



WASHINGTON
Essential Academic Learning Requirements—Mathematics
Benchmark 2—Grade 7
Impact Mathematics: Algebra and More Course 2 © 2004

BENCHMARKS	PAGE REFERENCES
1. The student understands and applies the concepts and procedures of mathematics. To meet this standard, the student will:	
1.1 Understand and apply concepts and procedures from number sense.	
Number and Numeration	
Demonstrate understanding of integers, fractions, decimals, percents, place value of decimals, and properties of the rational number system using pictures and symbols.	SE: 218-219, 239 #46, 244 #5 TG: AM T66
Compare and order integers, fractions, and decimals.	SE: 218, 239 #50, 675 #12-#13 <i>Think & Discuss</i> 219
Understand the concepts of prime and composite numbers, factors and multiples, and divisibility rules.	SE: 51 #19-#22, 90 #38, 107 #39, 163 #62
Understand and apply the concepts of ratio and direct proportion.	SE: 540-542, 543-547, 548-551, 551-553, 554-559, 566-568 TG: AL T545 AM T551 SA T543, T550
Computation	
Understand operations on nonnegative rational numbers.	SE: 242-244, 248-249, 250 #60, 252 #51-#56 TG: TD T243 TT T244
Add, subtract, multiply, and divide nonnegative fractions and decimals using rules for order of operation.	SE: 14-15, 65 #8-#19, 67 #1-#4, 70 #24-#29, 73 #65-#67, 75 #17-#19, 419-421, 422-425, 426-428, 429-433
Use mental arithmetic, pencil and paper, calculator, or computer as appropriate to the task involving nonnegative rational numbers.	SE: 14-15, 65 #8-#19, 67 #1-#4, 70 #24-#29, 73 #65-#67, 75 #17-#19, 419-421, 422-425, 426-428, 429-433
Estimation	
Identify situations involving nonnegative rational numbers in which estimation is sufficient and computation is not required.	SE: 551-553, 588-589
Use estimation to predict computation results and to determine the reasonableness of answers involving nonnegative rational numbers, <i>for example, estimating a tip.</i>	SE: 37-42

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1.2 Understand and apply concepts and procedures from measurement.	
Attributes and Dimensions	
Understand the concepts of and the relationships among perimeter, area, and volume and how changes in one dimension affect perimeter, area, and/or volume.	SE: 483-484, 485-488, 493 #5, 494 #9, 497-500, 501-503, 504-505, 507 #5 <i>Think & Discuss</i> 482 TG: AM T486
Measure objects and events directly or using indirect methods <i>such as calculating and applying procedures for determining perimeter, area, and volume.</i>	SE: 98-99, 103 #8-#11, 110-111, 112-114, 115-116, 119-121, 122-126, 482-484, 485-488
Understand the concept of rate and how to calculate rates and determine units.	SE: 530-531, 537 #30, 538 #31 TG: SS T531 T T531 TD T530
Approximation and Precision	
Understand that precision is related to the unit of measurement used and the calibration of the measurement tool.	SE: 98-99 <i>Chapter Summary</i> 141 TG: AL T452 SA T452
Know when to estimate and use estimation to obtain reasonable approximations, <i>for example, estimating the length and width of the playground to approximate its area.</i>	TG: AL T452
Systems and Tools	
Understand the appropriate uses of standard units of measurement for both direct and indirect measurement.	SE: 98-99, 103 #8-#11, 110-111, 112-114, 115-116, 119-121, 122-126, 482-484, 485-488
Understand the relationship among units within both the U.S. and metric systems.	SE: 135 #3-#4, 301-302, 314 #2, 317 #7, 318 #10, 539 #18 <i>Lab Investigation</i> 119
Select and use tools that will provide an appropriate degree of precision, <i>for example, using meters vs. kilometer.</i>	SE: 98-99 <i>Chapter Summary</i> 141 TG: AL T452 SA T452
1.3. Understand and apply concepts and procedures from geometric sense—properties and relationships and locations and transformations.	
Properties and Relationships.	
Use the properties and relationships of plane geometry to describe shapes and figures, <i>including angles, degrees in a circle, triangles, isosceles, equilateral, or quadrilateral.</i>	SE: 109, 122 #3-#4, 475, 516 #8 <i>Explore</i> 129 TG: TD T109
Identify, describe, or draw objects in the surrounding environment in geometric terms, <i>for example, producing a simple scale drawing of a classroom.</i>	SE: 486 #2, 487-488, 492-495

