

SCHOOL DISTRICT U-46
Algebra 3-4 with Support

Teacher Companion for Pacing Guide
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FIRST DEGREE EQUATIONS AND INEQUALITIES	Chapter 1 Chapter 2 Chapter 3 Chapter 4	Solving Equations and Inequalities Linear Relations and Functions Systems of Equations and Inequalities Matrices
POLYNOMIAL AND RADICAL EQUATIONS AND INEQUALITIES	Chapter 5 Chapter 6 Chapter 7	Polynomials Quadratic Functions and Inequalities Polynomial Functions
ADVANCED FUNCTIONS AND RELATIONS	Chapter 8 Chapter 9 Chapter 10	Conic Sections Rational Expressions and Equations Exponential and Logarithmic Relations
DISCRETE MATHEMATICS	Chapter 11 Chapter 12	Sequences and Series Probability and Statistics
TRIGONOMETRY	Chapter 13 Chapter 14	Extending Surface Area Extending Volume

CHAPTER 1 – SOLVING EQUATIONS AND INEQUALITIES

<i>Section</i>	<i>Math Skills and Concepts</i>	<i>Comments</i>	<i>Assignments and Teacher Notes</i>
1-1	Expressions and Formulas <ul style="list-style-type: none"> • Use order of operations to evaluate expressions; • Use formulas 	Cover entire section	
1-2	Properties of Real Numbers <ul style="list-style-type: none"> • Classify real numbers • Use properties of real numbers to evaluate expressions 	<ul style="list-style-type: none"> • Students apply properties to simplify expressions (distributive, combine like terms) • Skip identification of properties. • Use Alg. 1 Fast Files worksheets as resources. 	
1-3	Solving Equations <ul style="list-style-type: none"> • Translate between verbal and algebraic expressions • Solve equations 	<ul style="list-style-type: none"> • Emphasize this section – spend at least 2-3 days here. • Graphic organizer example on how to solve equations. 	
1-5	Solving Inequalities <ul style="list-style-type: none"> • Solve inequalities • Word problems with inequalities 	Cover entire section.	
1-6	Compound Inequalities	<ul style="list-style-type: none"> • Supplement from Alg. 1 & Alg. 2 Fast Files. • Skip problems to which solution is “all real numbers” or “no solution.” 	
1-4 & 1-6	Absolute Value Equations & Absolute Value Inequalities	<ul style="list-style-type: none"> • Teach as one lesson. Use simple absolute value expressions – coefficient of x is 1. • Skip problems to which solution is “all real numbers” or “no solution.” • Examples: $x - 4 = 11$, $x - 4 < 11$, $x - 4 > 11$ • Compare/contrast algebraic, verbal, number line (CRISS content frame?) 	
	Work Keys	Level 3 problems – do 2-3 problems 2-3 times a week – include on chapter assessment	

CHAPTER 2 – LINEAR RELATIONS AND FUNCTIONS

<i>Section</i>	<i>Math Skills and Concepts</i>	<i>Comments</i>	<i>Assignments and Teacher Notes</i>
2-1	<p>Relations and Functions</p> <ul style="list-style-type: none"> Analyze and graph relations Find functional values 	<ul style="list-style-type: none"> Emphasize domain & range, how to identify if a relation is a function or not, and use function notation to find function values 4 ways to represent a function: mapping, table, ordered pairs and graph 	
2-2	<p>Linear Relations</p> <ul style="list-style-type: none"> Identify linear equations and functions Write linear equations in standard form and graph them 	<ul style="list-style-type: none"> Identify whether equations/functions are linear or not; graph equations in standard form by finding x- and y intercepts. Skip changing equations into standard form. Add material on graphing equations in slope-intercept form. Compare/contrast slope-intercept and standard form of linear equations – when to use each one. (CRISS content frame?) 	
2-3	<p>Slope</p> <ul style="list-style-type: none"> Find and use slope of a line Graph parallel and perpendicular lines 	<ul style="list-style-type: none"> Types of slope: positive, negative, zero (horizontal = <u>z</u>ero; vertical – can't walk up a wall) & undefined. Find slope between 2 ordered pairs by formula (y's on top – rise on top – they rhyme) and by counting rise/run triangle on graph; graph line by starting point, then counting off slope (slope = constant rate of change) Move parallel and perpendicular lines to beginning of Ch. 3. 2 days. 	
2-4	<p>Writing Linear Equations</p> <ul style="list-style-type: none"> Write an equation of a line given slope and a point on the line Write equation of a line parallel or perpendicular to a given line 	<ul style="list-style-type: none"> Given equation of a line, identify slope and y-intercept. Write an equation of a line given slope & y-intercept, a point & a slope, 2 ordered pairs, or a graph with 2 points. Work Keys: problems like p. 79 #45 and p. 80 #49 & 50. 2 days. 	

