COLORADO
Content Standards Mathematics Grades 9-12
Geometry: 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	
• construct and interpret number meanings through real-world experiences* and the use of hands-on materials;	SE: 50-53, 54 #10, 55 #29, 56-58, 59 #10, 60 #29, 61 #35, 72 #24-33, 73 #44 *Hands-On Geometry* 69-70
• represent and use numbers in a variety of equivalent forms (*for example, fractions, decimals, percents, exponents*, scientific notation**);	SE: 50-53, 54 #11-16, 55 #37, 147 #59, 214 #28, 273 #3, 347 #3, 583 #2, 720-721 *Problem-Solving Workshop* 89
• know the structure and properties of the real number system* (*for example, primes*, factors, multiples, relationships among sets of numbers*); and	SE: 50-53, 54 #11-16, 57, 127 #27, 279, 548, 641 #10, 642 #19 *Problem-Solving Workshop* 453 TWE: 5MC 56
• use number sense, including estimation and mental arithmetic, to determine the reasonableness of solutions.	SE: 37 #4, 64 #3, 98 #7, 176 #6, 190 #3, 258 #3, 297 #3, 421 #4, 530 #2, 555 #1
GRADES 9-12 As students in grades 9-12 extend their knowledge, what they know and are able to do includes	
• demonstrating meanings for real numbers, absolute value*, and scientific notation using physical materials and technology in problem-solving situations;	SE: 50-53, 54 #10, 55 #29, 56-58, 59 #10, 60 #29, 61 #35, 72 #24-31, 73 #44 *Hands-On Geometry* 69-70
• developing, testing, and explaining conjectures about properties of number systems and sets of numbers; and	SE: 6-7, 46, 50-53, 54 #4, 87 #9, 493 #10, *Hands-On Geometry* 65 *Problem-Solving Workshop* 453
• using number sense to estimate and justify the reasonableness of solutions to problems involving real numbers.	SE: 37 #4, 64 #3, 98 #7, 176 #6, 190 #3, 258 #3, 297 #3, 421 #4, 530 #2, 555 #1
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	
• identify, describe, analyze, extend, and create a wide variety of patterns in numbers, shapes, and data;	SE: 4-5, 8 #27-31, 17 #38, 133 #32, 161 #38, 493 #9 *Hands-On Geometry* 283 *Investigation* 10-11 *Problem-Solving Workshop* 3, 187

OBJECTIVES	PAGE REFERENCES
• describe patterns using mathematical language;	SE: 4-5, 7 #3, 9 #36, 17 #33-36, 153 #50 *Hands-On Geometry* 283 *Investigation* 10-11 *Problem-Solving Workshop* 3
• solve problems and model real-world situations using patterns and functions;	SE: 133 #32, 161 #38, 178 #35, 179 #36, 492 *Investigation* 10-11
• compare and contrast different types of functions; and	SE: 174-176, 177 #12, 178 #35, 179 #38-39, 492-493 *Investigation* 502-503 *Problem-Solving Workshop* 3
• describe the connections among representations of patterns and functions, including words, tables, graphs, and symbols.	SE: 168-171, 174-176, 179 #38-39 *Investigation* 10-11
GRADES 9-12 As students in grades 9-12 extend their knowledge, what they know and are able to do includes	
• modeling real-world phenomena (*for example, distance-versus-time relationships, compound interest, amortization tables, mortality rates*) using functions, equations, inequalities, and matrices*;	SE: 264 #3, 265 #11, 365 #3, 366 #5, 367 #14, 373 #24, 392 #12, 521 #15, 619 #2 *Math In the Workplace* 623
• representing functional relationships using written explanations, tables, equations, and graphs, and describing the connections among these representations;	SE: 168-171, 174-176, 179 #38-39, 352 #4, 354 #43, 618-619, 621 #28-29, 622 #31 *Investigation* 10-11, 380-381
• solving problems involving functional relationships using graphing calculators and/or computers as well as appropriate paper-and-pencil techniques;	SE: 168-171, 425-428, 504-508, 606-608 *Graphing Calculator Exploration* 79, 112, 193, 246, 290, 371
• analyzing and explaining the behaviors, transformations*, and general properties of types of equations and functions *(for example, linear, quadratic*, exponential**); and	SE: 168-171, 174-176, 177 #1-2, 179 #36, 276-279, 618-619, 687-688, 692-693, 697-700, 703-704
• interpreting algebraic equations and inequalities geometrically and describing geometric relationships algebraically.	SE: 174-176, 256-259, 262-264, 618-619, 622 #30, 676-678, 681-683 *Investigation* 432-433, 708-709 *Math In the Workplace* 691
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	
• solve problems by systematically collecting, organizing, describing, and analyzing data using surveys, tables, charts, and graphs;	SE: 101 #29, 133 #32, 179 #38-39, 184-185, 219 #29, 277 #2, 354 #42, 443 #19, 466 #36, 501 #33
• make valid inferences, decisions, and arguments based on data analysis; and	SE: 101 #29, 133 #32, 179 #38-39, 184-185, 219 #29, 277 #2, 354 #42, 443 #19, 466 #36, 501 #33
• use counting techniques, experimental probability, or theoretical probability, as appropriate, to represent and solve problems involving uncertainty.	SE: 138, 438 #29, 484

