of Geometry	
Goal 4.1 Analyze characteristics and properties of two- and three-dimensional geometric shapes and develop mathematical arguments about geometric relationships.	
Objective(s): By the end of Algebra II, the student will be able to:	
<p>All.4.1.1 Use trigonometric relationships to determine lengths and angle measures.</p> <p>Skill Statements:</p> <p>a. Demonstrate the proper use of the Law of Sines and the Law of Cosines to solve triangles.</p>	<p>Student Edition: 60 #5, 168 <i>Connections</i> 123 #16, 594 #20 <i>Reflections</i> 69 #24 <i>Summarize the Mathematics</i> 61, 172</p> <p>Teacher Guide: I2 T168; PS T60; S T172</p>
Goal 4.2 Specify locations and describe spatial relationships using coordinate geometry and other representational systems.	
<p>All.4.2.1 Analyze the graphs of circles and parabolas.</p> <p>Skill Statement:</p> <p>a. Graph circles and parabolas and their transformations.</p>	<p>Teachers may meet this objective through classroom application of the following references:</p> <p>Student Edition: <i>Applications</i> 216 #6 <i>Connections</i> 340 #9, 350 #11, 472 #7 <i>Reflections</i> 342 #15, #16, 360 #16</p> <p>Teacher Guide: SAS T359</p>
Goal 4.3: Apply transformations and use symmetry to analyze mathematical situations.	
No objectives at this course level.	
Goal 4.4: Use visualization, spatial reasoning, and geometric models to solve problems.	
No objectives at this course level.	
Standard 5: Data Analysis, Probability, and Statistics	
No objectives at this course level.	