



# IMPACT MATHEMATICS

## Algebra and More

**Course 3**  
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STANDARDS	PAGE REFERENCES
Grade 8	
<p><b>ALGEBRAIC REASONING: PATTERNS AND FUNCTIONS</b> Patterns and functional relationships can be represented and analyzed using a variety of strategies, tools and technologies.</p>	
<p><b>How do patterns and functions help us describe data and physical phenomena and solve a variety of problems?</b></p>	
<p><b>Students should...</b> <b>1.1 Understand and describe patterns and functional relationships.</b></p>	
<p>a. Analyze physical phenomena, functions and patterns to identify relationships and make generalizations. <b>(1)</b> Write recursive and explicit functions to generalize patterns. <b>(2)</b> Identify relationships that are linear and nonlinear and compare and contrast their properties using tables, graphs, equations and verbal descriptions. <b>(3)</b> Recognize and solve problems of direct variation.</p>	<p><b>Student Edition:</b> 4-23, 51-52, 66 #13, 74-77, 383 #6, 488-496, 511 #33, 514-524, 526, 554-555 <i>Lab Investigation</i> 96-97, 159-161 <b>Teacher's Guide:</b> T 489, 492</p>

STANDARDS	PAGE REFERENCES
<b>1.2 Represent and analyze quantitative relationships in a variety of ways.</b>	
<p>a. Describe the effects of characteristics of linear relationships on the way the relationships are represented verbally and in tables, graphs and equations.</p> <p>(1) Determine the constant rate of change in a linear relationship and recognize this as the slope of a line.</p> <p>(2) Compare and contrast the graphs of lines with the same slope versus those with different slopes.</p> <p>(3) Interpret slope and y-intercepts from contextual situations, graphs and linear equations.</p> <p>(4) Given two linear relationships in context, recognize that they may have a common solution.</p>	<p><b>Student Edition:</b> 4-5, 12-15, 39 #12, 43 #39, 46-50, 63 #32, 64-65, 66 #13, 80 #7, 121 #3, 351 #14-#16</p> <p><i>Lab Investigation</i> 96-97</p> <p><b>Teacher’s Guide:</b> T 48, 52</p> <p><b>Quick Review Math Handbook Book 3</b> 324-335, 337</p>
<b>1.3 Use operations, properties and algebraic symbols to determine equivalence and solve problems.</b>	
<p>a. Solve problems using various algebraic methods and properties.</p> <p>(1) Solve multistep equations using algebraic properties.</p> <p>(2) Use tables, graphs and equations to represent mathematical relationships and solve real-world problems.</p>	<p><b>Student Edition:</b> 22 #14-#17, 80 #4, 120, 123, 142-143, 214-218, 223 #1-#6, 245-248, 260-262, 263-265, 266-269, 281</p> <p><i>Lab Investigation</i> 219-222</p> <p><b>Teacher’s Guide:</b> T 222</p> <p><b>Quick Review Math Handbook Book 3</b> 296-305</p>
<b>NUMERICAL AND PROPORTIONAL REASONING: Quantitative relationships can be expressed numerically in multiple ways in order to make connections and simplify calculations using a variety of strategies, tools and technologies.</b>	
<b>How are quantitative relationships represented by numbers?</b>	
<b>Students should...</b>	
<b>2.1 Understand that a variety of numerical representations can be used to describe quantitative relationships.</b>	
<p>a. Compare and order integers, powers and roots using number lines and grids.</p> <p>(1) Compare, locate, label and order rational numbers on number lines, scales, coordinate grids and measurement tools.</p> <p>(2) Identify another rational number between any two rational numbers.</p> <p>(3) Solve a variety of problems involving integers, powers, roots and scientific notation.</p>	<p><b>Student Edition:</b> 152, 161 #15a-#15c, 204 #36, #37, 205 #54, 238 #40</p>

