



Algebra

Concepts and Applications

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STANDARDS

PAGE REFERENCES

EARLY HIGH SCHOOL

STATE GOAL 6: Demonstrate and apply a knowledge and sense of numbers, including numeration and operations (addition, subtraction, multiplication, division), patterns, ratios and proportions.

Why This Goal Is Important: Numbers and operations on numbers play fundamental roles in helping us make sense of the world around us. Operations such as addition, subtraction, multiplication and division, as well as the ability to find powers and roots, extend the notion of numbers to create tools to model situations and solve problems in our everyday lives. Discussing and solving problems related to budgets, comparing prices on merchandise, understanding the nature of interest charges, measuring fuel consumption and calculating the trajectory for space travel would all be impossible without a sense of numbers and numerical operations. All people must develop this sense of numbers and operations and be able to use it to solve problems using mental computation, paper-and-pencil algorithms, calculators and computers.

STANDARDS	PAGE REFERENCES
<p>A. Demonstrate knowledge and use of numbers and their representations in a broad range of theoretical and practical settings.</p>	
<p>6.A.4 Identify and apply the associative, commutative, distributive and identity properties of real numbers, including special numbers such as pi and square roots.</p>	<p>Student Edition: 10, 14-18, 19-23, 26, 45, 47 #11-#18, 67, 77, 85 #57, 121 #45, 176-179, 321 #39, 354, 357-361, 388-393, 394-398, 428-433, 600-601, 748 #2 <i>Preparing for Standardized Tests</i> 49 #8, 235 #10</p> <p>Teacher Wraparound Edition: 5MC 19 #1-#4; EA 17, 396; ICE 15; OEA 18, 179; RA 16; TT 72, 601</p> <p>Teacher’s Resources: <i>Algebra: Noteables</i> 9-12, 24, 87-88, 178-179, 192-193, 196-197, 209-210, 299-301 <i>Algebra Practice Workbook</i> 3, 4, 27, 52, 56, 57, 61, 88 <i>Algebra Resource Masters</i> Chapter 1, 11-14, 16-20, 35, 37, 49; Chapter 4, 175-178; Chapter 8, 359-362; Chapter 9, 403-406; Chapter 10, 438-441; Chapter 14, 624-627</p>
<p>B. Investigate, represent and solve problems using number facts, operations (addition, subtraction, multiplication, division) and their properties, algorithms and relationships.</p>	
<p>6.B.4 Select and use appropriate arithmetic operations in practical situations including calculating wages after taxes, developing a budget and balancing a checkbook.</p>	<p>Student Edition: 24-29, 67 #5, 68 #20, 72 #9, 89 #32, #33, 99 #42, 158 #47-#49, 208 #27, 213-217, 233 #13-#17, 724-725, 743 #1-#4, 748 #1 <i>Preparing for Standardized Tests</i> 48 #1, 137 #10, 184</p> <p>Teacher Wraparound Edition: EC 175; ICE 67; ML 24; TT 213</p> <p>Teacher’s Resources: <i>Algebra: Noteables</i> 13-14, 107-108 <i>Algebra Practice Workbook</i> 5, 32 <i>Algebra Resource Masters</i> Chapter 1, 22-24; Chapter 5, 214; Chapter 11, 517</p>

STANDARDS	PAGE REFERENCES
<p>C. Compute and estimate using mental mathematics, paper-and-pencil methods, calculators and computers.</p>	
<p>6.C.4 Determine whether exact values or approximations are appropriate (e.g., bid a job, determine gas mileage for a trip).</p>	<p>Student Edition: 24-29, 67 #5, 72 #9, 83 #4, 85 #45, 179 #40, 190 #5, 197 #16, 207 #6, 259 #9, 315 #39, 727 #6, 760 <i>Investigation</i> 308-309 <i>Preparing for Standardized Tests</i> 184 #2, 417 #4 Teacher’s Resources: <i>Algebra: Noteables</i> 13-14</p>
<p>D. Solve problems using comparison of quantities, ratios, proportions and percents.</p>	
<p>6.D.4 Solve problems involving recipes or mixtures, financial calculations and geometric similarity using ratios, proportions and percents.</p>	<p>Student Edition: 24-29, 188-193, 194-197, 198-203, 204-207, 726 <i>Preparing for Standardized Tests</i> 49 #7, 281 #8, 546-547 Teacher Wraparound Edition: ML 188, 194; OA 197; RA 196 Teacher’s Resources: <i>Algebra: Noteables</i> 13-14, 96-98, 99-100, 101-102, 104-106, 135-136 <i>Algebra Practice Workbook</i> 5, 30 <i>Algebra Resource Masters</i> Chapter 5, 200-203, 208, 239</p>