CHAPTER 2 – LINEAR RELATIONS AND FUNCTIONS (CONTINUED)

2-5	Modeling Real-World Data Using Scatter Plots	Optional	
2-6	Special Functions	Optional	
2-7	Graphing Inequalities <ul style="list-style-type: none">• Graph linear inequalities• Graph absolute value inequalities	<ul style="list-style-type: none">• Emphasize boundary lines and shading.• Work on pencil & paper, then model on graphing calculator.• Skip special functions.	
	Work Keys	Level 3/4 problems – do 2-3 problems 2-3 times a week – include on chapter assessment	

CHAPTER 3 – SYSTEMS OF EQUATIONS AND INEQUALITIES

<i>Section</i>	<i>Math Skills and Concepts</i>	<i>Comments</i>	<i>Assignments and Teacher Notes</i>
2-3	Graph parallel & perpendicular lines	<ul style="list-style-type: none"> • Given equations of lines, identify whether they are parallel, perpendicular or neither. • Graph 2 lines and determine whether they are parallel, perpendicular or neither • Need worksheet... 	
3-1	Solving Systems of Equations by Graphing <ul style="list-style-type: none"> • Solve system of linear equations by graphing • Determine whether a system is consistent & independent, consistent and dependent, or inconsistent 	<ul style="list-style-type: none"> • Do problems w/pencil & paper 1st, then model on graphing calculator. • Drop consistent, inconsistent, etc. vocab – emphasize 1 solution, infinite solutions & no solution in stead. • Word problems like p. 113 #10-12 & #39-41 	
3-2	Solving Systems of Equations Algebraically <ul style="list-style-type: none"> • Solve systems of linear equations by substitution • Solve systems of linear equations by elimination 	<ul style="list-style-type: none"> • Substitution – 1 day – use problems where an equation is already solved for 1 variable • Elimination – 1 day • Mixed problems – choose strategy – 1 day – compare/contrast advantages and disadvantages of each method (content frame?) • Demo checking on graphing calculator • Include word problems! 	
3-3	Solving Systems of Inequalities by Graphing <ul style="list-style-type: none"> • Solve systems of inequalities by graphing • Determine coordinates of the vertices of a region formed by graph of a system of inequalities 	<ul style="list-style-type: none"> • Teacher discretion: could do this section after 3-1... • Skip special function (abs. value) problems • Omit 2nd objective about finding coordinates of bounded region 	
3-4	Linear Programming	Optional	
3-5	Solving Systems of Equations in Three Variable	Optional	
	Work Keys	Level 3/4 problems – do 2-3 problems 2-3 times a week – include on chapter assessment	

CHAPTER 4 – MATRICES

<i>Section</i>	<i>Math Skills and Concepts</i>	<i>Comments</i>	<i>Assignments and Teacher Notes</i>
4-1	Introduction to Matrices	Optional	
4-2	Operations with Matrices	Optional	
4-3	Multiplying Matrices	Optional	
4-4	Transformations with Matrices	Optional	
4-5	Determinants	Optional	
4-6	Cramer's Rule	Optional	
4-7	Identity and Inverse Matrices	Optional	
4-8	Using Matrices to Solve Systems of Equations	Optional	

