

Knox County Prioritized Mathematics Curriculum

3103 Algebra 2

2006-2007

Key:

C-Compact - objectives that have been previously taught

A-Assessed – objectives assessed by Knox County or the state

I-Important - objectives providing enrichment skills or support to subsequent mathematics courses (optional)

* These objectives and “aligned” chapters are arranged in the order of suggestive sequence for teaching.

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Chapter One Equations and Inequalities

<p style="text-align: center;">Vocabulary</p> <p>mathematical model, verbal model, algebraic model, compound inequality</p>	<p style="text-align: center;">Writing Prompts</p> <p>Explain the difference between a simple linear inequality and a compound linear inequality.</p>
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Key	State Performance Indicators	Knox County Performance Objectives	Textbook Correlation	
			Section	Pages
C	1.1a Order a given set of real numbers.	Use a number line to graph and order real numbers. Identify properties of and use operations with real numbers.	1.1	3 - 10
C	1.2e Add, subtract, and multiply algebraic expressions.	Evaluate algebraic expressions. Simplify algebraic expressions by combining like terms.	1.2	11 -17
C	2.1c Solve multi-step linear equations.	Solve linear equations. Use linear equations to solve real-life problems.	1.3	19 - 24
A	4.2a Apply the given formula to find area and circumference of circles, area and perimeter of polygons, and volume of regular solids.	Rewrite equations with more than one variable. Rewrite common formulas.	1.4	26 - 32
C	2.1b Select the algebraic equation that generalizes the pattern represented by data in a given table.	Use a general problem solving plan to solve real-life problems.	1.5	33 - 39
C	2.1f Identify the graphical representation of the solution to a one-variable inequality on a number line.	Solve simple inequalities. Solve compound inequalities.	1.6	41 - 47
A	2.1f Identify the graphical representation of the solution to a one-variable inequality on a number line.	Solve absolute value equations and inequalities. Use absolute value equations and inequalities to solve real-life problems.	1.7	50 - 55

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Chapter Two Linear Equations and Functions

Vocabulary relation, function, standard form, direct variation, scatter-plot, piecewise function	Writing Prompts Is a function always a relation? Is a relation always a function? Explain.
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Key	State Performance Indicators	Knox County Performance Objectives	Textbook Correlation	
			Section	Pages
A	2.2a Select functional notation to generalize a given numeric pattern.	Represent relations and functions. Graph and evaluate linear functions.	2.1	67 - 74
C	2.1d Select the graph that represents a given linear function expressed in slope intercept form.	Find slopes of lines and classify parallel and perpendicular lines. Use slope to solve real-life problems.	2.2	75 - 81
C	2.1d Select the graph that represents a given linear function expressed in slope- intercept form.	Use the slope-intercept form of a linear equation to graph linear equations. Use the standard form of a linear equation to graph linear equations.	2.3	82 - 90
A	2.1b Select the algebraic equation that generalizes the pattern represented by data in a given table.	Write linear equations. Write direct variation equations.	2.4	91 - 98
A	5.3a Categorize the correlation of a scatter plot using real-world data.	Use a scatter plot to identify the correlation shown by a set of data. Approximate the best-fitting line for a set of data.	2.5	99 - 107
C	2.2c Select the graph of a two-variable inequality.	Graph linear inequalities in two variables. Use linear inequalities to solve real-life problems.	2.6	108 - 113
A	2.1d Select the graph that represents a given linear function expressed in slope intercept form.	Represent piecewise functions. Use piecewise functions to model real-life quantities.	2.7	114 - 121
A	3.3a Describe the transformation that has changed a “parent function” to the given related function.	Represent absolute value functions. Use absolute value functions to model real-life situations.	2.8	122 – 128

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Chapter Three Systems of Linear Equations and Inequalities

