



COLORADO
Content Standards Mathematics Grades 9-12
***Algebra: Concepts and Applications* © 2004**

OBJECTIVES	PAGE REFERENCES
STANDARD 1: Students develop number sense and use numbers and number relationships in problem-solving situations and communicate the reasoning used in solving these problems. In order to meet this standard, a student will	
<ul style="list-style-type: none"> construct and interpret number meanings through real-world experiences* and the use of hands-on materials; 	SE: 54 Ex 5, 66-69, 72-74, 78-79, 83 Ex 4, 103 #33-35 TWE: ML 52 RA 97
<ul style="list-style-type: none"> represent and use numbers in a variety of equivalent forms (<i>for example, fractions, decimals, percents, exponents*, scientific notation*</i>); 	SE: 198-203, 204-209, 336-340, 341-345, 347-351, 352-356 TWE: ML 199 OA 356 <i>Enrichment Masters</i> 48, 50
<ul style="list-style-type: none"> know the structure and properties of the real number system* (<i>for example, primes*, factors, multiples, relationships among sets of numbers</i>); and 	SE: 14-18, 52, 433 #49-53, 420-425, 600-605, 662 <i>Graphing Calculator Exploration</i> 421 <i>Enrichment Masters</i> 60
<ul style="list-style-type: none"> use number sense, including estimation and mental arithmetic, to determine the reasonableness of solutions. 	SE: 24-25 Ex 1, 161 Ex 4, 191 Ex 6, 253 Ex 8, 292 Ex 4, 340 #43, 362-363, 368-369 Ex 4, 480 Ex 3, 485
GRADES 9-12 As students in grades 9-12 extend their knowledge, what they know and are able to do includes	
<ul style="list-style-type: none"> demonstrating meanings for real numbers, absolute value*, and scientific notation using physical materials and technology in problem-solving situations; 	SE: 54, 128-131, 134 #58, 135 #25, 352-356, 530-534, 600-601
<ul style="list-style-type: none"> developing, testing, and explaining conjectures about properties of number systems and sets of numbers; and 	SE: 10, 14-16 TWE: ML 14 <i>Enrichment Masters</i> 3
<ul style="list-style-type: none"> using number sense to estimate and justify the reasonableness of solutions to problems involving real numbers. 	SE: 362-363 <i>Investigation</i> 308 Also see Standard 1 bullet #4.
STANDARD 2 Students use algebraic methods to explore, model, and describe patterns and functions involving numbers, shapes, data, and graphs in problem-solving situations and communicate the reasoning used in solving these problems. In order to meet this standard, a student will	
<ul style="list-style-type: none"> identify, describe, analyze, extend, and create a wide variety of patterns in numbers, shapes, and data; 	SE: 69 #73, 170 #49, 219, 224, 302-307, 315 #40, 489-493, <i>Investigation</i> 110-111, 494-495 <i>Enrichment Masters</i> 58, 80

