



MathScape

Seeing and Thinking Mathematically

Course 3

© 2005

STANDARDS	PAGE REFERENCES
<p>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.</p>	
<p>In grade 8, what students know and are able to do include</p>	
<p>1.1 Demonstrating meanings for integers*, rational numbers*, percents, exponents, square roots* and pi (π) using physical materials and technology in problem-solving situations.</p>	
<p>1.1a Recognize and use equivalent representations of rational numbers and common irrational numbers (for example, locate rational numbers on a number line and demonstrate the meaning of square roots and perfect squares).</p>	<p>Student Edition: 150-151, 162-163, 176, 238-239, 246-247, 261, 264 Quick Review Handbook Book 3: 176-177, 351</p>
<p>1.2 Reading, writing, and ordering integers, rational numbers, and common irrational numbers* such as $\sqrt{2}$, $\sqrt{5}$, and π.</p>	
<p>1.2a Compare and order sets of integers and rational numbers that are expressed in a variety of ways.</p>	<p>Student Edition: 138-139, 160-161, 162-163, 166, 175, 176 Teacher's Guide: 135E, 137, 160A, 162A, 163A Quick Review Handbook Book 3: 75-76, 112-113, 129-130</p>

STANDARDS	PAGE REFERENCES
1.3 Applying number theory concepts (for example, primes, factors, multiples) to represent numbers in various ways.	
1.3a Apply number theory concepts (for example, primes, factors, multiples, exponents) in problem-solving situations.	<p>Student Edition: 296-297, 298-299, 300-301, 311-313 (exponent concepts for all references)</p> <p>Teacher's Guide: 294, 295, 298A, 300A</p> <p>For additional information on factors/multiples, see <i>MathScape: Seeing and Thinking Mathematically Course 2</i> © 2005 pages 116-117, 118-119, 120-121, 132, 133, 134</p> <p>Quick Review Handbook Book 3: 84, 87, 90, 168, 171</p>
1.4 Using the relationships among fractions, decimals, and percents, including the concepts of ratio and proportion, in problem-solving situations*.	
1.4a Use the relationships among fractions, decimals and percents, including the concepts of ratio and proportion, in problem -solving situations (similarity, scale factor, unit rate).	<p>Student Edition: 162-163, 176, 238-239, 242-243, 244-245, 246-247, 250-251, 262-264</p> <p>Teacher's Guide: 240, 241, 242A, 246A, 248, 249, 250A</p> <p>Quick Review Handbook Book 3: 156, 157, 159, 160, 308-310, 425-426</p>
1.5 Developing, testing, and explaining conjectures* about properties of integers* and rational numbers.	
1.5a Develop and test conjectures about properties of integers (Does $3 - 5 = 5 - 3$?) and rational numbers.	<p>Student Edition: 144-145, 150-151, 169, 171, 186-187, 196-197, 206-207, 208-209, 212, 216, 217, 220, 221</p> <p>Teacher's Guide: 196A, 197A</p> <p>Quick Review Handbook Book 3: 78, 79</p>
1.6 Using number sense* to estimate and justify the reasonableness of solutions to problems involving integers, rational numbers, and common irrational numbers* such as $\sqrt{2}$, $\sqrt{5}$, and π .	
1.6a Use number sense to estimate and justify the reasonableness of solutions to problems involving integers and rational numbers.	<p>Student Edition: 22-23, 41, 52-53, 79, 118-119, 132, 138-139, 140-141, 160-161, 162-163, 164-165, 166-167, 169 #10, 170 #16, 175 #14d, 175-177</p> <p>Teacher's Guide: 160A, 162A, 163A</p> <p>Quick Review Handbook Book 3: 133-134, 138, 139, 141-142, 151</p>