OBJECTIVES	PAGE REFERENCES
GRADES 9-12 As students in grades 9-12 extend their knowledge, what they know and are able to do includes	
• designing and conducting a statistical experiment to study a problem, and interpreting and communicating the results using the appropriate technology (*for example, graphing calculators, computer software*);	See Glencoe's *Algebra: Concepts and Applications* © 2004 pages 219-221.
• analyzing statistical claims for erroneous conclusions or distortions;	See Glencoe's *Algebra: Concepts and Applications* © 2004 pages 32-37.
• 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: 7 #5, 9 #36, 133 #32, 179 #38-39, 184-185, 219 #29, 267 #34, 332 #55, 653 #16, 680 #30
• drawing conclusions about distributions of data based on analysis of statistical summaries (*for example, the combination of mean and standard deviation, and differences between the mean and median*);	SE: 224, 225 #7, 298 #4, 305 #25, 307 #5, 347 #7, 418 #30, 583 #8, 665 #32, 715 #4
• using experimental and theoretical probability to represent and solve problems involving uncertainty (*for example, the chance of playing professional sports if a student is a successful high school athlete*); and	SE: 138, 438 #29, 484
• solving real-world problems with informal use of combinations and permutations* (*for example, determining the number of possible meals at a restaurant featuring a given number of side dishes*).	SE: 138 See Glencoe's *Algebra: Concepts and Applications* © 2004 pages 152-153.
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	
• connect various physical objects with their geometric representation;	SE: 21 #8, 94 #25, 127 #22, 136 #39, 153 #41, 172 #9, 213 #7, 321 #28, 512 #4 *Problem-Solving Workshop* 3
• connect mathematical concepts from across the standards with their geometric representations;	SE: 4-7, 50-53, 57-58, 68-70, 138-139, 174-176, 224-225, 434-435, 548-551, 564-567
• recognize, draw, describe, and analyze geometric shapes in one, two, and three dimensions;	SE: 174-176, 402-407, 454-456, 496-498, 504-507, 510-512, 516-519, 522-525, 528-530, 534-537
• make, investigate, and test conjectures about geometric ideas; and	SE: 6, 17 #37, 638-640, 662 #3-4, 664 #16-22 *Graphing Calculator Exploration* 193, 316-317 *Hands-On Geometry* 65
• solve problems and model real-world situations using geometric concepts.	SE: 109 #24, 133 #32, 167 #23, 172 #9, 358 #3, 365 #3, 421 #4 *Investigation* 10-11, 154-155 *Math In the Workplace* 95

