



# IMPACT MATHEMATICS

Algebra and More

Course 3  
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STANDARDS		PAGE REFERENCES
<b>Standard 1: Number and Operation</b>		
Students in Grade 8 read, write, compare, order, and place on a number line rational numbers, including integers, fractions, decimals, and percents, and absolute values. Students use rational numbers, including percents and ratios, and $\pi$ (pi) to solve problems. Students convert between standard form, scientific notation, and exponential form. Students add, subtract, multiply, and divide rational numbers and students recall the common equivalent fractions, decimals, and percents of halves, thirds, fourths, fifths, and tenths. Students evaluate numerical expressions with rational numbers using the order of operations and students evaluate numerical expressions with whole number exponents. Students estimate to predict computation results.		
<b>Goal 1.1: Understand and use numbers.</b>		
<b>Objective(s): By the end of Grade 8, the student will be able to:</b>		
8.M.1.1.1	Compare magnitudes and relative magnitudes of rational numbers, including integers, fractions, decimals, percents, and absolute values. (337.01.a)	<b>Student Edition:</b> 34-35, 157 #4, 224 #19, 626-628
8.M.1.1.2	Use rational numbers, including percents and ratios, and $\pi$ (pi) to solve problems. (337.01.b)	<b>Student Edition:</b> 7, 22, 41 #29, 62 #30, 125 #24, 177, 183 #7, 184 #17, 200-202, 206 #59, 389 #63, 414 #1, 512 #36-#38, 615 #9, 617 #4
8.M.1.1.3	Locate the position of rational numbers and positive real numbers on a number line. (337.01.e)	<b>Student Edition:</b> 200-201, 224 #19, 236 #27, #28, 285 #24 <i>Just the Facts</i> 192 <i>Lab Investigation</i> 161, 219

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8.M.1.1.4	Convert between standard form, scientific notation, and exponential form. (337.01.c)	<b>Student Edition:</b> 146-148, 150-152, 153-155, 156-158, 162-168, 169-172, 182-189, 455 #54 <i>Family Letter</i> 145 <i>Lab Investigation</i> 159-161 <b>Teacher's Guide:</b> T 152, T 169
8.M.1.1.5	Apply number theory concepts (primes, composites, prime factorization, LCM, GCF). (337.01.d)	<b>Student Edition:</b> 131 #1, 194, 312 #12d, 411 <b>Teacher's Guide:</b> T 411, T 496
8.M.1.1.6	Recognize pertinent information for problem solving. (338.01.b)	<b>Student Edition:</b> 41 #29, 81 #9, 92 #5, 224 #18, 301 #17, 436, 497, 614 #8, 625 <i>Lab Investigation</i> 159-161, 219-222, 475-478 <b>Teacher's Guide:</b> T 436
8.M.1.1.7	Apply integers in one- and two-step common real-world situations.	<b>Student Edition:</b> 10-11, 13, 17 #3, 27, 218 #2, 279 #25, 463 #23
8.M.1.1.8	Use appropriate vocabulary.	<b>Student Edition:</b> 22, 78, 118, 131, 146-148, 200-202, 224, 312 #12d, 626-628
<b>Goal 1.2: Perform computations accurately.</b>		
<b>Objective(s): By the end of Grade 8, the student will be able to:</b>		
8.M.1.2.1	Recall the common equivalent fractions, decimals, and percents of halves, thirds, fourths, fifths, and tenths. (337.02.b)	<b>Student Edition:</b> 114, 172 #2, 184-185, 207 #60
8.M.1.2.2	Add, subtract, multiply, and divide rational numbers. (337.02.a)	<b>Student Edition:</b> 125 #24, 166 #49, 177, 184-185, 389 #63, 410 #27-#32, 416-417, 421 #1, 512 #36-#38, 513 #50, 638-639
8.M.1.2.3	Evaluate numerical expressions with whole number exponents. (337.02.d)	<b>Student Edition:</b> 146, 148 #2, #3, 156-158, 629 #20-#22, #29, #32
8.M.1.2.4	Evaluate numerical expressions with rational numbers using the order of operations. (337.02.c)	The order of operations is demonstrated on equations. <b>Student Edition:</b> 436 #2, #3