<p>Vocabulary system, linear combination, linear programming, feasible region, ordered triple, octants</p>	<p>Writing Prompts Explain how you can tell whether a system has infinitely many or no solutions without trying to solve the system.</p>
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Key	State Performance Indicators	Knox County Performance Objectives	Textbook Correlation	
			Section	Pages
C	2.2f Solve a system of linear equations with 2 variables.	Graph and solve systems of linear equations in two variables. Use linear systems to solve real-life problems.	3.1	139 - 146
C	2.2f Solve a system of linear equations with 2 variables.	Use algebraic methods to solve linear systems. Use linear systems to model real-life situations.	3.2	147 - 155
C	2.2c Select the graph of a two-variable inequality.	Graph a system of linear inequalities to find the solutions of the system. Use systems of linear inequalities to solve real-life problems.	3.3	156 - 162
A	2.2f Solve a system of linear equations with 2 variables.	Solve linear programming problems. Use linear programming to solve real-life problems.	3.4	163 - 169
I	2.2f Solve a system of linear equations with 2 variables.	Graph linear equations in three variables and evaluate linear functions of two variables. Use functions of two variables to model real-life situations.	3.5	170 - 176
A	2.2f Solve a system of linear equations with 2 variables.	Solve systems of linear equations in three variables. Use systems in three variables to model real-life situations.	3.6	177 - 184

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Chapter Four Matrices and Determinants

Vocabulary	Writing Prompts
dimensions, entries, scalar, determinant, Cramer’s Rule, coefficient matrix, identity matrix, inverse matrix, variable matrix, constant matrix	Is multiplication of matrices commutative? Explain your answer.

Key	State Performance Indicators	Knox County Performance Objectives	Textbook Correlation	
			Section	Pages
C	2.2h Identify matrices that model given real-world situations.	Add and subtract matrices, multiply a matrix by a scalar, and solve matrix equations. Use matrices in real-life situations.	4.1	199 - 207
A	2.2h Identify matrices that model given real-world situations.	Multiply two matrices. Use matrix multiplication in real-life situations.	4.2	208 - 213
A	2.2f Solve a system of linear equations with 2 variables. 2.2h Identify matrices that model given real-world situations.	Evaluate determinants of 2 x 2 and 3 x 3 matrices. Use Cramer’s rule to solve systems of linear equations.	4.3	214 - 221
A	2.2h Identify matrices that model given real-world situations.	Find and use inverse matrices. Use inverse matrices in real-life situations.	4.4	222 - 229
A	2.2f Solve a system of linear equations with 2 variables.	Solve systems of linear equations using inverse matrices. Use systems of linear equations to solve real-life problems.	4.5	230 - 236
I	2.2f Solve a system of linear equations with 2 variables.	Solve systems of linear equations using elementary row operations on augmented matrices.	Chapter 4 Extension	237 - 238

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Chapter Five Quadratic Functions

<p style="text-align: center;">Vocabulary</p> <p>parabola, vertex, axis of symmetry, vertex form, radicand, rationalize the denominator, imaginary unit, complex number, complex plane, complex conjugates, complete the square, discriminant, quadratic regression</p>	<p style="text-align: center;">Writing Prompts</p> <p>Explain why complex numbers and radicals come in pairs.</p>
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Key	State Performance Indicators	Knox County Performance Objectives	Textbook Correlation	
			Section	Pages
A	3.2a Predict the graphical transformation that occurs when coefficients and/or constants of a given function are changed.	Graph quadratic functions. Use quadratic functions to solve real-life problems.	5.1	249 - 255
A	1.1c Multiply two polynomials with each factor having no more than two terms.	Factor quadratic expressions and solve quadratic equations. Find zeros of quadratic functions.	5.2	256 - 263
A	1.2e Add, subtract, and multiply algebraic expressions.	Solve quadratic equations by finding square roots. Use quadratic equations to solve real-life problems.	5.3	264 - 271
A	1.2a Perform basic operations using complex numbers.	Solve quadratic equations with complex solutions and perform operations with complex numbers. Apply complex numbers to fractal geometry.	5.4	272 - 280
A	4.1a Select the area representation for a given product of two binomials.	Solve quadratic equations by completing the square. Fuse completing the square to write quadratic functions in vertex form.	5.5	281 - 290
A	1.2a Perform basic operations using complex numbers.	Solve quadratic equations using the quadratic formula. Use the quadratic formula in real-life situations.	5.6	291 - 298
A	2.2c Select the graph of a two-variable inequality.	Graph quadratic inequalities in two variables. Solve quadratic inequalities in one variable.	5.7	299 - 305
A	2.1c Solve multi-step linear equations (one set of parentheses on each side of the equations and/or variables on both sides).	Write quadratic functions given characteristics of their graph. Use technology to find quadratic models for data.	5.8	306 - 312