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STATE GOAL 7: Estimate, make and use measurements of objects, quantities and relationships and determine acceptable levels of accuracy.

Why This Goal Is Important: Measurement provides a way to answer questions about “how many,” “how much” and “how far.” It is an indispensable component of business, manufacturing, art, medicine and many other aspects of daily life. We describe the sizes, capacities and values of many things, from the large distances involved in space travel, to the very small quantities in computer design and microbiology, to the varying values of currencies in international monetary exchange. All people must be able to choose an appropriate level of accuracy for a measurement; to select what measuring instruments to use and to correctly determine the measures of objects, space and time. These activities require people to be able to use standard instruments including rulers, volume and capacity measures, timers and emerging measurement technologies found in the home and workplace.

A. Measure and compare quantities using appropriate units, instruments and methods.

7.A.4a Apply units and scales to describe and compare numerical data and physical objects.

Student Edition:

97-99, 137 #1, 159 #59-#61, 190-193, 194-197, 231, 233, 261 #54, 307 #21, 571 #50, 725 #1, 726 #1, #2

Investigation 373

Teacher Wraparound Edition:

5MC 194, 198; EC 197; FA 648; IE 96

Teacher’s Resources:

Algebra: Noteables 52, 98, 99-100, 113

Algebra Practice Workbook 29

Algebra Resource Masters Chapter 5, 198, 200-203, 235, 237, 239, 240

7.A.4b Apply formulas in a wide variety of theoretical and practical real-world measurement applications involving perimeter, area, volume, angle, time, temperature, mass, speed, distance, density and monetary values.

Student Edition:

15 #4, 25, 27 #6, 29 #16, 37 #25, 72 #9, 85 #45, 109 #42, 115 #10, 164 #38, 174 #36, 205, 247 #5, 261 #51, 273 #3, 340 #43, 354 #7, 365 #37, #38, 399, 402 #7, 403 #20, 409 #35, 437 #5, 439 #50, 603 #10, 628 #33, 633, 649 #48, 725 #4, 748 #2

Investigation 426, 427

Preparing for Standardized Tests 235 #1, #5

Teacher Wraparound Edition:

EC 179, 433, 439

Teacher’s Resources:

Algebra Practice Workbook 5

Algebra Resource Masters Chapter 1, 23; Chapter 2, 86; Chapter 6, 270; Chapter 13, 577; Chapter 14, 647; Chapter 15, 692