OBJECTIVES	PAGE REFERENCES
<ul style="list-style-type: none"> describe patterns using mathematical language; 	SE: 255 #42, 284-287, 302-307, 316-321, 341-344, 464-467, 493 #25 <i>Graphing Calculator Exploration</i> 317 <i>Hands-On Algebra</i> 324 <i>Enrichment Masters</i> 66
<ul style="list-style-type: none"> solve problems and model real-world situations using patterns and functions; 	SE: 292 Ex 4, 295 #40, 300 #46, 303-307, 467 #27-28, 472-473 #24-26, 478, 486 #27 <i>Investigation</i> 262-263, 270-271
<ul style="list-style-type: none"> compare and contrast different types of functions; and 	SE: 256-261, 270, 316-321, 458-463, 464-468 <i>Graphing Calculator Exploration</i> 317
<ul style="list-style-type: none"> describe the connections among representations of patterns and functions, including words, tables, graphs, and symbols. 	SE: 250-255, 256-261, 458-463, 468-473, 489-493 <i>Investigation</i> 262-263 TWE: ML 458
GRADES 9-12 As students in grades 9-12 extend their knowledge, what they know and are able to do includes	
<ul style="list-style-type: none"> modeling real-world phenomena (<i>for example, distance-versus-time relationships, compound interest, amortization tables, mortality rates</i>) using functions, equations, inequalities, and matrices*; 	SE: 264-269, 270-275, 293 #14, 485-486, 492-493 #22-25, 575 Ex 5, 643 #61 <i>Investigation</i> 494-495, 578-579 <i>Math in the Workplace</i> 591
<ul style="list-style-type: none"> representing functional relationships using written explanations, tables, equations, and graphs, and describing the connections among these representations; 	SE: 256-261, 264-269, 270-275, 302-309, 458-463, 489-493 <i>Investigation</i> 262-263
<ul style="list-style-type: none"> solving problems involving functional relationships using graphing calculators and/or computers as well as appropriate paper-and-pencil techniques; 	SE: 302-309, 458-463, 464-467, 468-473, 475 Ex 2, 483-487, 489-493, 524-529 <i>Graphing Calculator Exploration</i> 317, 521
<ul style="list-style-type: none"> analyzing and explaining the behaviors, transformations*, and general properties of types of equations and functions (<i>for example, linear, quadratic*, exponential*</i>); and 	SE: 284-289, 290-295, 310-315, 316-321, 323-327, 458-463, 464-467, 489-493 <i>Hands-On Algebra</i> 324 <i>Graphing Calculator Exploration</i> 317
<ul style="list-style-type: none"> interpreting algebraic equations and inequalities geometrically and describing geometric relationships algebraically. 	SE: 117-121, 122, 128, 366-371, 388-393, 394-398, 399-404, 431 Ex 3, 437-439 <i>Investigation</i> 372-373 <i>Hands-On Algebra</i> 511 <i>Enrichment Masters</i> 33, 57
STANDARD 3: Students use data collection and analysis, statistics, and probability in problem-solving situations and communicate the reasoning used in solving these problems. In order to meet this standard, a student will	
<ul style="list-style-type: none"> solve problems by systematically collecting, organizing, describing, and analyzing data using surveys, tables, charts, and graphs; 	SE: 32-37, 38-43, 104-109, 198-203, 302-307, 308-309 <i>Investigation</i> 210-211, 308-309 TWE: ML 303

OBJECTIVES	PAGE REFERENCES
<ul style="list-style-type: none"> make valid inferences, decisions, and arguments based on data analysis; and 	SE: <i>Investigation</i> 210-211 TWE: EC 307 IE 303, 304 OA 307 <i>Study Guide Masters</i> 44
<ul style="list-style-type: none"> use counting techniques, experimental probability, or theoretical probability, as appropriate, to represent and solve problems involving uncertainty. 	SE: 219-223, 224-229 TWE: IE 220, 221 ML 224 OA 223 <i>Practice Masters</i> 33 <i>Student Guide Masters</i> 33 <i>Enrichment Masters</i> 33
GRADES 9-12	
As students in grades 9-12 extend their knowledge, what they know and are able to do includes	
<ul style="list-style-type: none"> designing and conducting a statistical experiment to study a problem, and interpreting and communicating the results using the appropriate technology (<i>for example, graphing calculators, computer software</i>); 	SE: <i>Graphing Calculator Exploration</i> 105 TWE: HA 220, 225 IE 225 ML 219, 224
<ul style="list-style-type: none"> analyzing statistical claims for erroneous conclusions or distortions; 	SE: 32-37, 43 #24, #25, #26 TWE: EA 42, 228
<ul style="list-style-type: none"> fitting curves to scatter plots, using informal methods or appropriate technology, to determine the strength of the relationship between two data sets and to make predictions; 	SE: 302-307 <i>Investigation</i> 308-309 <i>Workshop</i> 237 <i>Graphing Calculator Exploration</i> 491 TWE: OA 307 <i>Enrichment Masters</i> 44 <i>Practice Masters</i> 44
<ul style="list-style-type: none"> drawing conclusions about distributions of data based on analysis of statistical summaries (<i>for example, the combination of mean and standard deviation, and differences between the mean and median</i>); 	SE: 104-109 TWE: IE 105 ML 104
<ul style="list-style-type: none"> using experimental and theoretical probability to represent and solve problems involving uncertainty (<i>for example, the chance of playing professional sports if a student is a successful high school athlete</i>); and 	SE: 219-223, 224-229, 229 # 8, <i>Enrichment Masters</i> 34
<ul style="list-style-type: none"> solving real-world problems with informal use of combinations and permutations* (<i>for example, determining the number of possible meals at a restaurant featuring a given number of side dishes</i>). 	SE: 146-151 <i>Investigation</i> 152-153 TWE: EC 151 IE 147, 148 ML 146 OA 151 <i>Enrichment Masters</i> 22 <i>Practice Masters</i> 22 <i>Study Guide Masters</i> 22