STANDARDS	PAGE REFERENCES
<p>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.</p> <hr/> <p>In grade 8, what students know and are able to do include</p> <hr/> <p>2.1 Representing, describing, and analyzing patterns* and relationships using tables, graphs, verbal rules, and standard algebraic notation.</p>	
<p>2.1a Represent, describe, and analyze patterns (for example, geometric and numeric) and relationships using tables, graphs, verbal rules, and standard algebraic notation.</p>	<p>Student Edition: 138-139, 142-143, 144-145, 148-149, 166-171, 173-177, 198-199, 216, 217, 298-299, 312</p> <p>Teacher’s Guide: 135G, 135H, 146, 147</p> <p>Quick Review Handbook Book 3: 202, 204, 205, 206, 207, 209-211</p>
<p>2.1b Convert from one functional representation (table, graph, verbal rule, standard algebraic notation) to another.</p>	<p>Student Edition: 138-139, 140-141, 142-143, 144-145, 148-149, 150-151, 152-153, 154-155, 166-171, 173</p> <p>Teacher’s Guide: 135E, 136, 137, 138A, 140A, 141A, 146, 147, 149A, 151A, 153A, 156</p> <p>Quick Review Handbook Book 3: 196-197, 211</p>
<p>2.2 Describing patterns using variables, expressions, equations, and inequalities in problem-solving situations.</p>	
<p>2.2a Describe patterns using variables, expressions, equations, and inequalities in problem-solving situations.</p>	<p>Student Edition: 182-183, 184-185, 186-187, 188-189, 196-197, 204-205, 208-209, 210-213, 216, 219, 220, 221</p> <p>Teacher’s Guide: 185A, 190, 191</p> <p>Quick Review Handbook Book 3: 281</p>

STANDARDS	PAGE REFERENCES
2.3 Analyzing functional relationships to explain how a change in one quantity results in a change in another (for example, how the area of a circle changes as the radius increases, or how a person's height changes over time).	
2.3a Analyze functional relationships to explain how a change in one quantity results in a change in another (for example, how a person's height changes over time).	<p>Student Edition: 60-61, 62-63, 72-73, 74-75, 82, 83, 87, 88, 138-139, 152-153, 154-155, 160-161, 162-163, 164-165, 166-167, 172, 174, 175-177, 244-245, 263, 280-281, 282-283, 284-285, 296, 305-307</p> <p>Teacher's Guide: 58, 59</p> <p>Quick Review Handbook Book 3: 329-330 (with Teacher assistance)</p>
2.4 Distinguishing between linear and nonlinear functions* through informal investigations.	
2.4a Distinguish between linear and nonlinear functions* through informal investigations.	<p>Student Edition: 272-273, 274-275, 276-277, 280-281, 282-283, 284-285, 302-303</p> <p>Teacher's Guide: 269E, 270, 271, 273A, 276A, 280A</p> <p>Quick Review Handbook Book 3: 30 (defines linear)</p>
2.5 Solving simple linear equations in problem-solving situations using a variety of methods (informal, formal, and graphical) and a variety of tools (physical materials, calculators, and computers).	
2.5a Solve simple linear equations in problem-solving situations using a variety of methods (informal, formal, and graphic).	<p>Student Edition: 204-205, 206-207, 208-209, 219-221</p> <p>Teacher's Guide: 200, 201</p> <p>Quick Review Handbook Book 3: 296-301</p>

STANDARDS	PAGE REFERENCES
<p>Standard 3: Students use data collection and analysis, statistics, and probability in problem-solving situations and communicate the reasoning and processes used in solving these problems.</p>	
<p>In grade 8, what students know and are able to do include</p>	
<p>3.1 Reading and constructing displays of data using appropriate techniques (for example, line graphs, circle graphs, scatterplots*, box plots*, stem-and-leaf plots*) and appropriate technology.</p>	
<p>3.1a Read and construct displays of data using appropriate techniques (for example, circle graphs, scatterplots*, box-and-whisker plots*, stem-and-leaf plots).</p>	<p>Student Edition: 6-7, 8-9, 10-11, 12-13, 16-17, 18-19, 22-23, 34, 41 Teacher’s Guide: 3H, 4, 5, 6A, 7A, 8A, 9A, 14, 15, 17A Quick Review Handbook Book 3: 203, 204, 205, 208, 214</p>
<p>3.2 Displaying and using measures of central tendency*, such as mean, median, and mode, and measures of variability*, such as range and quartiles.</p>	
<p>3.2a Display and use measures of central tendency*, (such as mean, median, and mode) and measures of variability*, (such as range and quartiles) in problem-solving situations.</p>	<p>Student Edition: 6-7, 8-9, 10-11, 16-17, 34, 35, 36, 37 Teacher’s Guide: 3G, 8A Quick Review Handbook Book 3: 222-228</p>
<p>3.3 Evaluating arguments that are based on statistical claims.</p>	
<p>3.3a Analyze a graph, table, or summary for misleading characteristics.</p>	<p>Student Edition: 6-7, 10-11, 18-19, 22-23, 34, 36, 39, 41, 138-139, 154-155, 158-159, 160-161, 162-163, 173, 174, 175 Teacher’s Guide: 6A, 7A, 18A, 19A, 138A, 158A, 159A, 162A Quick Review Handbook Book 3: 214, 215, 219</p>
<p>3.3b Recognize the misuse of statistical data in written arguments.</p>	<p>Student Edition: 6-7, 10-11, 18-19, 22-23, 34, 36, 39, 41, 138-139, 154-155, 158-159, 160-161, 162-163, 173, 174, 175 Teacher’s Guide: 6A, 7A, 18A, 19A, 138A, 158A, 159A, 162A Quick Review Handbook Book 3: 214, 215, 219</p>