STANDARDS	PAGE REFERENCES
B. Estimate measurements and determine acceptable levels of accuracy.	
<p>7.B.4 Estimate and measure the magnitude and directions of physical quantities (e.g., velocity, force, slope) using rulers, protractors and other scientific instruments including timers, calculators and computers.</p>	<p>Student Edition: 57 #49, 253 #8, 265 #3, 284-289, 349 #5, 364 #35, 467 #28, 486 #26, #27, 518 #44, 577 #45, 643 #63 <i>Preparing for Standardized Tests</i> 48 #1, 680 #1</p> <p>Teacher Wraparound Edition: FA 484; TT 265</p>
C. Select and use appropriate technology, instruments and formulas to solve problems, interpret results and communicate findings.	
<p>7.C.4a Make indirect measurements, including heights and distances, using proportions (e.g., finding the height of a tower by its shadow).</p>	<p>Student Edition: 194-197 <i>Investigation</i> 410-411 <i>Preparing for Standardized Tests</i> 378 #2, 379 #3, 546-547</p> <p>Teacher Wraparound Edition: EC 193, 197; ML 188, 194; RA 196</p> <p>Teacher’s Resources: <i>Algebra: Noteables</i> 99-100, 113 <i>Algebra Resource Masters</i> Chapter 5, 200-203, 235-237, 240, 241</p>
<p>7.C.4b Interpret scale drawings and models using maps and blueprints.</p>	<p>Student Edition: 194-197, 203 #45, 209 #33, 463 #50, #51, 726 #2</p> <p>Teacher Wraparound Edition: 5MC 198; ICE 195; ML 194; TT 195</p> <p>Teacher’s Resources: <i>Algebra: Noteables</i> 99-100, 113 <i>Algebra Practice Workbook</i> 29 <i>Algebra Resource Masters</i> Chapter 5, 200-203, 235-237, 240, 241</p>
<p>7.C.4c Convert within and between measurement systems and monetary systems using technology where appropriate.</p>	<p>Student Edition: 174 #36, 190, 192, 203 #46, #47, 217 #42, #43, 301 #53, 520, 744 #16</p> <p>Teacher Wraparound Edition: FA 520</p> <p>Teacher’s Resources: <i>Algebra: Noteables</i> 97 <i>Algebra Practice Workbook</i> 28 <i>Algebra Prerequisite Skills Workbook</i> 77-93 <i>Algebra Resource Masters</i> Chapter 5, 233, 241; Chapter 8, 358</p>

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STATE GOAL 8: Use algebraic and analytical methods to identify and describe patterns and relationships in data, solve problems and predict results.

Why This Goal Is Important: Algebra unites patterns and quantities in patterns with the means of describing change through the use of variables and functions. Its concepts and analytical methods allow people to consider general solutions to problems with common characteristics and develop related formulas. Algebra provides verbal, symbolic and graphical formats for discussing and representing settings as diverse as the pricing patterns of merchandise in a store, the behavior of a car as it accelerates or slows down, the changes in two chemicals as they react with one another, or the type of variation existing in a comparison of two factors in the economy. All people must be able to use algebraic methods to construct and examine tables of values; to interpret the relationships expressed by patterns in these tables; to relate change and variation in graphs and formulas; to reason about changes in quantities and the relationships involved in changes; and to find solutions to everyday problems using algebra's symbolic manipulation and formulas.

A. Describe numerical relationships using variables and patterns.

8.A.4a Use algebraic methods to convert repeating decimals to fractions.

Introductory information for repeating decimals only is found on the following pages.

Student Edition:

96, 600-601

Preparing for Standardized Tests 136 #2

Teacher Wraparound Edition:

TT 601

8.A.4b Represent mathematical patterns and describe their properties using variables and mathematical symbols.

Student Edition:

69 #73, 78 #46, 243 #26, 303, 315 #40, 341, 398 #65, 405, 489

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B. Interpret and describe numerical relationships using tables, graphs and symbols.

8.B.4a Represent algebraic concepts with physical materials, words, diagrams, tables, graphs, equations and inequalities and use appropriate technology.

Student Edition:

112-116, 117-121, 122-127, 133, 160-164, 165-170, 171-175, 176-179, 204-209, 212-217, 504-508, 509-513, 514-518, 519-523

Graphing Calculator Exploration 167, 521

Teacher Wraparound Edition:

5MC 122; ML 160; RA 114, 162, 168

Teacher's Resources:

Algebra: Noteables 57-58, 59-60, 61-62, 79-81, 82-84, 85-86, 247-249, 250, 251-256

Algebra Practice Workbook 17, 18, 19, 24, 25, 26, 27, 31, 32, 72, 73, 74, 75

Algebra Resource Masters Chapter 3, 115-118, 120, 123; Chapter 4, 163, 168, 173, 175, 179;