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Chapter Six Polynomials and Polynomial Functions

Vocabulary		Writing Prompts		
polynomial function, leading coefficient, constant term, degree, standard form, synthetic substitution, end behavior, sum/difference of 2 cubes, factor by grouping, quadratic form, long division, synthetic division, local maximum and minimum, finite differences		Sketch a graph of a polynomial function with 3 turning points. What must be true about the degree of the function? Explain your reasoning.		
Key	State Performance Indicators	Knox County Performance Objectives	Textbook Correlation	
			Section	Pages
A	1.2d Simplify expressions with rational and negative exponents.	Use properties of exponents to evaluate and simplify expressions involving powers. Use exponents and scientific notation to solve real-life problems.	6.1	323 - 328
A/I	3.2a Predict the graphical transformation that occurs when coefficients and/or constants of a given function are changed. 5.1a Make a prediction from the graph of a real-world data set.	Evaluate a polynomial function. Graph a polynomial function.	6.2	329 - 337
A	1.2e Add, subtract, and multiply algebraic expressions.	Add, subtract, and multiply polynomials. Use polynomial operations in real-life problems.	6.3	338 - 344
A	2.1a Translate a verbal sentence into an algebraic equation and vice versa.	Factor polynomial expressions. Use factoring to solve polynomial equations.	6.4	345 - 351
A	2.1a Translate a verbal sentence into an algebraic equation and vice versa.	Divide polynomials and relate the result to the remainder theorem and the factor theorem. Use polynomial division in real-life problems.	6.5	352 - 358
A	4.2a Apply the given formula to find area and circumference of circles, area and perimeter of polygons, and volume of regular solids.	Find the rational zeros of a polynomial function. Use polynomial equations to solve real-life problems.	6.6	359 - 365
A	1.3a Determine the conjugate of a complex number.	Use the fundamental theorem of algebra to determine the number of zeros of a polynomial function. Use technology to	6.7	366 - 372

		approximate the real zeros of a polynomial function.		
A	2.1a Translate a verbal sentence into an algebraic equation and vice versa.	Analyze the graph of a polynomial function. Use the graph of a polynomial function to answer questions about real-life situations.	6.8	373 - 378
I	2.2a Select functional notation to generalize a given numeric pattern.	Use finite differences to determine the degree of a polynomial function that will fit a set of data. Use technology to find polynomial models for real-life data.	6.9	379 - 386

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Chapter Seven Powers, Roots, Radicals

Vocabulary		Writing Prompts		
index, nth root, rational exponent, power function, composition, inverse function, horizontal line test, radical function, radical equations, extraneous solutions, measures of central tendency, standard deviation, box and whisker plot, quartiles, measures of dispersion, frequency distribution		Does every function have an inverse that is a function? Explain your answer.		
Key	State Performance Indicators	Knox County Performance Objectives	Textbook Correlation	
			Section	Pages
A	1.2d Simplify expressions with rational and negative exponents.	Evaluate the nth roots of real numbers using both radical notation and rational exponent notation. Use nth roots to solve real-life problems.	7.1	401 - 406
A	1.2d Simplify expressions with rational and negative exponents.	Use properties of rational exponents to evaluate and simplify expressions. Use properties of rational exponents to solve real-life problems.	7.2	407 - 414
A	1.2d Simplify expressions with rational and negative exponents.	Perform operations with functions including power functions. Use power functions and function operations to solve real-life problems.	7.3	415 - 420
A	2.2a Select functional notation to generalize a given numeric pattern.	Find inverses of linear functions. Find inverses of nonlinear functions.	7.4	421 - 430
A	3.3a Describe the transformation that has changed a “parent function” to the given related function.	Graph square root and cube root functions. Use square root and cube root functions to find real-life quantities.	7.5	431 - 436
A	1.2d Simplify expressions with rational and negative exponents.	Solve equations that contain radicals or rational exponents. Use radical equations to solve real-life problems.	7.6	437 - 444
A	5.1b Determine the measures of central tendency for a given set of real-world data.	Use measures of central tendency and measures of dispersion to describe data sets. Use box-and-whisker plots and histograms to represent data graphically.	7.7	445 - 454