STANDARDS	PAGE REFERENCES
3.3c Describe how data can be interpreted in more than one way or be used to support more than one position in a debate.	<p>Student Edition: 6-7, 10-11, 34, 36, 60-61, 62-63, 82, 83, 154-155, 158-159, 160-161, 162-163, 164-165, 173</p> <p>Teacher's Guide: 7A, 62A, 158A</p> <p>Quick Review Handbook Book 3: 214, 215, 218-219</p>
3.4 Formulating hypotheses, drawing conclusions, and making convincing arguments based on data analysis.	
3.4a Formulate hypotheses, draw conclusions, and make convincing arguments based on data analysis.	<p>Student Edition: 6-7, 8-9, 10-11, 34-36, 138-139, 144-145, 148, 151, 154, 158-159, 160, 166, 169, 171, 173 #5</p> <p>Teacher's Guide: 145A, 159A, 160A</p> <p>Quick Review Handbook Book 3: 202-210, 214-220</p>
3.5 Determining probabilities through experiments or simulations.	<p>Student Edition: 26-27, 28-29, 30-31, 32-33, 42-45</p> <p>Teacher's Guide: 24, 30A, 33A</p> <p>Quick Review Handbook Book 3: 240-243</p>
3.6 Making predictions and comparing results using both experimental and theoretical probability drawn from real-world problems*.	
3.6a Use a model (list, tree diagram, area model) to determine theoretical probabilities to solve problems involving uncertainty.	<p>Student Edition: 26-27, 28-29, 30-31, 32-33, 42-45</p> <p>Teacher's Guide: 24, 25, 27A, 28A, 29A, 31A, 33A</p> <p>Quick Review Handbook Book 3: 232-233, 234</p>
3.6b Make predictions using theoretical probability in real-world problems.	<p>Student Edition: 26-27, 30-31, 32-33</p> <p>Teacher's Guide: 26A, 27A, 32A</p> <p>Quick Review Handbook Book 3: 241-242</p>

STANDARDS	PAGE REFERENCES
3.7 Using counting strategies to determine all the possible outcomes from an experiment (for example, the number of ways students can line up to have their picture taken).	
3.7a Use a model or counting technique to determine all the possible outcomes from an experiment (for example, the number of ways students can line up to have their picture taken).	<p>Student Edition: 28-29, 32-33, 43, 45</p> <p>Teacher’s Guide: 29A</p> <p>Quick Review Handbook Book 3: 232-238</p>
<p>Standard 4: Students use geometric concepts, properties, and relationships in problem-solving situations, and communicate the reasoning used in solving these problems.</p>	
<p>In grade 8, what students know and are able to do include</p>	
4.1 Constructing two- and three-dimensional models using a variety of materials and tools.	<p>Student Edition: 94-95, 108-109, 114-115, 116-117, 120-121, 122, 130, 133, 228-229, 230-231, 236-237, 247, 250-251, 252-253, 254-255, 257, 258, 260, 261, 264-267</p> <p>Teacher’s Guide: 91G, 94A, 108A, 113, 114A, 237A, 238A, R2 (Skill Quiz)</p> <p>Quick Review Handbook Book 3: 371</p>
4.2 Describing, analyzing, and reasoning informally about the properties (for example, parallelism, perpendicularity, congruence) of two- and three-dimensional figures.	
4.2a Describe, analyze, and reason informally about the properties (for example, parallelism, perpendicularity, congruence, and similarity) of two- and three-dimensional figures.	<p>Student Edition: 94-95, 98-99, 104-111, 114-117, 120, 133 #4, 228-229, 252-253, 254-255, 257, 266-267</p> <p>Teacher’s Guide: 91G, 120A, 229A, 252A</p> <p>Quick Review Handbook Book 3: 350, 351, 424</p>
4.3 Applying the concept of ratio, proportion, and similarity* in problem-solving situations.	
4.3a Apply the concept of ratio, proportion, and similarity* in problem-solving situations.	<p>Student Edition: 120-121, 133, 242-243, 244-245, 254-255, 267</p> <p>Teacher’s Guide: 240, 241, 254A</p> <p>Quick Review Handbook Book 3: 424, 425, 426, 427</p>