Chapter 5, 210-218; Chapter 12, 523-536, 538-541

STANDARDS	PAGE REFERENCES
<p>8.B.4b Use the basic functions of absolute value, square root, linear, quadratic and step to describe numerical relationships.</p>	<p>Student Edition: 128-131, 134, 145 #49-#51, 193 #64, 250-255, 277, 284-289, 301 #57, 357-361, 365 #40-#43, 458, 479-480</p> <p>Teacher Wraparound Edition: A 131</p> <p>Teacher’s Resources: <i>Algebra: Noteables</i> 63-64, 126-128, 144-145, 178-179, 260-261, 288-290 <i>Algebra Practice Workbook</i> 20, 37, 41, 52, 69, 88 <i>Algebra Resource Masters</i> Chapter 3, 125-129; Chapter 6, 255-258; Chapter 7, 289-292; Chapter 8, 359-362; Chapter 11, 493-497</p>
<p>C. Solve problems using systems of numbers and their properties.</p>	
<p>8.C.4a Analyze and report the effects of changing coefficients, exponents and other parameters on functions and their graphs.</p>	<p>The following reference is limited to exponential functions.</p> <p>Student Edition: 489-493</p> <p>Teacher Wraparound Edition: EC 493</p> <p>Teacher’s Resources: <i>Algebra: Noteables</i> 239-240 <i>Algebra Resource Masters</i> Chapter 11, 503-506</p>
<p>8.C.4b Apply algebraic properties and procedures with matrices, vectors, functions and sequences using data found in business, industry and consumer situations.</p>	<p>Student Edition: <i>Investigation</i> 80-81, 110-111, 262-263, 494-495, 578-579</p> <p>Teacher’s Resources: <i>Algebra Resource Masters</i> Chapter 2, 60</p>

STANDARDS	PAGE REFERENCES
D. Use algebraic concepts and procedures to represent and solve problems.	
<p>8.D.4 Formulate and solve linear and quadratic equations and linear inequalities algebraically and investigate nonlinear inequalities using graphs, tables, calculators and computers.</p>	<p>Student Edition: 250-255, 277, 310-315, 316-321, 468-473, 474-477, 478-480, 483-486, 498-499, 504-508, 509-513, 514-518, 572-577</p> <p>Teacher Wraparound Edition: EC 315; RA 471</p> <p>Teacher’s Resources: <i>Algebra: Noteables</i> 126-128, 154-156, 157-159, 230-232, 233-234, 235-236, 247-253 <i>Algebra Practice Workbook</i> 37, 45, 46, 68, 69, 70, 72, 73 <i>Algebra Resource Masters</i> Chapter 6, 258; Chapter 7, 309-312; Chapter 11, 483-491, 493-496, 498-501; Chapter 12, 523-526, 528-536; Chapter 13, 593-596</p>
STATE GOAL 9: Use geometric methods to analyze, categorize and draw conclusions about points, lines, planes and space.	
<p>Why This Goal Is Important: Geometry provides important methods for reasoning and solving problems with points, lines, planes and space. The word “geometry” comes from Greek words meaning “measurement of the Earth.” While we use modern technology and employ a wider variety of mathematical tools today, we still study geometry to understand the shapes and dimensions of our world. The applications of geometry are widespread in construction, engineering, architecture, mapmaking and art. Historically, geometry is a way to develop skill in forming convincing arguments and proofs. This goal of developing a means of argument and validation remains an important part of our reasons for studying geometry today.</p>	
A. Demonstrate and apply geometric concepts involving points, lines, planes and space.	
<p>9.A.4a Construct a model of a three-dimensional figure from a two-dimensional pattern.</p>	<p>Student Edition: 444 #43, 477 #33, 584 #23, 758 <i>Hands-On Algebra</i> 25</p> <p>Teacher’s Resources: <i>Algebra Resource Masters</i> Chapter 11, 492</p>
<p>9.A.4b Make perspective drawings, tessellations and scale drawings, with and without the use of technology.</p>	<p>Student Edition: 69 #61, 77-79, 88, 194-197, 425 #55, 473 #26, 739 #13, 743 #11, #14, 749 #5 <i>Preparing for Standardized Tests</i> 378 #2</p> <p>Teacher Wraparound Edition: EC 197; IE 77; RA 196</p> <p>Teacher’s Resources: <i>Algebra: Noteables</i> 99-100 <i>Algebra Resource Masters</i> Chapter 5, 200-203</p>