OBJECTIVES	PAGE REFERENCES
STANDARD 4: Students use geometric concepts, properties, and relationships in problem-solving situations and communicate the reasoning used in solving these problems. In order to meet this standard, a student will	
<ul style="list-style-type: none"> connect various physical objects with their geometric representation; 	SE: 177 Ex 3, 288 #12, 371 #35, 393 #43, 397 #62, 414 #58, 431 Ex 6, 460 Ex 4 <i>Investigation</i> 410-411 TWE: ML 458
<ul style="list-style-type: none"> connect mathematical concepts from across the standards with their geometric representations; 	SE: 394, 399, 405-407, 480 Ex 3, 584 # 23, 653, 659 Ex 10 <i>Hands-On Algebra</i> 388-389, 400
<ul style="list-style-type: none"> recognize, draw, describe, and analyze geometric shapes in one, two, and three dimensions; 	SE: 323 Ex 2, 366-371, 387 #56, 402 Ex 7, 403 #20, 610 #28
<ul style="list-style-type: none"> make, investigate, and test conjectures about geometric ideas; and 	SE: 599 <i>Hands-On Algebra</i> 511 TWE: ML 366
<ul style="list-style-type: none"> solve problems and model real-world situations using geometric concepts. 	SE: 12 #53, 27 #6, 168 #48, 174 #36, 340 #42, 393 #43, 404 #53, 599, 623 #37 <i>Investigation</i> 540-541
GRADES 9-12 As students in grades 9-12 extend their knowledge, what they know and are able to do includes	
<ul style="list-style-type: none"> finding and analyzing relationships among geometric figures using transformations (<i>for example, reflections, translations, rotations, dilations*</i>) in coordinate systems*; 	SE: 69 #61, 77 Ex 9, 458-463, 464-467 TWE: IE 464, 465 ML 464 <i>Enrichment Masters</i> 66 <i>Practice Masters</i> 66 <i>Study Guide Masters</i> 66
<ul style="list-style-type: none"> deriving and using methods to measure perimeter, area, and volume of regular and irregular geometric figures; 	SE: 247 Ex 5, 391, 402 Ex 7, 403 # 20, 442 Ex 4, 443 # 12, 476 Ex 4, 478-480
<ul style="list-style-type: none"> making and testing conjectures about geometric shapes and their properties, incorporating technology where appropriate; and 	SE: 366-371 TWE: ML 366 TT 368
<ul style="list-style-type: none"> using trigonometric ratios* in problem-solving situations (<i>for example, finding the height of a building from a given point, if the distance to the building and the angle of elevation are known</i>). 	See Glencoe's <i>Geometry: Concepts and Applications</i> © 2004 SE: 566 #3, 568 #5-7, 569 #20, 573 #2, 575 #11, 576 #34, 577 #36-38, 580 #35 <i>Investigation</i> 570-571, 598-599
STANDARD 5: Students use a variety of tools and techniques to measure, apply the results in problem-solving situations, and communicate the reasoning used in solving these problems. In order to meet this standard, a student will	
<ul style="list-style-type: none"> understand and apply the attributes of length, capacity*, weight, mass, time, temperature, perimeter, area, volume, and angle measurement in problem-solving situations; 	SE: 23 #41, 25, 28 #15, 29 #17, 115 #38, 176-178, 190-191 Ex 3-6, 247 Ex 5 <i>Hands-On Algebra</i> 25 <i>Investigation</i> 262-263, 372-373