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Chapter Eight Exponential and Logarithmic Functions

Vocabulary	Writing Prompts
exponential function, asymptote, growth and decay, growth factor, decay factor, base e, logarithm, common and natural logarithm, change of base formula, expand and condense logarithms, logarithmic equations	Is it possible to express e as a ratio of two integers? Explain.

Key	State Performance Indicators	Knox County Performance Objectives	Textbook Correlation	
			Section	Pages
A	3.3a Describe the transformation that has changed a “parent function” to the given related function.	Graph exponential growth functions. Use exponential growth functions to model real-life situations.	8.1	465 - 472
A	3.3a Describe the transformation that has changed a “parent function” to the given related function.	Graph exponential decay functions. Use exponential decay functions to model real-life situations.	8.2	473 - 479
A	2.2d Determine the domain of polynomial, rational, square root, exponential and logarithmic functions. 2.2e Determine the range of a wide variety of functions given a graph.	Use the number e as the base of exponential functions. Use the natural base e in real life situations.	8.3	480 - 485
A	1.2c Identify the exponential form of a logarithmic expression and vice versa.	Evaluate logarithm functions. Graph logarithm functions.	8.4	486 - 492
A	2.2g Apply properties of logarithms to simplify a logarithmic expression.	Use properties of logarithms. Use properties of logarithms to solve real-life problems.	8.5	493 - 500
A	2.2g Apply properties of logarithms to simplify a logarithmic expression.	Solve exponential equations. Solve logarithm equations.	8.6	501 - -508
I	4.3a Solve real- world problems given logarithmic and exponential formulas.	Model data with exponential functions. Model data with power functions.	8.7	509 - 516

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Chapter Nine Rational Equations and Functions

<p>Vocabulary constant of variation, inverse and joint variation, rational function, hyperbola, complex fraction</p>	<p>Writing Prompts Explain how you know when a rational expression is in simplified form.</p>
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Key	State Performance Indicators	Knox County Performance Objectives	Textbook Correlation	
			Section	Pages
I	2.1b Select the algebraic equation that generalizes the pattern represented by data in a given table.	Write and use inverse variation models. Write and use joint variation models.	9.1	533 - 539
A	2.2d Determine the domain of polynomial, rational, square root, exponential, and logarithmic functions. 2.2e Determine the range of a wide variety of functions given a graph.	Graph simple rational functions. Use the graph of a rational function to solve real-life problems.	9.2	540 - 546
A	2.2d Determine the domain of polynomial, rational, square root, exponential, and logarithmic functions. 2.2e Determine the range of a wide variety of functions given a graph.	Graph general rational functions. Use the graph of rational functions to solve real-life problems.	9.3	547 - 553
A	1.2e Add, subtract, and multiply algebraic expressions.	Multiply and divide rational expressions. Use rational expressions to model real-life quantities.	9.4	554 - 561
A	1.2e Add, subtract, and multiply algebraic expressions.	Add and subtract rational expressions. Simplify complex fractions.	9.5	562 - 567
A	2.2b Solve one-variable linear equations with rational expressions.	Solve rational equations. Use rational equations to solve real-life problems.	9.6	568 - 574