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8.M.1.2.5	Select and use an appropriate method of computation from mental math, paper and pencil, calculator, or a combination of the three. (337.02.e)	<b>Student Edition:</b> 114 #6, 151 #4-#10, 154 #2, 157 #3, 175
8.M.1.2.6	Use a variety of strategies including common mathematical formulas to compute problems drawn from real life situations. (338.01.a)	<b>Student Edition:</b> 26, 70, 74, 76, 85, 127, 156, 160, 177, 218, 241, 251 #20, 408 #21, 469 #1-#3, 512 #33 <i>Lab Investigation</i> 96-97, 270-274
8.M.1.2.7	Use appropriate vocabulary and notations. (337.02.f)	<b>Student Edition:</b> 74, 76, 114, 125 #24, 177, 207 #60, 389 #63, 408 #21
<b>Goal 1.3: Estimate and judge reasonableness of results.</b>		
<b>Objective(s): By the end of Grade 8, the student will be able to:</b>		
8.M.1.3.1	Estimate to predict computation results. (337.03.a)	<b>Student Edition:</b> 61 #27, 88 #4, 174 #2, 242 #2, 394, 636-637
8.M.1.3.2	Identify when estimation is appropriate and apply to problem solving situations. (337.03.b)	<b>Student Edition:</b> 34-35, 51-52, 53, 101, 157 #4, 172, 182 #1, 242 #2, 262 #4, 636 <i>Lab Investigation</i> 159-161 <b>Teacher's Guide:</b> T 52
8.M.1.3.3	Identify whether a given estimate is an overestimate or underestimate. (337.03.c)	<b>Student Edition:</b> 61 #27, 101, 172, 229 #8, 242 #2, 262 #4, 633
8.M.1.3.4	Use a four-function calculator to solve complex grade-level problems.	<b>Student Edition:</b> 55, 73 #6, 157 #3, 229 #8, 242 #2 <b>Teacher's Guide:</b> T 55, T 157
8.M.1.3.5	Formulate conjectures and justify (short of formal proof) why they must be or seem to be true. (338.02.c)	<b>Student Edition:</b> 127, 128-130, 135 #8, #9, 224 #18, 262 #4, 392 #6, 414 #66, 625, 633
8.M.1.3.6	Use appropriate vocabulary and notations. (337.03.d)	<b>Student Edition:</b> 51-52, 53, 61 #27, 101, 174 #2, 182 #1, 262 #4, 633

STANDARDS		PAGE REFERENCES
<b>Standard 2: Concepts and Principles of Measurement</b>		
Students in Grade 8 select and use appropriate units and tools to make formal measurements in both systems. Students apply given formulas for perimeter, circumference, and area of triangles, circles, and quadrilaterals, and the volume and surface area of rectangular prisms. Students solve problems involving area of circles and the perimeter and area of rectangles and triangles. Students use rates, proportions, ratios, and map scales in problem solving situations.		
<b>Goal 2.1: Understand and use U.S. customary and metric measurements.</b>		
<b>Objective(s): By the end of Grade 8, the student will be able to:</b>		
8.M.2.1.1	Select and use appropriate units and tools to make formal measurements in both systems. (339.01.a)	<b>Student Edition:</b> 157 #4, 167 #57, 175, 208 #4, 626-628
8.M.2.1.2	Apply estimation of measurement to real-world and content problems using standard measuring devices. (339.01.b)	<b>Student Edition:</b> 34-35, 101 #13, 157 #4
8.M.2.1.3	Compare the differences and relationships among measures of perimeter, area, and volume (capacity) within both systems. (339.01.c)	<b>Student Edition:</b> 499-501 <i>Lab Investigation</i> 366-367, 502-503 <b>Teacher's Guide:</b> T 366, T 499, T 501
8.M.2.1.4	Given the formulas, find the circumference, perimeter, or area of triangles, circles, and quadrilaterals, and the volume and surface area of rectangular prisms. (341.01.e)	<b>Student Edition:</b> 22 #13, 62 #30, 70, 72, 107 #42, #43, 255 #23, #24, 338 #21, #22, 441 #33, #34, 449 #7, 499-501, 533 #36, 615 #9 <i>Lab Investigation</i> 502-503
8.M.2.1.5	Convert units of measurement within each system in problem solving situations. (339.01.e)	<b>Student Edition:</b> 228 #6, 441 #35, 513 #50
8.M.2.1.6	Solve problems involving area of circles and the perimeter and area of rectangles and triangles. (339.01.d)	<b>Student Edition:</b> 22 #13, 70, 110 #1, 441 #33, #34, 449 #7, 499-501, 533 #36
8.M.2.1.7	Use appropriate vocabulary and notations. (339.01.f)	<b>Student Edition:</b> 22 #13, 62, 101, 255, 338, 441, 499-501, 533, 615

