



NEW JERSEY
Core Curriculum Content Standards for Mathematics
Grade 7
Impact Mathematics: Algebra and More Course 2 © 2004

CONTENT STANDARDS	PAGE REFERENCES
Standard 4.1 (Number and Numerical Operations) All students will develop number sense and will perform standard numerical operations and estimations on all types of numbers in a variety of ways.	
Building upon knowledge and skills gained in preceding grades, by the end of Grade 7 , students will:	
A. Number Sense	
1. Extend understanding of the number system by constructing meanings for the following (unless otherwise noted, all indicators for grade 7 pertain to these sets of numbers as well): <ul style="list-style-type: none"> • Rational numbers • Percents • Whole numbers with exponents 	SE: 239 #46, 244 #5 TG: AM T66
2. Demonstrate a sense of the relative magnitudes of numbers.	SE: 218-219, 239 #50
3. Understand and use ratios, proportions, and percents (including percents greater than 100 and less than 1) in a variety of situations.	SE: 562-565, 566-567, 568-571, 572-574, 575-584 TG: I T566, T572
4. Compare and order numbers of all named types.	SE: 675 #12-#13 <i>Think & Discuss</i> 219
5. Use whole numbers, fractions, decimals, and percents to represent equivalent forms of the same number.	SE: 457 #2-#5, 543, 565 #5-#7, 567 #1-#2, 575 #2-#6 <i>Share & Summarize</i> 568
6. Understand that all fractions can be represented as repeating or terminating decimals.	TG: I T248
B. Numerical Operations	
1. Use and explain procedures for performing calculations with integers and all number types named above with: <ul style="list-style-type: none"> • Pencil-and-paper • Mental math • Calculator 	SE: 222-225, 226-227, 228-230, 234-235, 236-241, 243-244, 245-247, 248-249, 250 #1-#5
2. Use exponentiation to find whole number powers of numbers.	SE: 15 #9-#12, 16 #2-#6, 25 #22, 583 #39 TG: TD T15
3. Understand and apply the standard algebraic order of operations, including appropriate use of parentheses.	SE: 14-15, 65 #8-#19, 67 #1-#14, 70 #24-#29, 73 #65-#67, 75 #17-#19, 419-421, 422-425, 426-428, 429-433

CONTENT STANDARDS	PAGE REFERENCES
C. Estimation	
1. Use equivalent representations of numbers such as fractions, decimals, and percents to facilitate estimation.	SE: 457 #2-#5, 543, 565 #5-#7, 567 #1-#2, 575 #2-#6 <i>Share & Summarize</i> 568
Standard 4.2 (Geometry and Measurement) All students will develop spatial sense and the ability to use geometric properties, relationships, and measurement to model, describe and analyze phenomena.	
A. Geometric Properties	
1. Understand and apply properties of polygons. <ul style="list-style-type: none"> Quadrilaterals, including squares, rectangles, parallelograms, trapezoids, rhombi Regular polygons 	SE: 122 #3-#4, 516 #8
2. Understand and apply the concept of similarity. <ul style="list-style-type: none"> Using proportions to find missing measures Scale drawings Models of 3D objects 	SE: 461-463, 465 #5, 466 #14-#17, 468 #24, 469 #27, 472-474, 479 #8-#17, 480 #20 <i>In Your Own Words</i> 467 TG: SA 463
3. Use logic and reasoning to make and support conjectures about geometric objects.	SE: 469 #25, 486 #3, 494 #13, 511 #18, 516 #8 <i>Share & Summarize</i> 484, 488, 500
B. Transforming Shapes	
1. Understand and apply transformations. <ul style="list-style-type: none"> Finding the image, given the pre-image, and vice-versa Sequence of transformations needed to map one figure onto another Reflections, rotations, and translations result in images congruent to the pre-image Dilations (stretching/shrinking) result in images similar to the pre-image 	SE: 130-131, 132-134, 255-258, 259-262 TG: AL T452
C. Coordinate Geometry	
1. Use coordinates in four quadrants to represent geometric concepts.	SE: 259-261, 264-265, 279 #29
2. Use a coordinate grid to model and quantify transformations (e.g., translate right 4 units).	SE: 259-262
D. Units of Measurement	
1. Solve problems requiring calculations that involve different units of measurement within a measurement system (e.g., 4'3" plus 7'10" equals 12'1").	SE: 317 #6, 318 #8-#10 <i>Lab Investigation</i> 119
2. Select and use appropriate units and tools to measure quantities to the degree of precision needed in a particular problem-solving situation.	SE: 98-99 <i>Chapter Summary</i> 141 TG: AL T452 SA T452
3. Recognize that all measurements of continuous quantities are approximations.	See Glencoe's <i>Geometry</i> © 2005 pages 13-19.

