



# Impact Mathematics

Course 3 © 2005

STANDARDS	PAGE REFERENCES
<b>Grade 8</b>	
<p><b>Number Sense and Operations</b></p> <p>Understand numbers, ways of representing numbers, relationships among numbers, and number systems</p> <p>Understand meanings of operations and how they relate to one another</p> <p>Compute fluently and make reasonable estimates</p>	
<p><i>Students engage in problem solving, communicating, reasoning, connecting, and representing as they:</i></p>	
<p><b>8.N.1</b> Compare, order, estimate, and translate among integers, fractions and mixed numbers (i.e., rational numbers), decimals, and percents.</p>	<p><b>Student Edition:</b>  <b>Course 2:</b> Lesson 4.1, pp. 218-219; Lesson 8.2, pp. 562-567  <b>Quick Review Math Handbook:</b>            Book 3, pp. 154-157</p>
<p><b>8.N.2</b> Define, compare, order, and apply frequently used irrational numbers, such as <math>\sqrt{2}</math> and <math>\pi</math>.</p>	<p><b>Student Edition:</b>            Lesson 3.3, pp. 200-205</p>
<p><b>8.N.3</b> Use ratios and proportions in the solution of problems, in particular, problems involving unit rates, scale factors, and rate of change.</p>	<p><b>Student Edition:</b>  <b>Course 2:</b> Lesson 8.1, pp. 520-531; Lesson 8.2, pp. 545-551  <b>Quick Review Math Handbook:</b>            Book 3, pp. 308-310, pp. 424-426</p>
<p><b>8.N.4</b> Represent numbers in scientific notation, and use them in calculations and problem situations.</p>	<p><b>Student Edition:</b>            Lesson 3.1, p. 148, pp. 151-152, pp. 156-161</p>

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<p><b>8.N.5</b> Apply number theory concepts, including prime factorization and relatively prime numbers, to the solution of problems.</p>	<p><b>Student Edition:</b>  <b>Course 1:</b> Lesson 2.1, pp. 76-87  <b>Quick Review Math Handbook:</b>  Book 3, pp. 88-90</p>
<p><b>8.N.6</b> Demonstrate an understanding of absolute value, e.g., <math> -3  =  3  = 3</math>.</p>	<p><b>Student Edition:</b>  Lesson 4.1, p. 224</p>
<p><b>8.N.7</b> Apply the rules of powers and roots to the solution of problems. Extend the Order of Operations to include positive integer exponents and square roots.</p>	<p><b>Student Edition:</b>  Lesson 3.1, pp. 146-158  <b>Course 2:</b> p. 14 (order of operations)  <b>Quick Review Math Handbook:</b>  Book 3, p. 82 (order of operations)</p>
<p><b>8.N.8</b> Demonstrate an understanding of the properties of arithmetic operations on rational numbers. Use the associative, commutative, and distributive properties; properties of the identity and inverse elements (e.g., <math>-7 + 7 = 0</math>; <math>3/4 \times 4/3 = 1</math>); and the notion of closure of a subset of the rational numbers under an operation (e.g., the set of odd integers is closed under multiplication but not under addition).</p>	<p><b>Student Edition:</b>  Lesson 6.1, pp. 358-365  <b>Teacher Edition:</b>  <b>Course 2:</b> Lesson 1.2, p. T32 (commutative and associative properties); Lesson 3.1, p. T148 (additive and multiplicative identity elements)  <b>Course 3:</b> Lesson 4.1, p. T220 (commutative property; additive and multiplicative inverse)</p> <p><i>Closure is not covered.</i></p>
<p><b>8.N.9</b> Use the inverse relationships of addition and subtraction, multiplication and division, and squaring and finding square roots to simplify computations and solve problems, e.g., multiplying by <math>1/2</math> or <math>0.5</math> is the same as dividing by 2.</p>	<p><b>Student Edition:</b>  Lesson 4.1, pp. 214-218; Lesson 7.1, pp. 432-438</p>
<p><b>8.N.10</b> Estimate and compute with fractions (including simplification of fractions), integers, decimals, and percents (including those greater than 100 and less than 1).</p>	<p><b>Student Edition:</b>  <b>Course 2:</b> Lesson 8.2, pp. 562-567 (percents)  <b>Course 1:</b> Lesson 2.2, pp. 104-105; Lesson 3.2, p. 179; Lesson 4.3, p. 262, p. 266  <b>Quick Review Math Handbook:</b>  Book 3, pp. 106-107; pp. 132-138; pp. 144-152</p>
<p><b>8.N.11</b> Determine when an estimate rather than an exact answer is appropriate and apply in problem situations.</p>	<p><b>Student Edition:</b>  Lesson 4.4, pp. 257-259  <b>Course 2:</b> Lesson 3.4, p. 209; Lesson 4.2, pp. 250-251; Lesson 8.4, pp. 588-589</p>