STANDARDS	PAGE REFERENCES
4.4 Solving problems using coordinate geometry*.	
4.4a Solve problems in real-world situations using coordinate geometry (for example, maps, distance on a number line).	<p>Student Edition: 62-63, 70-71, 72-73, 86, 87, 292-293, 305 #16, 307 #5</p> <p>Teacher's Guide: 62A, 72A</p> <p>Quick Review Handbook Book 3: 349</p>
4.5 Solving problems involving perimeter and area in two dimensions, and involving surface area and volume* in three dimensions.	
4.5a Solve problems involving perimeter and area in two dimensions, and involving surface area and volume* in three dimensions. (include right prisms and cylinders).	<p>Student Edition: 98-99, 100-101, 104-105, 106-107, 108-109, 110-111, 124, 125, 126, 127, 128, 129</p> <p>Teacher's Guide: 91G, 93, 98A, 102, 103, 109A</p> <p>Quick Review Handbook Book 3: 366-369, 373, 375, 378, 380, 383, 384</p>
4.5b Apply the Pythagorean Theorem to solve real-world problems.	<p>Student Edition: 236-237, 238-239, 246-247, 250-251, 260, 261, 264, 265</p> <p>Teacher's Guide: 223G, 232, 237A, 239A</p> <p>Quick Review Handbook Book 3: 369, 394-395</p>
4.6 Transforming geometric figures using reflections*, translations*, and rotations* to explore congruence.	
4.6a Transform geometric figures using reflections, translations, and rotations to determine congruence.	<p>Student Edition: 259 #14 (with Teacher assistance)</p> <p>Also see <i>MathScape: Seeing and Thinking Mathematically Course 2</i> © 2005 pages 288-289</p> <p>Quick Review Handbook Book 3: 360-362, 363, 364</p>

STANDARDS	PAGE REFERENCES
<p>Standard 5: Students use a variety of tools and techniques to measure, apply the results in problem-solving situations, and communicate the reasoning involved in solving these problems.</p>	
<p>In grade 8, what students know and are able to do include</p>	
<p>5.1 Estimating, using, and describing measures of distance, perimeter, area, volume, capacity*, weight, mass, and angle comparison.</p>	
<p>5.1a Estimate and use measures of area, volume, capacity*, weight, and angle comparisons to solve problems.</p>	<p>Student Edition: 50-51, 52-53, 78, 79, 98-99, 118-119, 124, 132, 211 #8, 226-227, 228-229, 230-231, 256-258</p> <p>Teacher’s Guide: 98A, 118a</p> <p>Quick Review Handbook Book 3: 342-344, 372, 416-418</p>
<p>5.2 Estimating, making, and using direct and indirect measurements to describe and make comparisons.</p>	
<p>5.2a Estimate, make, and use direct and indirect measurements to describe and make comparisons (for example, use a proportion to find the height of a flagpole).</p>	<p>Student Edition: 50-51, 78-79, 120-121, 133, 246-247, 264</p> <p>Teacher’s Guide: 48, 241</p> <p>Quick Review Handbook Book 3: 416-422, 424-425</p>
<p>5.3 Reading and interpreting various scales including those based on number lines, graphs, and maps.</p>	
<p>5.3a Read and interpret scales on number lines, graphs, and maps (for example, given a map and a scale, determine the distance between two points on the map).</p>	<p>Student Edition: 62-63, 120-121, 228-229, 230-231, 257, 258</p> <p>Teacher’s Guide: 230A</p> <p>Quick Review Handbook Book 3: 349</p>
<p>5.4 Developing and using formulas and procedures to solve problems involving measurement.</p>	
<p>5.4a Develop and use formulas and procedures to solve problems involving measurement (for example, distance, area, surface area, and volume of right prisms and cylinders).</p>	<p>Student Edition: 98-99, 100-101, 104-105, 106-107, 108-109, 110-111, 116-117, 124-125, 126, 127, 131, 211 #8</p> <p>Teacher’s Guide: 103, 112, 113, 125A</p> <p>Quick Review Handbook Book 3: 292-293, 372-376, 383, 384, 438</p>