STANDARDS	PAGE REFERENCES
B. Identify, describe, classify and compare relationships using points, lines, planes and solids.	
<p>9.B.4 Recognize and apply relationships within and among geometric figures.</p>	<p>Student Edition: 63 #37, 69 #61, 77 #9, 79 #49, 327 #40, 425 #55, 473 #26, 611 #10, 619 #40, 743 #11, #14, 749 #5 <i>Investigation</i> 426-427 <i>Preparing for Standardized Tests</i> 546 #1, #2, 635 #4, 681 #9 <i>Quiz 1</i> #10</p> <p>Teacher Wraparound Edition: ML 194</p>
C. Construct convincing arguments and proofs to solve problems.	
<p>9.C.4a Construct and test logical arguments for geometric situations using technology where appropriate.</p>	<p>Student Edition: <i>Investigation</i> 372-373 <i>Preparing for Standardized Tests</i> 378 #2, 547 #10</p> <p>Teacher’s Resources: <i>Algebra Resource Masters</i> Chapter 8, 383</p>
<p>9.C.4b Construct and communicate convincing arguments for geometric situations.</p>	<p>Student Edition: 63 #37, 79 #49, 275 #29, 327 #40, 369 #1, #2 <i>Preparing for Standardized Tests</i> 547 #10</p> <p>Teacher Wraparound Edition: EC 327; RA 196</p> <p>Teacher’s Resources: <i>Algebra Resource Masters</i> Chapter 8, 383</p>
<p>9.C.4c Develop and communicate mathematical proofs (e.g., two-column, paragraph, indirect) and counter examples for geometric statements.</p>	<p>Student Edition: 327 #40, 369 #1, #2 <i>Investigation</i> 372-373 <i>Preparing for Standardized Tests</i> 547 #10</p> <p>Teacher Wraparound Edition: EC 327</p> <p>Teacher’s Resources: <i>Algebra Resource Masters</i> Chapter 8, 383</p>

STANDARDS	PAGE REFERENCES
D. Use trigonometric ratios and circular functions to solve problems.	
<p>9.D.4 Analyze and solve problems involving triangles (e.g., distances which cannot be measured directly) using trigonometric ratios.</p>	<p>Student Edition: 619 #40 (limited to the Pythagorean Theorem) <i>Investigation</i> 372-373 <i>Preparing for Standardized Tests</i> 378-379, 546-547, 680 #1</p> <p>Teacher’s Resources: <i>Algebra: Noteables</i> 181-182 <i>Algebra Practice Workbook</i> 54 <i>Algebra Resource Masters</i> Chapter 14, 632</p>
STATE GOAL 10: Collect, organize and analyze data using statistical methods; predict results; and interpret uncertainty using concepts of probability.	
<p>Why This Goal Is Important: The ability to understand and interpret data (e.g., opinion polls, stock prices, tax rates, crime statistics, scientific studies, weather reports) grows more important each day. Students must be able to organize data, make sense of variables and patterns, and judge the logical reasonableness of any claims and interpretations made. Even very young students can count objects and communicate their findings with charts and graphs. Students of all ages can collect, display and interpret data to answer specific questions. They also must construct and analyze arguments that involve data and its interpretation. All students need to understand and apply the role probability plays in data collection and decision making. Data analysis and use are important abilities necessary for all careers.</p>	
A. Organize, describe and make predictions from existing data.	
<p>10.A.4a Represent and organize data by creating lists, charts, tables, frequency distributions, graphs, scatterplots and box-plots.</p>	<p>Student Edition: 32-37, 38-43, 46, 47 #19, #20, 57 #51, 134 #57, 175 #48, 302-307, 330 #41, 693 #5-#8, 724 #6 <i>Investigation</i> 210-211, 263, 308-309, 674-675 <i>Preparing for Standardized Tests</i> 185 #10, 281 #10, 333</p> <p>Teacher Wraparound Edition: IE 33, 39, 304; OA 43, 307; RA 34, 304</p> <p>Teacher’s Resources: <i>Algebra: Noteables</i> 15-22, 151-153 <i>Algebra Practice Workbook</i> 6, 7, 44 <i>Algebra Resource Masters</i> Chapter 1, 26-29, 31-34, 42, 44, 48; Chapter 7, 304-308</p>