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Understand symmetry, congruence, and similarity.	SE: 482-484, 485-488, 489-491, 492 #1-#4, 494 #10 TG: AL T487 AM T486
Perform geometric constructions using a variety of tools and technologies <i>such as paper folding, computer software, straightedge, compass.</i>	SE: 467 #22 <i>In Your Own Words</i> 516
Locations and Transformations.	
Identify and describe location of objects on coordinate grids in any of the four quadrants.	SE: 259-261, 264-265, 279 #29
Understand and apply simple geometric transformations using combinations of translations (slides), or reflections (flips), or rotations (turns).	SE: 130-131, 132-134, 255-258, 259-262 TG: AL T452
1.4. Understand and apply concepts and procedures from probability and statistics.	
Probability	
Know how to calculate numerical measures of chance for simple events.	SE: 676-677, 678-679, 680-682, 683-685, 686-690
Understand procedures for counting outcomes to determine probabilities.	SE: 666-667, 668-669, 670, 672 #2a, 673 #4a, 674 #7a
Know how to conduct experiments and simulations and to compare results with mathematical expectations.	SE: 677 #2, 678 #1, 681-682, 683 <i>Explore</i> 692
Statistics	
Collect a random sample of data that represents a described population.	SE: 698-699, 703 #10, 704 #14, 705 #16 TG: TT T699
Organize and display data in appropriate forms <i>such as frequency tables, circle graphs, and stem-and-leaf plots.</i>	SE: 675 #14, 709, 710-713, 715 #3b, 716 #2b, 718-722
Calculate and appropriately use range and measures of central tendency to describe data.	SE: 703 #11e, 711 #3-#4, 713 #2, 719 #3a, 720 #9a-#9b, 721 #10b-#10d, 727 #5e
Identify how statistics can be used to support different points of view.	SE: 675 #14, 709, 710-713, 714-717, 718-722
Prediction and Inference	
Predict outcomes of experiments and simulations and compare the predictions to experimental results.	SE: 682 #4, 693 #1, 694 #2, 700-701 <i>Explore</i> 692
Understand and make inferences based on analysis of experimental results, statistical data, and simple graphical representations.	SE: 675 #14, 709, 710-713, 714-717, 718-722
1.5 Understand and apply concepts and procedures from algebraic sense.	
Patterns	
Recognize, extend, and create patterns and sequences.	SE: 245 #1-#4, 345-347, 348-350, 351-353, 365-367, 368-370, 644-647, 648-649, 652-658 <i>Think & Discuss</i> 281

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Represent and describe patterns with tables, graphs, and rule.	SE: 245 #1-#4, 345-347, 348-350, 351-353, 365-367, 368-370, 644-647, 648-649, 652-658 <i>Think & Discuss</i> 281
Representations	
Represent equalities and inequalities symbolically using =, >, <, ≤, ≥.	SE: 21 #1, 23 #8a, 24 #10, 25 #27a, 26 #34b, 28 #41, 34-36, 46 #2a, 50 #18 <i>Share & Summarize</i> 18
Use variables to write simple expressions, equations, and inequalities, for example, $3x > 18$.	SE: 21 #1, 23 #8a, 24 #10, 25 #27a, 26 #34b, 28 #41, 34-36, 46 #2a, 50 #18 <i>Share & Summarize</i> 18
Operations	
Evaluate expressions and formulas.	SE: 21 #1, 23 #8a, 24 #10, 25 #27a, 26 #34b, 28 #41, 34-36, 46 #2a, 48 #13a, 50 #18
Solve single-variable equations.	SE: 385-387, 392 #1-#7, 395-397, 410-411, 412, 413-414, 415-417, 419-421, 428 #12-#15, 430 #32-#41
2. The student uses mathematics to define and solve problems. To meet this standard, the student will:	
2.1 Investigate situations.	
Search systematically for patterns in simple situations.	SE: 78-79, 80-81, 82-83, 84-90, 345-347 TG: SA T346 SS T347
Develop and use a variety of strategies and approaches.	SE: 543, 646 #3 <i>Share & Summarize</i> 548 <i>Think & Discuss</i> 52
Identify missing or extraneous information.	SE: 543, 646 #3 <i>Share & Summarize</i> 548 <i>Think & Discuss</i> 52
Recognize the need to modify or abandon an unproductive approach.	SE: 543, 646 #3 <i>Share & Summarize</i> 548 <i>Think & Discuss</i> 52
2.2 Formulate questions and define the problem.	
Identify questions to be answered in new situations.	SE: 543, 646 #3 <i>Share & Summarize</i> 548 <i>Think & Discuss</i> 52
Define problems in new situations.	SE: 543, 646 #3 <i>Share & Summarize</i> 548 <i>Think & Discuss</i> 52
Identify the known and unknown in new situations.	SE: 543, 646 #3 <i>Share & Summarize</i> 548 <i>Think & Discuss</i> 52
2.3 Construct solutions.	
Organize relevant information from multiple sources.	SE: 312-313
Select and use appropriate mathematical tools.	SE: 386-391