STANDARDS		PAGE REFERENCES
<b>Goal 2.2: Apply the concepts of rates, ratios, and proportions.</b>		
<b>Objective(s): By the end of Grade 8, the student will be able to:</b>		
8.M.2.2.1	Use rates, proportions, ratios, and map scales in problem-solving situations. (339.03.a)	<b>Student Edition:</b> 24-27, 41 #29, 186 #21, 200-201, 389 #60-#62, 512 #36-#38, 513 #50, 630, 631, 660-662, 667-669, 677
8.M.2.2.2	Determine unit rates in real-world situations.	<b>Student Edition:</b> 53 #2, #5, 125 #24, 428 #15, 441 #35, 606, 626 #15
<b>Goal 2.3: Apply dimensional analysis.</b>		
<b>Objective(s): By the end of Grade 8, the student will be able to:</b>		
8.M.2.3.1	Illustrate the interrelationship of measurement units through dimensional analysis conversions. (339.04.a)	After defining the terms, the following pages can be used to meet this standard. <b>Student Edition:</b> 81, 123, 253 #14, 408 #21
<b>Standard 3: Concepts and Language of Algebra and Functions</b>		
Students in Grade 8 translate simple word statements and story problems into algebraic expressions and equations. Students use the order of operations in evaluating basic algebraic expressions and students solve one- and two-step equations and inequalities. Students represent a set of data in a table, as a graph, and as a mathematical relationship.		
<b>Goal 3.1: Use algebraic symbolism as a tool to represent mathematical relationships.</b>		
<b>Objective(s): By the end of Grade 8, the student will be able to:</b>		
8.M.3.1.1	Use variables in expressions, equations, and inequalities. (340.01.a)	<b>Student Edition:</b> 107 #42, #43, 126 #29-#33, 138 #23a, 227-229, 235 #14, #15, 261, 401, 402 #3, 407 #3
8.M.3.1.2	Translate simple word statements and story problems into algebraic expressions and equations. (340.01.b)	<b>Student Edition:</b> 80 #6, 107, 126, 138 #23a, 261 #15, 371 #34b, 402 #2, 428 #15, 449 #7 <i>Lab Investigation</i> 366-367
8.M.3.1.3	Use symbols "<," ">," "=", "≠," "≤," and "≥" to express relationships. (340.01.c)	<b>Student Edition:</b> 80 #6, 121 #4-#9, 178 #8, 183 #9-#14, 226, 228, 231, 235 #3-#11, 236, 240 <b>Teacher's Guide:</b> T 22, T 228, T 232

STANDARDS		PAGE REFERENCES
<b>Goal 3.2: Evaluate algebraic expressions.</b>		
<b>Objective(s): By the end of Grade 8, the student will be able to:</b>		
8.M.3.2.1	Use and apply the following properties in evaluating algebraic expressions: commutative, associative, identity, zero, inverse, distributive, and substitution. (340.02.a)	<b>Student Edition:</b> 22, 106 #32-#34, 242 #2d, 263-264, 278 #21b, 350 #11, 358, 361 #5, 372 #42-#44, 381, 427 <i>Lab Investigation</i> 219-222
8.M.3.2.2	Use the order of operations in evaluating simple algebraic expressions. (340.02.b)	<b>Student Edition:</b> 106 #32-#34, 126 #29-#33, 301 #18-#21, 364 #1-#4, 436 #2, #3
8.M.3.2.3	Simplify algebraic expressions. (340.02.c)	<b>Student Edition:</b> 126 #29-#33, 362-365, 388 #49, #50, 409 #22, #23, 427 #4-#6, 428 #11, #12, 429, 581 #21-#24
<b>Goal 3.3: Solve algebraic equations and inequalities.</b>		
<b>Objective(s): By the end of Grade 8, the student will be able to:</b>		
8.M.3.3.1	Solve one- and two-step equations and inequalities. (340.03.a)	<b>Student Edition:</b> 10 #3-#5, 40 #20-#28, 43 #33-#38, 107 #44, 227-229, 229-231, 235 #16, 240, 245-248, 261 #1-#3, 264, 268, 275 #1
8.M.3.3.2	Match graphical representations with simple linear equations. (340.03.b)	<b>Student Edition:</b> 4-5, 10 #3-#5, 16-19, 29-31, 34-35 <i>Family Letter</i> 3 <b>Teacher's Guide:</b> T 8, T 12, T 14
<b>Goal 3.4: Understand the concept of functions.</b>		
<b>Objective(s): By the end of Grade 8, the student will be able to:</b>		
8.M.3.4.1	Extend patterns and identify a rule (function) that generates the pattern using rational numbers. (343.01.a)	<b>Student Edition:</b> 81 #8, 166 #50, 224 #18, 488-489, 492-496, 510 #27, 511 #33 <b>Teacher's Guide:</b> T 492
8.M.3.4.2	Use relationships to explain how a change in one quantity may result in a change in another, and identify the relationship as a positive, negative, or neither. (343.01.b)	<b>Student Edition:</b> 31-35, 80-81 #7, #8, 104 #29, 111, 210 #8, 488-489, 491, 496 #2, 506 #10