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<p>b. Extend the understanding of scientific notation to very small numbers.</p> <p>(1) Use powers of ten and negative exponents to write decimal fractions.</p> <p>(2) Use powers of ten and positive and negative exponents to express and compare magnitude of very large and very small numbers and connect to scientific notation.</p> <p>(3) Find the results of multiplication and division with powers of ten using patterns in operating with exponents.</p> <p>(4) Develop, describe and use a variety of methods to operate with very large and very small numbers.</p>	<p><b>Student Edition:</b> 148, 149-152, 156-158, 162-165, 175-181, 182 #2, 186 #20, 208</p> <p><i>Just the facts</i> 177</p> <p><i>Lab Investigation</i> 159-161</p> <p><b>Teacher's Guide:</b> T 148</p> <p><b>Quick Review Math Handbook Book 3</b> 172-174, 175, 182-186, 187, 191</p>
<p><b>2.2 Use numbers and their properties to compute flexibly and fluently, and to reasonably estimate measures and quantities.</b></p>	
<p>a. Solve problems involving fractions, decimals, ratios and percents.</p> <p>(1) Estimate and solve problems involving percent of increase and decrease.</p>	<p><b>Student Edition:</b> 41 #29, 101, 113-114, 120 #2, 123 #19, 138 #25, 165, 166 #49, 183 #7, 184 #17, 276 #7, 512 #36-#38, 617</p> <p><i>Lab Investigation</i> 159-161, 475-478</p> <p><b>Quick Review Math Handbook Book 3</b> 121, 125, 131, 139, 142, 148, 149, 150, 153, 158, 161, 311</p>
<p>b. Make generalizations about operations with very large and very small numbers.</p> <p>(1) Use the rules for exponents to multiply and divide with powers of ten, including negative exponents.</p> <p>(2) Develop, describe and use a variety of methods to estimate and calculate mentally with very large and very small numbers.</p>	<p><b>Student Edition:</b> 148, 149-152, 156-158</p> <p><i>Lab Investigation</i> 159-161</p> <p><b>Teacher's Guide:</b> T 148</p> <p><b>Quick Review Math Handbook Book 3</b> 182-186</p>
<p>c. Connect the exponential growth and decay models to repeated multiplication by the same factor.</p> <p>(1) Solve problems that involve repetitive patterns and iterations, such as compound interest, using tables, spreadsheets and calculators.</p>	<p><b>Student Edition:</b> 169-172, 173-174, 175-178, 178-181, 184 #17, 351 #17</p>

STANDARDS	PAGE REFERENCES
<p><b>GEOMETRY AND MEASUREMENT</b></p>	
<p>Shapes and structures can be analyzed, visualized, measured and transformed using a variety of strategies, tools and technologies.</p>	
<p>How do geometric relationships and measurements help us to solve problems and make sense of our world?</p>	
<p>Students should...</p>	
<p><b>3.1 Use properties and characteristics of two- and three-dimensional shapes and geometric theorems to describe relationships, communicate ideas and solve problems.</b></p>	
<p>a. Explore the relationships among sides, angles, perimeters, areas, surface areas and volumes of congruent and similar polygons and solids.</p> <p>(1) Explore the effect of scale factors on the length, area and volume ratios of similar polygons, circles and solids.</p> <p>(2) Make and test conjectures about the relationships among angles, sides, perimeters and areas of congruent and similar polygons, including the Pythagorean Theorem.</p>	<p><b>Student Edition:</b> 206 #58, 280 #33-#38, 315 #4, 329, 464 #25, 499-501</p> <p><i>Lab Investigation</i> 502-503</p> <p><b>Quick Review Math Handbook Book 3</b> 346-347, 369, 395, 425-426</p>
<p><b>3.2 Use spatial reasoning, location and geometric relationships to solve problems.</b></p>	
<p>a. Model geometric relationships in a variety of ways.</p> <p>(1) Use coordinate geometry to explore and test geometric relationships of parallel and perpendicular lines and polygons and their transformations.</p>	<p><b>Student Edition:</b> 289-291, 292-295, 295-296, 302-304, 305-306, 309, 313-315, 339, 340-342, 343-344, 356-347</p> <p><i>Lab Investigation</i> 36-37, 318-321</p> <p><b>Teacher's Guide:</b> T 289, 296</p> <p><b>Quick Review Math Handbook Book 3</b> 360-365</p>
<p><b>3.3 Develop and apply units, systems, formulas and appropriate tools to estimate and measure.</b></p>	
<p>a. Use a variety of concrete methods, including displacement, to find volumes of solids.</p> <p>(1) Develop measurement strategies to find the surface area and volume of pyramids, cones, spheres and irregular solids.</p> <p>(2) Use estimation and measurement strategies to solve problems involving the volumes of solids.</p>	<p><b>Student Edition:</b> 62 #30, 63 #32, 72</p> <p><i>Lab Investigation</i> 502-503</p> <p><b>Quick Review Math Handbook Book 3</b> 382-387</p>