CONTENT STANDARDS	PAGE REFERENCES
E. Measuring Geometric Objects	
1. Develop and apply strategies for finding perimeter and area. <ul style="list-style-type: none"> • Geometric figures made by combining triangles, rectangles and circles or parts of circles • Estimation of area using grids of various sizes 	SE: 482-484, 485-488, 489-491, 492-495
2. Recognize that the volume of a pyramid or cone is one-third of the volume of the prism or cylinder with the same base and height (e.g., use rice to compare volumes of figures with same base and height).	SE: 121 #6
Standard 4.3 (Patterns and Algebra) All students will represent and analyze relationships among variable quantities and solve problems involving patterns, functions, and algebraic concepts and processes.	
A. Patterns	
1. Recognize, describe, extend, and create patterns involving whole numbers, rational numbers, and integers. <ul style="list-style-type: none"> • Descriptions using tables, verbal and symbolic rules, graphs, simple equations or expressions • Finite and infinite sequences • Generating sequences by using calculators to repeatedly apply a formula 	SE: 245 #1-#4, 345-347, 348-350, 644-647, 648-649, 652-658 <i>Think & Discuss</i> 281
B. Functions and Relationships	
1. Graph functions, and understand and describe their general behavior. <ul style="list-style-type: none"> • Equations involving two variables 	SE: 351-353, 356 #5-#9, 359 #16, 364, 365-367, 368-370, 371-374, 625-626, 632-634, 635 #1
C. Modeling	
1. Analyze functional relationships to explain how a change in one quantity can result in a change in another, using pictures, graphs, charts, and equations.	SE: 321-325, 326-327, 328-329 TG: SA T326 TD T326
2. Use patterns, relations, symbolic algebra, and linear functions to model situations. <ul style="list-style-type: none"> • Using manipulatives, tables, graphs, verbal rules, algebraic expressions/equations/inequalities • Growth situations, such as population growth and compound interest, using recursive (e.g., NOW-NEXT) formulas (cf. science standard 5.5 and social studies standard 6.6) 	SE: 351-353, 356 #5-#9, 359 #16, 364, 365-367, 368-370, 371-374, 625-626, 632-634, 635 #1

CONTENT STANDARDS	PAGE REFERENCES
D. Procedures	
1. Use graphing techniques on a number line. <ul style="list-style-type: none"> • Absolute value • Arithmetic operations represented by vectors (arrows) (e.g., “-3 + 6” is “left 3, right 6”) 	SE: 218, 222-225, 226-227, 228-230, 236 #22-#23, 237 #24-#25
2. Solve simple linear equations informally and graphically. <ul style="list-style-type: none"> • Multi-step, integer coefficients only (although answers may not be integers) • Using paper-and-pencil, calculators, graphing calculators, spreadsheets, and other technology 	SE: 385-387, 392 #1-#7, 395-397, 410-411, 412, 413-414, 415-417, 419-421, 428 #12-#15, 430 #32-#41
3. Create, evaluate, and simplify algebraic expressions involving variables. <ul style="list-style-type: none"> • Order of operations, including appropriate use of parentheses • Substitution of a number for a variable 	SE: 21 #1, 23 #8a, 24 #10, 25 #27a, 26 #34b, 28 #41, 34-36, 46 #2a, 48 #13a, 50 #18
4. Understand and apply the properties of operations, numbers, equations, and inequalities. <ul style="list-style-type: none"> • Additive inverse • Multiplicative inverse 	SE: 627
Standard 4.4 (Data Analysis, Probability, and Discrete Mathematics) All students will develop an understanding of the concepts and techniques of data analysis, probability, and discrete mathematics, and will use them to model situations, solve problems, and analyze and draw appropriate inferences from data.	
A. Data Analysis	
1. Select and use appropriate representations for sets of data, and measures of central tendency (mean, median, and mode). <ul style="list-style-type: none"> • Type of display most appropriate for given data • Box-and-whisker plot, upper quartile, lower quartile • Scatter plot • Calculators and computer used to record and process information 	SE: 675 #14, 709, 710-713, 714-717, 718-722
2. Make inferences and formulate and evaluate arguments based on displays and analysis of data.	SE: 610-615, 616-622, 645-647, 652-659, 675 #14, 709, 710-713, 714-717, 718-722
B. Probability	
1. Interpret probabilities as ratios, percents, and decimals.	SE: 667, 671 #3, 672-673, 676-677 TG: I T666
2. Model situations involving probability with simulations (using spinners, dice, calculators and computers) and theoretical models. <ul style="list-style-type: none"> • Frequency, relative frequency 	SE: 673 #6, 693-694 <i>Explore</i> 692 <i>Share & Summarize</i> 668 <i>Think & Discuss</i> 666