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Apply viable strategies and appropriate concepts and procedures to construct a solution.	SE: 543, 646 #3 <i>Share & Summarize</i> 548 <i>Think & Discuss</i> 52
3. The student uses mathematical reasoning. To meet this standard, the student will:	
3.1 Analyze information.	
Compare, contrast, and interpret information from a variety of sources.	SE: 312-313
Validate thinking and mathematical ideas using models, known facts, patterns, relationships, and counter-examples.	SE: 15 #13, 53, 239 #50, 457 #6, 469 #25, 479 #18, 698 #1-#4 <i>Think & Discuss</i> 305
3.2 Predict results.	
Make conjectures based on analysis of new problem situations.	SE: 239 #50, 486 #3, 488 #2e, 494 #13, 511 #18, 516 #8
3.3 Draw conclusions and verify results.	
Test conjectures and explain why they are true or false.	SE: 239 #50, 486 #3, 488 #2e, 494 #13, 511 #18, 516 #8
Support arguments and justify results using evidence.	SE: 15 #13, 53, 239 #50, 457 #6, 469 #25, 479 #18, 698 #1-#4 <i>Think & Discuss</i> 305
Check for reasonableness of results.	SE: 37-42
Reflect on and evaluate procedures and results in new problem situations.	SE: 15 #13, 53, 239 #50, 457 #6, 469 #25, 479 #18, 698 #1-#4 <i>Think & Discuss</i> 305
4. The student communicates knowledge and understanding in both everyday and mathematical language. To meet this standard, the student will:	
4.1 Gather information.	
Develop and follow a plan for collecting information.	SE: 312-313
Use reading, listening, and observation to access and extract mathematical information from multiple sources <i>such as pictures, diagrams, physical models, oral narratives, and symbolic representations.</i>	SE: 312-313
Choose appropriate available technology to browse, select, and retrieve relevant mathematical information from a variety of sources.	SE: 386-391
4.2 Organize and interpret information.	
Organize and clarify mathematical information by reflecting, verbalizing, discussing, or writing.	SE: 116-119, 146-148, 149-151, 152-155, 156-159, 160-163, 395-397, 398-401 TG: AL T151 TD T117

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4.3 Represent and share information.	
Clearly and effectively express or present ideas and situations using both everyday and mathematical language <i>such as models, tables, charts, graphs, written reflection, or algebraic notation.</i>	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
Explain or represent mathematical ideas and information in ways appropriate for audience and purpose.	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
5. The student understands how mathematical ideas connect within mathematics, other subject areas, and real-life situations. To meet this standard, the student will:	
5.1 Relate concepts and procedures within mathematics.	
Relate and use conceptual and procedural understandings among a variety of mathematical content areas.	SE: 116-119, 146-148, 149-151, 152-155, 156-159, 160-163, 395-397, 398-401 TG: AL T151 TD T117
Relate and use different mathematical models and representations of the same situation.	SE: 116-119, 146-148, 149-151, 152-155, 156-159, 160-163, 395-397, 398-401 TG: AL T151 TD T117
5.2 Relate mathematical concepts and procedures to other disciplines.	
Identify mathematical patterns and ideas in other disciplines.	SE: 25 #27, 27 #38-#39, 28 #41, 29 #45, 34-35, 36 #3-#4, 46 #1-#3, 47 #12-#13 <i>In Your Own Words</i> 138 <i>Lab Investigation</i> 42-45
Use mathematical thinking and modeling in other disciplines.	SE: 25 #27, 27 #38-#39, 28 #41, 29 #45, 34-35, 36 #3-#4, 46 #1-#3, 47 #12-#13 <i>In Your Own Words</i> 138 <i>Lab Investigation</i> 42-45
Describe examples of contributions to the development of mathematics <i>such as the contributions of women, men, and different cultures.</i>	SE: <i>Just the Facts</i> 261, 264, 655
5.3 Relate mathematical concepts and procedures to real-life situations.	
Recognize the widespread use of mathematics in daily life and the extensive use of mathematics outside the classroom, <i>for example, in banking or sports statistics.</i>	SE: 25 #27, 27 #38-#39, 28 #41, 29 #45, 34-35, 36 #3-#4, 46 #1-#3, 47 #12-#13 <i>In Your Own Words</i> 138 <i>Lab Investigation</i> 42-45
Investigate the use of mathematics within several occupations/careers of interest.	See <i>Impact Mathematics: Algebra and More Course 1</i> © 2004 SE: 343-345 <i>On Your Own Exercises</i> 270 #18, 299 #15, 329 #4 <i>Explore</i> 342

Codes Used for TG Pages

AL	Access for All Learners
AM	About the Mathematics
SA	On the Spot Assessment
SS	Share & Summarize
T	Troubleshooting
TD	Think & Discuss
TT	Tips from Teachers