CHAPTER 5 – POLYNOMIALS

<i>Section</i>	<i>Math Skills and Concepts</i>	<i>Comments</i>	<i>Assignments and Teacher Notes</i>
5-1	Monomials <ul style="list-style-type: none"> • Multiply and divide monomials • Scientific notation 	<ul style="list-style-type: none"> • Cover entire section - use 2 days • Multiplying & applicable scientific notation – 1st day • Dividing & applicable scientific notation – 2nd day • Show how to do scientific notation on calculator 	
5-2	Polynomials <ul style="list-style-type: none"> • Add & subtract polynomials • Multiply polynomials 	<ul style="list-style-type: none"> • Cover entire section – use 2 days • Add & subtract – 1st day • Multiply – distributive & FOIL only – 2nd day 	
5-3	Dividing Polynomials <ul style="list-style-type: none"> • Divide using long division • Divide using synthetic division 	Optional	
5-4	Factoring Polynomials <ul style="list-style-type: none"> • Factor polynomials • Simplify polynomial quotients by factoring 	<ul style="list-style-type: none"> • Spend about a week (+/-) • Review perfect squares and cubes • Intro. Hook: solve $x^2 - 1 = 0$, $2x^2 - 5x + 2 = 0$ and $x^3 + 8 = 0$. Need factoring... • Factoring by grouping optional (depending on how factoring trinomials is taught) • Will need supplemental materials to break up this section – algebra tiles? 	
	Assess on 5-1, 5-2, & 5-4		
5-5	Roots of Real Numbers <ul style="list-style-type: none"> • Simplify radicals • Use a calculator to approximate radicals 	<ul style="list-style-type: none"> • Spend about a week (+/-) on 5-5 & 5-6 • p. 248 #28-53 • Skip 2nd objective – no calculators! 	
5-6	Radical Expressions <ul style="list-style-type: none"> • Simplify radical expressions • Perform operations with radicals 	<ul style="list-style-type: none"> • Simplify, add, subtract, & multiply with monomial square and cube roots • FOIL and rationalize square roots only • Will need supplemental materials to break up this section 	
	Assess on 5-5 & 5-6		

CHAPTER 5 – POLYNOMIALS (CONTINUED)

5-7	<p>Rational Exponents</p> <ul style="list-style-type: none"> • Change expressions between radical form and rational exponents • Simplify expressions in exponential or radical form 	<ul style="list-style-type: none"> • Skip 1st objective • Show students how to simplify exponential and radical expression on the calculator (problems #29-40 on p. 261) 	
5-8	<p>Radical Equations and Inequalities</p> <ul style="list-style-type: none"> • Solve radical equations • Solve radical inequalities 	<ul style="list-style-type: none"> • Suggested problems: p. 266 #13-22, 24 • No “variable on both sides” problems • No extraneous solutions • Skip radical inequalities 	
5-9	<p>Complex Numbers</p> <ul style="list-style-type: none"> • Perform operations with complex numbers 	<ul style="list-style-type: none"> • Spend about 3 days • Intro hook: Solve $x^2 + 9 = 0$; $\sqrt{-16} = ?$ • Concept of i • Operations with complex numbers – skip division/rationalizing 	

CHAPTER 6 – QUADRATIC FUNCTIONS AND INEQUALITIES

<i>Section</i>	<i>Math Skills and Concepts</i>	<i>Comments</i>	<i>Assignments and Teacher Notes</i>
6-3	Solve Quadratic Equations by Factoring <ul style="list-style-type: none"> • Solve quadratic equations by factoring • Write a quadratic equation given its roots 	<ul style="list-style-type: none"> • p. 304 #14-31 • Skip 2nd objective 	
6-1	Graphing Quadratic Functions <ul style="list-style-type: none"> • Graph quadratic functions • Identify and interpret max. and min. values of a quadratic function 	<ul style="list-style-type: none"> • Find vertex using $x = \frac{-b}{2a}$ • Use table from graphing calculator with vertex at center and values on either side to make table on paper. • Sketch on graph paper, then identify x-int's, y-int., axis of symmetry, max and min values • Use table/content frame for above values 	
6-2	Solving Quadratic Equations by Graphing <ul style="list-style-type: none"> • Solve quadratic equations by graphing Estimate solutions of quadratic equations by graphing	<ul style="list-style-type: none"> • Do problems with integer answers only • Skip 2nd section 	
6-4	Completing the Square	Optional	
6-5	The Quadratic Formula and the Discriminant <ul style="list-style-type: none"> • Solve quadratic equations by using the quadratic formula • Use the discriminant to determine the number and nature of the roots of a quadratic equation 	Possibly spend 2 days, at teacher discretion	
6-6	Analyzing Graphs of Quadratic Functions	Move to Ch. 8	
6-7	Graphing and Solving Quadratic Inequalities	Optional	

CHAPTER 7 – POLYNOMIAL FUNCTIONS

<i>Section</i>	<i>Math Skills and Concepts</i>	<i>Comments</i>	<i>Assignments and Teacher Notes</i>
7-1	Polynomial Functions	Do problems on graphing calculator	
7-2	Graphing Polynomial Functions	Do problems on graphing calculator	
7-3	Solving Equations Using Quadratic Techniques	Optional - Do problems on graphing calculator	
7-4	The Remainder and Factor Theorem	Optional	
7-5	Roots and Zeroes	Optional	
7-6	Rational Zero Theorem	Optional	
7-7	Operations on Functions	Optional	
7-8	Radical Equations and Inequalities	Optional	
7-9	Radical Equations and Inequalities	Optional	