STANDARDS	PAGE REFERENCES
<p>10.A.4b Analyze data using mean, median, mode, range, variance and standard deviation of a data set, with and without the use of technology.</p>	<p>Student Edition: 104-109, 121 #42, 131 #41, 134 #57, 135 #13, 240 #3, 243 #33 <i>Investigation</i> 210-211 <i>Preparing for Standardized Tests</i> 184 #1, 185 #7, 281 #10</p> <p>Teacher Wraparound Edition: EA 241; FA 108; RA 107</p> <p>Teacher’s Resources: <i>Algebra: Noteables</i> 55-56 <i>Algebra Practice Workbook</i> 16 <i>Algebra Resource Masters</i> Chapter 3, 105-109; Chapter 8, 363</p>
<p>10.A.4c Predict from data using interpolation, extrapolation and trend lines, with and without the use of technology.</p>	<p>After defining the terms, the following pages will meet this standard.</p> <p>Student Edition: 38-43, 47 #20, 208 #27, 241 #8, 302-307, 745 <i>Investigation</i> 308-309</p> <p>Teacher Wraparound Edition: EC 43; TT 303</p> <p>Teacher’s Resources: <i>Algebra: Noteables</i> 19-22, 151-153 <i>Algebra Practice Workbook</i> 7 <i>Algebra Resource Masters</i> Chapter 1, 31-34</p>
<p>B. Formulate questions, design data collection methods, gather and analyze data and communicate findings.</p>	
<p>10.B.4 Design and execute surveys or experiments, gather data to answer relevant questions, and communicate results and conclusions to an audience using traditional methods and contemporary technology.</p>	<p>Student Edition: 32-37, 40, 175 #48, 208 #27 <i>Preparing for Standardized Tests</i> 184 #2</p> <p>Teacher Wraparound Edition: EA 35; EC 131; ML 32</p> <p>Teacher’s Resources: <i>Algebra: Noteables</i> 15-18 <i>Algebra Resource Masters</i> Chapter 1, 31-34</p>

STANDARDS	PAGE REFERENCES
C. Determine, describe and apply the probabilities of events.	
<p>10.C.4a Solve problems of chance using the principles of probability including conditional settings.</p>	<p>Student Edition: 219-223, 232, 243 #27, #28, 315 #43-#45, 398 #76, #77, 467 #35, 539 #42, 619 #50, 726 <i>Preparing for Standardized Tests</i> 281 #1</p> <p>Teacher Wraparound Edition: ICE 221; ML 219</p> <p>Teacher’s Resources: <i>Algebra: Noteables</i> 109-110 <i>Algebra Practice Workbook</i> 33 <i>Algebra Prerequisite Skills Workbook</i> 99-100 <i>Algebra Resource Masters</i> Chapter 5, 220-223, 229, 241</p>
<p>10.C.4b Design and conduct simulations (e.g., waiting times at restaurant, probabilities of births, likelihood of game prizes), with and without the use of technology.</p>	<p>Student Edition: 219-223, 467 #35, 539 #42</p> <p>Teacher Wraparound Edition: HOA 220</p>
<p>10.C.4c Propose and interpret discrete probability distributions, with and without the use of technology.</p>	<p>Student Edition: 146-151, 183 #8-#10, 224-229, 243 #30, 279 #24, 315 #40, 321 #37, 699 <i>Investigation</i> 110-111, 152-153, 494-495 <i>Preparing for Standardized Tests</i> 280-281, 333 #7</p> <p>Teacher Wraparound Edition: EC 151, 229; TT 148; WC 111</p> <p>Teacher’s Resources: <i>Algebra: Noteables</i> 74-75 <i>Algebra Practice Workbook</i> 22 <i>Algebra Resource Masters</i> Chapter 4, 151-154, 190; Chapter 5, 225-228</p>