CONTENT STANDARDS	PAGE REFERENCES
3. Estimate probabilities and make predictions based on experimental and theoretical probabilities.	SE: 682 #4, 693 #1, 694 #2, 700-701 <i>Explore</i> 692
4. Play and analyze probability-based games, and discuss the concepts of fairness and expected value.	SE: 674 #7, 676-677, 678-680, 681-682, 683-685, 686-690
C. Discrete Mathematics–Systematic Listing and Counting	
1. Apply the multiplication principle of counting. <ul style="list-style-type: none"> Permutations: ordered situations with replacement (e.g., number of possible license plates) vs. ordered situations without replacement (e.g., number of possible slates of 3 class officers from a 23 student class) 	SE: 666-667, 668-669, 670, 672 #2a, 673 #4a, 674 #7a
2. Explore counting problems involving Venn diagrams with three attributes (e.g., there are 15, 20, and 25 students respectively in the chess club, the debating team, and the engineering society; how many different students belong to the three clubs if there are 6 students in chess and debating, 7 students in chess and engineering, 8 students in debating and engineering, and 2 students in all three?).	See Glencoe’s <i>Algebra 2</i> © 2005 pages 12 and 271.
3. Apply techniques of systematic listing, counting, and reasoning in a variety of different contexts.	SE: 666-667, 668-669, 670, 672 #2a, 673 #4a, 674 #7a
D. Discrete Mathematics–Vertex-Edge Graphs and Algorithms	
1. Use vertex-edge graphs to represent and find solutions to practical problems. <ul style="list-style-type: none"> Finding the shortest network connecting specified sites Finding the shortest route on a map from one site to another Finding the shortest circuit on a map that makes a tour of specified sites 	SE: 496 #26
Standard 4.5. (Mathematical Processes) All students will use mathematical processes of problem solving, communication, connections, reasoning, representations, and technology to solve problems and communicate mathematical ideas.	
Cumulative Progress Indicators	
At each grade level, with respect to content appropriate for that grade level, students will:	
A. Problem Solving	
1. Learn mathematics through problem solving, inquiry, and discovery.	SE: 10-12, 17, 23-24, 25 #27, 27 #38-#39, 29 #45, 34-35, 36 #3-#6, 38 #1-#3, 46 #1-#3

CONTENT STANDARDS	PAGE REFERENCES
2. Solve problems that arise in mathematics and in other contexts (cf. workplace readiness standard 8.3). <ul style="list-style-type: none"> • Open-ended problems • Non-routine problems • Problems with multiple solutions • Problems that can be solved in several ways 	SE: 25 #27, 27 #38-#39, 28 #41, 29 #45, 34-35, 36 #3-#6, 46 #1-#3, 47 #12-#13 <i>In Your Own Words</i> 138 <i>Lab Investigation</i> 42-45
3. Select and apply a variety of appropriate problem-solving strategies (e.g., try a simpler problem or make a diagram) to solve problems.	SE: 543, 646 #3 <i>Share & Summarize</i> 548 <i>Think & Discuss</i> 52
4. Pose problems of various types and levels of difficulty.	SE: <i>In Your Own Words</i> 250 <i>Share & Summarize</i> 67, 227, 258
5. Monitor their progress and reflect on the process of their problem-solving activity.	SE: 15 #13, 53, 55 #5, 239 #50 <i>Share & Summarize</i> 55 TG: AL T35
B. Communication	
1. Use communication to organize and clarify their mathematical thinking. <ul style="list-style-type: none"> • Reading and writing • Discussion, listening, and questioning 	SE: 15 #13, 60 #6 <i>In Your Own Words</i> 106 <i>Share & Summarize</i> 55, 83, 99 <i>Think & Discuss</i> 61, 82 TG: AL T35, T57
2. Communicate their mathematical thinking coherently and clearly to peers, teachers, and others, both orally and in writing.	SE: 15 #13, 60 #6 <i>In Your Own Words</i> 106 <i>Share & Summarize</i> 55, 83, 99 <i>Think & Discuss</i> 61, 82 TG: AL T35, T57
3. Analyze and evaluate the mathematical thinking and strategies of others.	SE: 15 #13, 53, 239 #50, 457 #6, 469 #25, 479 #18, 698 #1-#4 <i>Think & Discuss</i> 305
4. Use the language of mathematics to express mathematical ideas precisely.	SE: 15 #13, 60 #6 <i>In Your Own Words</i> 106 <i>Share & Summarize</i> 55, 83, 99 <i>Think & Discuss</i> 61, 82 TG: AL T35, T57
C. Connections	
1. Recognize recurring themes across mathematical domains (e.g., patterns in number, algebra, and geometry).	SE: 50 #17, 73 #55, 106 #25, 187 #20, 210 #59, 211 #60, 239 #46, 240 #52-#60, 251 #30
2. Use connections among mathematical ideas to explain concepts (e.g., two linear equations have a unique solution because the lines they represent intersect at a single point).	SE: 29 #44, 71 #40, 72 #53, 106 #25, 139 #18, 175 #52-#66, 187 #20, 239 #46, 240 #52-#60, 252 #42-#44
3. Recognize that mathematics is used in a variety of contexts outside of mathematics.	SE: 25 #27, 27 #38-#39, 28 #41, 29 #45, 34-35, 36 #3-#6, 46 #1-#3, 47 #12-#13 <i>In Your Own Words</i> 138 <i>Lab Investigation</i> 42-45