OBJECTIVES	PAGE REFERENCES
<ul style="list-style-type: none"> make and use direct and indirect measurements to describe and compare real-world phenomena; 	SE: 190-191, 194-197, 253 Ex 8, 265-266 Ex 3-4 <i>Investigation 262-263</i>
<ul style="list-style-type: none"> understand the structure and use of systems of measurement; 	SE: 190-193 <i>Enrichment Masters 76</i>
<ul style="list-style-type: none"> describe and use rates of change (<i>for example, temperature as it changes throughout the day, or speed as the rate of change of distance over time</i>) and other derived measures; and 	SE: 166 Ex 4, 240 Ex 3, 273 Ex 3, 285 Ex 3, 670-671 Ex 5
<ul style="list-style-type: none"> select appropriate units, including metric and U. S. customary, and tools (<i>for example, rulers, protractors, compasses, thermometers</i>) to measure to the degree of accuracy required to solve a given problem. 	SE: <i>Hands-On Algebra 25, 372-373</i> <i>Enrichment Masters 76</i>
GRADES 9-12	
As students in grades 9-12 extend their knowledge, what they know and are able to do includes	
<ul style="list-style-type: none"> measuring quantities indirectly using techniques of algebra, geometry, or trigonometry*; 	SE: 391-392 Ex 7, 396-397, 399, 431 Ex 5, 433, 437-439 <i>Hands-On Algebra 400</i> TWE: IE 431 <i>Enrichment Masters 62</i>
<ul style="list-style-type: none"> selecting and using appropriate techniques and tools to measure quantities in order to achieve specified degrees of precision, accuracy, and error (or tolerance) of measurements; and 	<i>Enrichment Masters 76</i>
<ul style="list-style-type: none"> determining the degree of accuracy of a measurement (<i>for example, by understanding and using significant digits</i>). 	See Glencoe's <i>Geometry: Concepts and Applications</i> © 2004 SE: 29-32, 58 #3, 59 #3, 428 TWE: EC 418
STANDARD 6: Students link concepts and procedures as they develop and use computational techniques, including estimation, mental arithmetic, paper-and-pencil, calculators, and computers, in problem-solving situations and communicate the reasoning used in solving these problems. In order to meet this standard, a student will	
<ul style="list-style-type: none"> model, explain, and use the four basic operations - addition, subtraction, multiplication, and division - in problem-solving situations; 	SE: 64-69, 70-74, 75-79, 97-99, 100-103, 104-109, 122-127 <i>Hands-On Algebra 66</i> TWE: OA 79
<ul style="list-style-type: none"> develop, use, and analyze algorithms*; 	SE: 64-69, 70-74, 75-79, 82-85, 117-121, 122-127, 128-131 <i>Investigation 80-81, 110-111</i> <i>Hands-On Algebra 66</i>
<ul style="list-style-type: none"> select and apply appropriate computational techniques to solve a variety of problems and determine whether the results are reasonable. 	SE: 112-116, 117-121, 122-127, 128-131, 146-151, 154-159, 160-164, 165-170, 188-193 <i>Investigation 152-153</i>

OBJECTIVES	PAGE REFERENCES
GRADES 9-12	
As students in grades 9-12 extend their knowledge, what they know and are able to do includes	
<ul style="list-style-type: none"> using ratios, proportions, and percents in problem-solving situations; 	SE: 112 #29, 188-193, 194-197, 198-203, 204-209, 212-217, 229 #26 <i>Investigation</i> 210-211 <i>Enrichment Masters</i> 28
<ul style="list-style-type: none"> selecting and using appropriate methods for computing with real numbers in problem-solving situations from among mental arithmetic, estimation, paper-and-pencil, calculator, and computer methods, and determining whether the results are reasonable; and 	SE: 24-25 Ex 1, 70-74, 161-163, 165-170, 176-179, 191 Ex 6, 253 Ex 8, 292 Ex 4, 368-369 Ex 4, 480 Ex 3
<ul style="list-style-type: none"> describing the limitations of estimation, and assessing the amount of error resulting from estimation within acceptable limits. 	SE: <i>Workshop</i> 283

Codes Used for TWE Pages

EA	Error Analysis
EC	Extra Credit
HA	Hands on Application
IE	In-Class Examples
ML	Motivating the Lesson
OA	Open-ended Assessment
RA	Reteaching Activity
TT	Teaching Tip