OBJECTIVES	PAGE REFERENCES
GRADES 9-12 As students in grades 9-12 extend their knowledge, what they know and are able to do includes	
• finding and analyzing relationships among geometric figures using transformations (*for example, reflections, translations, rotations, dilations**) in coordinate systems*;	SE: 198-200, 203-205, 207 #29-31, 210-212, 215-217, 219 #23 *Investigation* 208-209
• deriving and using methods to measure perimeter, area, and volume of regular and irregular geometric figures;	SE: 35-38, 413-421, 425-428, 504-507, 510-513, 516-519 *Investigation* 432-433
• making and testing conjectures about geometric shapes and their properties, incorporating technology where appropriate; and	SE: *Graphing Calculator Exploration* 316, 371, 427, 478, 504 *Investigation* 154-155, 244-245, 380-381, 432-433, 502-503
• using trigonometric ratios* in problem-solving situations (*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*).	SE: 566 #3, 568 #5-7, 569 #20, 573 #2, 575 #11, 576 #34, 577 #36-38, 580 #35 *Investigation* 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	
• understand and apply the attributes of length, capacity*, weight, mass, time, temperature, perimeter, area, volume, and angle measurement in problem-solving situations;	SE: 57-58, 59 #10, 60 #29, 61 #35, 414 #2, 429 #15, 444 #22, 482 #29, 512 #4, 566 #3
• make and use direct and indirect measurements to describe and compare real-world phenomena;	SE: 58, 60 #29, 262-264, 265 #11, 366 #5, 373 #22-24, 564-567, 568 #5-6, 579 #20 *Investigation* 570-571
• understand the structure and use of systems of measurement;	SE: 50-53, 57-58, 60 #29, 265 #11, 362-365, 373 #22-24, 564-567 *Hands-On Geometry* 283, 474 *Investigation* 570-571
• describe and use rates of change (*for example, temperature as it changes throughout the day, or speed as the rate of change of distance over time*) and other derived measures; and	SE: 168-171, 172 #9, 174-176, 179 #36
• select appropriate units, including metric and U. S. customary, and tools (*for example, rulers, protractors, compasses, thermometers*) to measure to the degree of accuracy required to solve a given problem.	SE: 57-58, 59 #8-9, 60 #29, 96-97, 109 #24, 354 #44, 358 #3, 444 #22, 512 #4, 532 #15
GRADES 9-12 As students in grades 9-12 extend their knowledge, what they know and are able to do includes	
• measuring quantities indirectly using techniques of algebra, geometry, or trigonometry*;	SE: 262-264, 265 #11, 366 #5, 373 #22-24, 564-567, 568 #5-6, 579 #27, 580 #35 *Investigation* 570-571

OBJECTIVES	PAGE REFERENCES
• 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	SE: 29-32, 58 #3, 59 #3, 428 TWE: EC 418
• determining the degree of accuracy of a measurement (*for example, by understanding and using significant digits*).	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	
• model, explain, and use the four basic operations - addition, subtraction, multiplication, and division - in problem-solving situations;	SE: 56-57, 76-78, 262-264, 276-279, 649, 651, 718, 722-725
• develop, use, and analyze algorithms*; and	SE: 654 *Graphing Calculator Exploration* 32, 79, 112 *Hands-On Geometry* 65, 99, 107, 162, 425 *Math In the Workplace* 691
• select and apply appropriate computational techniques to solve a variety of problems and determine whether the results are reasonable.	SE: 421 #4, 444 #22, 484 #3, 487 #26, 508 #4, 521 #15, 525 #7, 533 #23, 619 #2 *Math In the Workplace* 431
GRADES 9-12 As students in grades 9-12 extend their knowledge, what they know and are able to do includes	
• using ratios, proportions, and percents in problem-solving situations;	SE: 350-352, 358 #3, 389-390, 398, 534-537, 564-567, 572-574 *Graphing Calculator Exploration* 478 *Investigation* 380-381, 570-571
• 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: 421 #4, 444 #22, 484 #3, 508 #4, 521 #15, 533 #23, 619 #2 *Graphing Calculator Exploration* 170, 426 *Math In the Workplace* 431
• describing the limitations of estimation, and assessing the amount of error resulting from estimation within acceptable limits.	SE: 171 #2, 225 #5, 267 #34, 347 #7, 479 #1 TWE: EC 418

Codes Used for TWE Pages

5MC	5-Minute Check
EC	Extra Credit