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<p>b. Solve problems involving measurement through the use of appropriate tools, techniques and strategies.</p> <p>(1) Use the Pythagorean Theorem to solve indirect measurement problems.</p> <p>(2) Describe the accuracy of estimates and measures and the precision of measurement tools.</p> <p>(3) Solve dimensional analysis problems.</p>	<p><b>Student Edition:</b> 62 #30, 63 #32, 101, 157 #4, 161 #13, 170, 182 #1 <i>Lab Investigation</i> 502-503 <b>Quick Review Math Handbook Book 3</b> 396, 410, 444-451</p>
<p><b>WORKING WITH DATA: PROBABILITY AND STATISTICS</b> Data can be analyzed to make informed decisions using a variety of strategies, tools and technologies.</p>	
<p><b>How can collecting, organizing and displaying data help us analyze information and make reasonable predictions and informed decisions?</b></p>	
<p><b>Students should...</b> <b>4.1 Collect, organize and display data using appropriate statistical and graphical methods.</b></p>	
<p>a. Construct appropriate representations of data based on the size and kind of data set and the purpose for its use.</p> <p>(1) Collect, organize, display, compare and analyze large data sets.</p> <p>(2) Construct a variety of data displays, including box-and-whisker plots, and identify where measures of central tendency and dispersion are found in graphical displays.</p>	<p><b>Student Edition:</b> 45, 53, 120 #1, 124 #21, 352 #18, 537, 602-604, 605-608, 608-612, 612-615, 616-629 <b>Quick Review Math Handbook Book 3</b> 196-199, 222-229</p>
<p><b>4.2 Analyze data sets to form hypotheses and make predictions.</b></p>	
<p>a. Make and evaluate statistical claims and justify conclusions with evidence.</p> <p>(1) Make predictions from scatter plots using or estimating a line-of-best-fit.</p> <p>(2) Make inferences and evaluate reasonable hypotheses based on experimental data.</p> <p>(3) Analyze and interpret data using descriptive statistics, including range, mode, median, quartiles, outliers and mean.</p> <p>(4) Determine the accuracy of statistical claims.</p> <p>(5) Describe the role of random sampling, random number generation and the effects of sample size in statistical claims.</p>	<p><b>Student Edition:</b> 52-55, 66 #13, 602-604, 608-612, 615, 616 #1-#3, 631, 638-641, 642, 645 #8, 649 #15, 654 <b>Quick Review Math Handbook Book 3</b> 202, 204, 206, 209, 214-217, 218, 219, 222-231</p>

## STANDARDS

## PAGE REFERENCES

**4.3 Understand and apply basic concepts of probability.**

a. Determine possible outcomes using a variety of counting techniques.

**(1)** Distinguish between combinations and permutations as ways to predict possible outcomes in certain situations.

**(2)** Use combinations and permutations, trees and networks (counting strategies) in a variety of contexts, and identify when order is irrelevant in determining a solution.

**Student Edition:**

372, 482, 547-550, 550-557, 558-563, 566-568, 569-570, 571-572, 573-580, 583-586

*Lab Investigation* 545-546

**Teacher's Guide:**

T 583

***Quick Review Math Handbook Book 3***

232-239