STANDARDS	PAGE REFERENCES
5.5 Describing how a change in an object's linear dimensions affects its perimeter, area, and volume.	
5.5a Describe how a change in an object's linear dimensions affects its perimeter, area, and volume (for example, how the area of a circle changes as the radius increases).	<p>Student Edition: 110-111, 114-115, 116-117, 118-119, 129, 131, 132, 211 #8, 246, 292</p> <p>Teacher's Guide: 113, 118A, 292A</p> <p>Quick Review Handbook Book 3: 292-293, 372-376, 383, 384, 388-389</p>
5.6 Selecting and using appropriate units and tools to measure to the degree of accuracy required in a particular problem-solving situation.	<p>Student Edition: 52-53, 79, 118-119, 120-121, 133, 160-161, 175, 226-227, 228-229, 238-239, 252-253, 257, 259, 261, 266</p> <p>Teacher's Guide: 118A, 223E, 228A</p> <p>Quick Review Handbook Book 3: 410-414, 422, 444-449</p>
<p>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 involved in solving these problems.</p>	
<p>In grade 8, what students know and are able to do include</p>	
<p>6.1 Using models to explain how ratios, proportions, and percents can be used to solve real-world problems.</p>	
6.1a Use models to explain how ratios, proportions, and percents can be used to solve real-world problems.	<p>Student Edition: 120-121, 133, 162-163, 164-165, 176, 242-243, 244-245, 246-247, 250-251, 264</p> <p>Teacher's Guide: 240, 241, 246A, 248, 249, 250A</p> <p>Quick Review Handbook Book 3: 145, 308-310</p>
6.1b Convert from one set of units to another using proportions.	<p>Student Edition: 118-119, 120-121, 124, 132, 133</p> <p>Teacher's Guide: 118A, 120A</p> <p>Quick Review Handbook Book 3: 424-426</p>

STANDARDS	PAGE REFERENCES
6.2 Constructing, using, and explaining procedures to compute and estimate with whole numbers, fractions, decimals, and integers.	
6.2a Apply order of operations to evaluate simple expressions with integers.	Student Edition: 184-185, 186-187, 188-189, 196-197, 211, 212, 216 Quick Review Handbook Book 3: 82, 292
6.3 Developing, applying, and explaining a variety of different estimation strategies in problem-solving situations, and explain why an estimate may be acceptable in place of an exact answer.	Student Edition: 20-21, 22-23, 40, 41, 72, 73, 87, 167, 169 Quick Review Handbook Book 3: 76, 141, 142
6.4 Selecting and using appropriate methods for computing with commonly used fractions and decimals, percents, and integers in problem-solving situations from among mental arithmetic*, estimation, paper-and-pencil, calculator, and computer methods, and determining whether the results are reasonable.	
6.4a Apply computational methods (including ratio and proportion) to solve problems involving commonly used fractions, decimals, percents, and integers (for example, discount, tax, sale price, unit price) and determine whether the results are reasonable.	Student Edition: 74-75, 88-89, 140-141, 144-145, 158-159, 162-163, 167, 169, 174, 176, 192-193, 214, 246-247, 264 Teacher's Guide: 162A, 163A Quick Review Handbook Book 3: 93, 94, 116-117, 122-124, 132-134, 136-138