CHAPTER 8 – CONIC SECTIONS

<i>Section</i>	<i>Math Skills and Concepts</i>	<i>Comments</i>	<i>Assignments and Teacher Notes</i>
8-1	Midpoint and Distance Formulas	Also review slope as well.	
8-3	Circles	Use problems in standard form only. (No "completing the square" problems.)	
8-4	Ellipses	Use problems in standard form only. (No "completing the square" problems.)	
8-5	Hyperbolas	Use problems in standard form only. (No "completing the square" problems.)	
8-2	Parabolas	Use problems in vertex form only. (No "completing the square" problems.)	
6-6	Analyzing Graphs of Quadratic Functions	Use as additional problems for 8-2	
8-6	Conic Sections	Use problems in standard form only. (No "completing the square" problems.)	
8-7	Solving Quadratic Systems	Optional	

CHAPTER 9 – RATIONAL EXPRESSIONS

<i>Section</i>	<i>Math Skills and Concepts</i>	<i>Comments</i>	<i>Assignments and Teacher Notes</i>
9-1	Multiplying and Dividing Rational Expressions		
9-2	Adding and Subtracting Rational Expressions	Monomial denominators or like denominators only	
9-3	Graphing Rational Functions	Optional	
9-4	Direct, Joint and Inverse Variation	Optional	
9-5	Classes of Functions	Optional	
9-6	Solving Rational Equations and Inequalities	Important – emphasize! Skip inequalities.	

CHAPTER 10 – EXPONENTIAL AND LOGARITHMIC FUNCTIONS

<i>Section</i>	<i>Math Skills and Concepts</i>	<i>Comments</i>	<i>Assignments and Teacher Notes</i>
10-1	Exponential Functions		
10-2	Logarithms and Logarithmic Functions		
10-3	Properties of Logarithms		
10-4	Common Logarithms		
10-5	Base e and Natural Logarithms	Optional	
10-6	Exponential Growth and Decay	Optional	

CHAPTER 11 – SEQUENCES AND SERIES

<i>Section</i>	<i>Math Skills and Concepts</i>	<i>Comments</i>	<i>Assignments and Teacher Notes</i>
11-1	Arithmetic Sequences	Optional	
11-2	Arithmetic Series	Optional	
11-3	Geometric Sequences	Optional	
11-4	Geometric Series	Optional	
11-5	Infinite Geometric Series	Optional	
11-6	Recursion and Special Sequences	Optional	
11-7	The Binomial Theorem	Optional	
11-8	Proof and Mathematical Induction	Optional	

CHAPTER 12 – PROBABILITY AND STATISTICS

<i>Section</i>	<i>Math Skills and Concepts</i>	<i>Comments</i>	<i>Assignments and Teacher Notes</i>
12-1	The Counting Principle		
12-2	Permutations and Combinations		
12-3	Probability		
12-4	Multiplying Probabilities	Optional	
12-5	Adding Probabilities	Optional	
12-6	Statistical Measures	Optional	
12-7	The Normal Distribution	Optional	
12-8	Binomial Experiments	Optional	
12-9	Sampling and Error	Optional	

CHAPTER 13 – TRIGONOMETRIC FUNCTIONS

<i>Section</i>	<i>Math Skills and Concepts</i>	<i>Comments</i>	<i>Assignments and Teacher Notes</i>
	Pythagorean Theorem	Review...	
13-1	Right Triangle Trigonometry	Important – emphasize!	
13-2	Angles and Angle Measure		
13-3	Trigonometric Functions of General Angles		
13-4	Law of Sines	Optional	
13-5	Law of Cosines	Optional	
13-6	Circular Functions		
13-7	Inverse Trigonometric Functions	Optional	

CHAPTER 14 – TRIGONOMETRIC GRAPHS AND IDENTITIES

<i>Section</i>	<i>Math Skills and Concepts</i>	<i>Comments</i>	<i>Assignments and Teacher Notes</i>
14-1	Graphing Trigonometric Functions	Optional	
14-2	Translations of Trigonometric Functions	Optional	
14-3	Trigonometric Identities	Optional	
14-4	Verifying Trigonometric Identities	Optional	
14-5	Sum & Differences Identities	Optional	
14-6	Double-Angle & Half-Angle Identities	Optional	
14-7	Solving Trigonometric Equations	Optional	