STANDARDS		PAGE REFERENCES
8.M.3.4.3	Use appropriate vocabulary and notations. (343.01.c)	<b>Student Edition:</b> 25, 49, 52, 104 #29, 111, 224 #18, 488-489 <i>Family Letter</i> 3, 487
<b>Goal 3.5: Represent equations, inequalities and functions in a variety of formats.</b>		
<b>Objective(s): By the end of Grade 8, the student will be able to:</b>		
8.M.3.5.1	Represent a set of data in a table, as a graph, and as a mathematical relationship. (343.02.a)	<b>Student Edition:</b> 488-489, 492-496, 497-499, 501 #1-#4, 506, 508, 509, 511 #31-#33 <i>Lab Investigation</i> 502-503
<b>Goal 3.6: Apply functions to a variety of problems.</b>		
<b>Objective(s): By the end of Grade 8, the student will be able to:</b>		
8.M.3.6.1	Use patterns and linear functions to represent and solve problems. (343.03.a)	<b>Student Edition:</b> 81 #8, 116 #50, 224 #18, 488-489, 492-496, 510 #27, 511 #33 <b>Teacher's Guide:</b> T 492
<b>Standard 4: Concepts and Principles of Geometry</b>		
Students in Grade 8 describe and classify relationships among types of one-, two-, and three-dimensional geometric figures using their defining properties. Students apply the fundamental concepts, properties, and relationships among points, lines, rays, planes, angles, and shapes. Students identify and apply congruence, similarities, and line symmetry of shapes.		
<b>Goal 4.1: Apply concepts of size, shape, and spatial relationships.</b>		
<b>Objective(s): By the end of Grade 8, the student will be able to:</b>		
8.M.4.1.1	Describe and classify relationships among types of one-, two-, and three-dimensional geometric figures, using their defining properties. (341.01.a)	<b>Student Edition:</b> 107 #42-#43, 205 #53, 297, 465 #36, 533 #36 <i>Lab Investigation</i> 366-367
8.M.4.1.2	Draw and measure various angles and shapes using appropriate tools. (341.01.b)	<b>Student Edition:</b> 38 #2, 76, 126 #40, 294 #5, 301 #25, 341 #46, 453 #44, 536 #47, 564 #27-#29 <i>Lab Investigation</i> 366-367, 475-478
8.M.4.1.3	Apply the fundamental concepts, properties, and relationships among points, lines, rays, planes, and angles. (341.01.c)	<b>Student Edition:</b> 60 #20, 67 #22, 294, 298, 301 #25, 510 #27, 564 #27-#29 <i>Lab Investigation</i> 36-37, 475-478, 502-503 <i>Remember</i> 42, 72

STANDARDS		PAGE REFERENCES
8.M.4.1.4	Identify and model the effects of reflections, translations, rotations, and scaling on various shapes. (341.01.g)	<b>Student Edition:</b> 288-291, 302-308, 313-315, 322-328, 330-333 <i>Family Letter</i> 287 <i>Lab Investigation</i> 318-321
8.M.4.1.5	Identify congruence, similarities, and line symmetry of shapes. (341.01.d)	<b>Student Edition:</b> 206 #58, 280 #33-#38, 289-291, 294, 299, 302-304, 305-306, 308, 315, 329, 425 #52, 455, 595 #15, 662 <i>Lab Investigation</i> 475-478, 502-503 <b>Teacher's Guide:</b> T 302, T 306, T 329
8.M.4.1.6	Explain the concept of surface area and volume (capacity). (341.01.f)	<b>Student Edition:</b> 62 #30, 72, 338 #21, #22, 255 #23, #24, 338 #21, #22 <i>Lab Investigation</i> 502-503
8.M.4.1.7	Use appropriate vocabulary and symbols. (341.01.h)	<b>Student Edition:</b> 76, 126 #40, 205, 206, 280, 301, 302-308, 425, 533, 536
<b>Goal 4.2: Apply the geometry of right triangles.</b>		
No objectives at this grade level.		
<b>Goal 4.3: Apply graphing in two dimensions.</b>		
<b>Objective(s): By the end of Grade 8, the student will be able to:</b>		
8.M.4.3.1	Identify and plot points on a coordinate plane. (341.03.a)	<b>Student Edition:</b> 23 #25, 27 #1, #2, 45, 63 #32, 104 #28d, 339-342, 343-345, 346