CONTENT STANDARDS	PAGE REFERENCES
4. Apply mathematics in practical situations and in other disciplines.	SE: 25 #27, 27 #38-#39, 28 #41, 29 #45, 34-35, 36 #3-#6, 46 #1-#3, 47 #12-#13 <i>In Your Own Words</i> 138 <i>Lab Investigation</i> 42-45
5. Trace the development of mathematical concepts over time and across cultures (cf. world languages and social studies standards).	SE: <i>Just the Facts</i> 261, 264, 655
6. Understand how mathematical ideas interconnect and build on one another to produce a coherent whole.	SE: 29 #44, 71 #40, 72 #53, 106 #25, 139 #18, 175 #52-#66, 187 #20, 239 #46, 240 #52-#60, 252 #42-#44
D. Reasoning	
1. Recognize that mathematical facts, procedures, and claims must be justified.	SE: 239 #50, 486 #3, 488 #2e, 494 #13, 511 #18, 516 #8
2. Use reasoning to support their mathematical conclusions and problem solutions.	SE: 15 #13, 53, 239 #50, 457 #6, 469 #25, 479 #18, 698 #1-#4 <i>Think & Discuss</i> 305
3. Select and use various types of reasoning and methods of proof.	SE: 239 #50, 486 #3, 488 #2e, 494 #13, 511 #18, 516 #8
4. Rely on reasoning, rather than answer keys, teachers, or peers, to check the correctness of their problem solutions.	SE: 15 #13, 53, 239 #50, 457 #6, 469 #25, 479 #18, 698 #1-#4 <i>Think & Discuss</i> 305
5. Make and investigate mathematical conjectures. <ul style="list-style-type: none"> • Counterexamples as a means of disproving conjectures • Verifying conjectures using informal reasoning or proofs. 	SE: 239 #50, 486 #3, 488 #2e, 494 #13, 511 #18, 516 #8
6. Evaluate examples of mathematical reasoning and determine whether they are valid.	SE: 15 #13, 53, 239 #50, 457 #6, 469 #25, 479 #18, 698 #1-#4 <i>Think & Discuss</i> 305
E. Representations	
1. Create and use representations to organize, record, and communicate mathematical ideas. <ul style="list-style-type: none"> • Concrete representations (e.g., base-ten blocks or algebra tiles) • Pictorial representations (e.g., diagrams, charts, or tables) • Symbolic representations (e.g., a formula) • Graphical representations (e.g., a line graph) 	SE: 116-119, 146-148, 149-151, 152-155, 156-159, 160-163, 395-397, 398-401 TG: AL 151 TD T117
2. Select, apply, and translate among mathematical representations to solve problems.	SE: 116-119, 146-148, 149-151, 152-155, 156-159, 160-163, 395-397, 398-401 TG: AL 151 TD T117
3. Use representations to model and interpret physical, social, and mathematical phenomena.	SE: 116-119, 146-148, 149-151, 152-155, 156-159, 160-163, 395-397, 398-401 TG: AL 151 TD T117

CONTENT STANDARDS	PAGE REFERENCES
F. Technology	
1. Use technology to gather, analyze, and communicate mathematical information.	SE: 200-202, 388-391 TG: SS T202 TD T200
2. Use computer spreadsheets, software, and graphing utilities to organize and display quantitative information.	SE: 42-45, 388-391 TG: US T390
3. Use graphing calculators and computer software to investigate properties of functions and their graphs.	SE: 388-391
4. Use calculators as problem-solving tools (e.g., to explore patterns, to validate solutions).	SE: 200-202 TG: SS T202 TD T200
5. Use computer software to make and verify conjectures about geometric objects.	See Glencoe's <i>Geometry ancillary Graphing Calculator and Computer Masters</i> . This ancillary includes activities to incorporate the TI-83 Plus calculator and computer applications, such as spreadsheets and the <i>Geometer's Sketchpad</i> .
6. Use computer-based laboratory technology for mathematical applications in the sciences.	SE: 200-202, 388-391 TG: SS T202 TD T200 This objective can be met during teacher/class lab using Glencoe's Science technology resources.

Codes Used for TG Pages

AL	Access for All Learners
AM	About the Mathematics
I	Investigation
SA	On the Spot Assessment
SS	Share & Summarize
TD	Think and Discuss
US	Use Your Spreadsheet