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Chapter Ten Quadratic Relations and Conic Sections

<p style="text-align: center;">Vocabulary</p> <p>distance formula, midpoint formula, focus, directrix, center and radius of a circle, foci, major and minor axes, vertices, co-vertices, transverse axis, eccentricity</p>	<p style="text-align: center;">Writing Prompts</p> <p>Describe how the equation of a circle is related to the Pythagorean theorem. Include a diagram to illustrate the relationship.</p>
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Key	State Performance Indicators	Knox County Performance Objectives	Textbook Correlation	
			Section	Pages
C	3.1a Apply given Pythagorean Theorem to real-world problems.	Find the distance between two points and find the midpoint of the line segment joining two points. Use the distance and midpoint formulas in real-life situations.	10.1	589 - 594
A	3.2a Predict the graphical transformation that occurs when coefficients and/or constants of a given function are changed.	Graph and write equations of parabolas. Use parabolas to solve real-life problems.	10.2	595 - 600
A	3.2a Predict the graphical transformation that occurs when coefficients and/or constants of a given function are changed.	Graph and write equations of circles. Use circles to solve real-life problems.	10.3	601 - 608
A	3.2a Predict the graphical transformation that occurs when coefficients and/or constants of a given function are changed.	Graph and write equations of ellipses. Use ellipses if real-life situations.	10.4	609 - 614
A	3.2a Predict the graphical transformation that occurs when coefficients and/or constants of a given function are changed.	Graph and write equations of hyperbolas. Use hyperbolas to solve real-life problems.	10.5	615 - 621
A	3.2a Predict the graphical transformation that occurs when coefficients and/or constants of a given function are changed.	Write and graph an equation of a parabola with its vertex at (h, k) and an equation of a circle, ellipse, or hyperbola with its center at (h, k). Classify a conic using its equation.	10.6	622 - 631
I	2.2f Solve a system of linear equations with two variables.	Solve systems of quadratic equations. Use quadratic systems to solve real-life problems.	10.7	632 - 638

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Chapter Twelve Probability and Statistics

<p>Vocabulary</p> <p>counting principle, permutation, combination, binomial theorem, theoretical and experimental probability, geometric probabilities, compound event, mutually exclusive events, complement, conditional probability, normal distribution</p>	<p>Writing Prompts</p> <p>Explain the difference between a permutation and a combination. Describe what it means for two events to be mutually exclusive.</p>
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Key	State Performance Indicators	Knox County Performance Objectives	Textbook Correlation	
			Section	Pages
A	5.2b Determine the number of possible outcomes for a given experiment (i.e., the multiplication counting principle, permutations, or combinations).	Use the fundamental counting principle to count the number of ways an event can happen. Use permutations to count the number of ways an event can happen.	12.1	701 - 707
A/I	5.2b Determine the number of possible outcomes for a given experiment (i.e., the multiplication counting principle, permutations, or combinations).	Use combinations to count the number of ways an event can happen. Use the binomial theorem to expand a binomial that is raised to a power.	12.2	708 - 715
A	5.2c Determine the theoretical probability of a simple event for a given situation.	Find theoretical and experimental probabilities. Find geometric probabilities.	12.3	716 - 723
A	5.2d Determine the theoretical probability of a compound event (i.e., dependent or independent, union and intersection).	Find probabilities of unions and intersections of two events. Use complements to find the probability of an event.	12.4	724 - 729
A	5.2d Determine the theoretical probability of a compound event (i.e., dependent or independent, union and intersection).	Find the probability of independent events. Find the probability of dependent events.	12.5	730 - 737
I	5.2d Determine the theoretical probability of a compound event (i.e., dependent or independent, union and intersection).	Find binomial probabilities and analyze binomial distributions. Test a hypothesis.	12.6	738 - 745
A	5.1b Determine the measures of central tendency for a given set of real-world data.	Calculate probabilities using normal distributions. Use normal distributions to approximate binomial distributions.	12.7	746 - 752