STANDARDS		PAGE REFERENCES
<b>Standard 5: Data Analysis, Probability, and Statistics</b>		
Students in Grade 8 analyze and interpret tables, charts and graphs, including frequency tables, scatter plots, line graphs, line plots, bar graphs, histograms, circle graphs, and stem-and-leaf plots. Students collect, organize, and display data with appropriate notation in tables, charts, and graphs, including scatter plots, line graphs, line plots, bar graphs, histograms, and stem-and-leaf plots. Students choose and calculate the appropriate measure of central tendency – mean, median, and mode. Students recognize equally likely outcomes and make predictions based on experimental and theoretical probabilities.		
<b>Goal 5.1: Understand data analysis.</b>		
<b>Objective(s): By the end of Grade 8, the student will be able to:</b>		
8.M.5.1.1	Analyze and interpret tables, charts, and graphs, including frequency tables, scatter plots, broken line graphs, line plots, bar graphs, histograms, circle graphs, and stem-and-leaf plots. (342.01.a)	<b>Student Edition:</b> 45, 101, 120 #2, 352, 410 #36, 537, 562 #11, 602-604, 614-615, 625-627, 652 #1, #2
8.M.5.1.2	Explain and justify conclusions drawn from tables, charts, and graphs. (342.01.b)	<b>Student Edition:</b> 45, 58 #14, 101, 157 #4, 352, 389 #63, 410 #36, 441 #35, 537, 575, 608-612, 621, 625-627, 631, 633, 636, 643 #4
8.M.5.1.3	Use appropriate vocabulary and notations. (342.01.c)	<b>Student Edition:</b> 101, 352, 410 #36, 441 #35, 537
<b>Goal 5.2: Collect, organize, and display data.</b>		
<b>Objective(s): By the end of Grade 8, the student will be able to:</b>		
8.M.5.2.1	Collect, organize, and display data with appropriate notation in tables, charts, and graphs, including scatter plots, broken line graphs, line plots, bar graphs, histograms, and stem-and-leaf plots. (342.02.a)	<b>Student Edition:</b> 410 #36, 537, 575, 605-608, 625-627, 638-639, 645
<b>Goal 5.3: Apply simple statistical measurements.</b>		
<b>Objective(s): By the end of Grade 8, the student will be able to:</b>		
8.M.5.3.1	Choose and calculate the appropriate measure of central tendency – mean, median, and mode. (342.03.a)	<b>Student Edition:</b> 45, 53 #2, 54, 62 #28, 410 #36, 537, 614 #8, 616 <b>Teacher’s Guide:</b> T 614

STANDARDS		PAGE REFERENCES
8.M.5.3.2	Explain the significance of distribution of data, including range, frequency, gaps, and clusters. (342.03.b)	The following pages cover range and outliers. <b>Student Edition:</b> 54, 238 #40, 518-520
<b>Goal 5.4: Understand basic concepts of probability.</b>		
<b>Objective(s): By the end of Grade 8, the student will be able to:</b>		
8.M.5.4.1	Model situations of probability using simulations. (342.04.a)	<b>Student Edition:</b> 583-585, 588-589, 591 #4
8.M.5.4.2	Recognize equally likely outcomes. (342.01.c)	<b>Student Edition:</b> 544, 549, 558, 560 #8, 568, 569, 580, 590 #2, 593 #10
8.M.5.4.3	Explain that probability ranges from 0% to 100% and identify a situation as having high or low probability.	<b>Student Edition:</b> 544, 549, 560 #8, 568, 578-579, 649
8.M.5.4.4	Use the language of probability. (342.04.b)	<b>Student Edition:</b> 544, 549, 550-552, 560 <b>Teacher's Guide:</b> 543a
<b>Goal 5.5: Make predictions or decisions based on data.</b>		
<b>Objective(s): By the end of Grade 8, the student will be able to:</b>		
8.M.5.5.1	Make predictions based on experimental and theoretical probabilities. (342.05.a)	<b>Student Edition:</b> 482 #25, 551, 558-559, 563 #13, 573 #2, 638-639, 649 <i>Lab Investigation</i> 545-546
8.M.5.5.2	Conduct statistical experiments and interpret results using tables, charts, or graphs. (342.05.c)	<b>Student Edition:</b> 551-552, 554, 574 #3, 575, 638, 649
8.M.5.5.3	Use appropriate vocabulary and notations. (342.05.b)	<b>Student Edition:</b> 482, 551, 558, 580