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<p><b>8.N.12</b> Select and use appropriate operations—addition, subtraction, multiplication, division, and positive integer exponents—to solve problems with rational numbers (including negatives).</p>	<p><b>Student Edition:</b> Lesson 4.1, pp. 214-218; Lesson 4.3, pp. 260-262</p>
<p><b>Patterns, Relations, and Algebra</b> Understand patterns, relations, and functions Represent and analyze mathematical situations and structures using algebraic symbols Use mathematical models to represent and understand quantitative relationships Analyze change in various contexts</p> <hr/> <p><i>Students engage in problem solving, communicating, reasoning, connecting, and representing as they:</i></p>	
<p><b>8.P.1</b> Extend, represent, analyze, and generalize a variety of patterns with tables, graphs, words, and, when possible, symbolic expressions. Include arithmetic and geometric progressions, e.g., compounding.</p>	<p><b>Student Edition:</b> Lesson 2.1, pp. 74-77; Lesson 2.2, pp. 93-95; Lesson 3.2, pp. 170-181; Lesson 8.2, pp. 515-517 <b>Course 2:</b> Lesson 2.1, pp. 79-83; Lesson 3.3, pp. 176-182; Lesson 5.3, pp. 345-353; Lesson 9.3, pp. 645-651</p>
<p><b>8.P.2</b> Evaluate simple algebraic expressions for given variable values, e.g., <math>3a^2 - b</math> for <math>a = 3</math> and <math>b = 7</math>.</p>	<p><b>Student Edition:</b> Lesson 2.1, pp. 70-73; Lesson 2.2, pp. 84-87</p>
<p><b>8.P.3</b> Demonstrate an understanding of the identity <math>(-x)(-y) = xy</math>. Use this identity to simplify algebraic expressions, e.g., <math>(-2)(-x+2) = 2x - 4</math>.</p>	<p><b>Student Edition:</b> <b>Course 2:</b> Lesson 4.2, pp. 245-247 <b>Quick Review Math Handbook:</b> Book 3, p. 94</p>
<p><b>8.P.4</b> Create and use symbolic expressions and relate them to verbal, tabular, and graphical representations.</p>	<p><b>Student Edition:</b> Lesson 1.1, pp. 4-15; Lesson 2.1, pp. 70-77; Lesson 2.2, pp. 83-95</p>

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<b>8.P.5</b>	Identify the slope of a line as a measure of its steepness and as a constant rate of change from its table of values, equation, or graph. Apply the concept of slope to the solution of problems.	<b>Student Edition:</b> Lesson 1.2, pp. 24-35
<b>8.P.6</b>	Identify the roles of variables within an equation, e.g., $y = mx + b$ , expressing $y$ as a function of $x$ with parameters $m$ and $b$ .	<b>Student Edition:</b> Lesson 1.1, pp. 4-15; Lesson 1.2, pp. 24-35
<b>8.P.7</b>	Set up and solve linear equations and inequalities with one or two variables, using algebraic methods, models, and/or graphs.	<b>Student Edition:</b> Lesson 4.1, pp. 214-218; Lesson 4.2, pp. 227-234; Lesson 4.3, pp. 241-248
<b>8.P.8</b>	Explain and analyze—both quantitatively and qualitatively, using pictures, graphs, charts, or equations—how a change in one variable results in a change in another variable in functional relationships, e.g., $C = \pi d$ , $A = \pi r^2$ ( $A$ as a function of $r$ ), $A_{\text{rectangle}} = lw$ ( $A_{\text{rectangle}}$ as a function of $l$ and $w$ ).	<b>Student Edition:</b> Lesson 1.1, pp. 6-15; Lesson 8.1, pp. 490-501; Lesson 8.2, pp. 515-521
<b>8.P.9</b>	Use linear equations to model and analyze problems involving proportional relationships. Use technology as appropriate.	<b>Student Edition:</b> Lesson 1.1, pp. 6-15
<b>8.P.10</b>	Use tables and graphs to represent and compare linear growth patterns. In particular, compare rates of change and $x$ - and $y$ -intercepts of different linear patterns.	<b>Student Edition:</b> Lesson 1.1, pp. 6-15; Lesson 2.2, p. 25-35

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<p><b>Geometry</b></p> <p>Analyze characteristics and properties of two- and three-dimensional geometric shapes and develop mathematical arguments about geometric relationships</p> <p>Specify locations and describe spatial relationships using coordinate geometry and other representational systems</p> <p>Apply transformations and use symmetry to analyze mathematical situations</p> <p>Use visualization, spatial reasoning, and geometric modeling to solve problems</p> <hr/> <p><i>Students engage in problem solving, communicating, reasoning, connecting, and representing as they:</i></p>	
<p><b>8.G.1</b> Analyze, apply, and explain the relationship between the number of sides and the sums of the interior and exterior angle measures of polygons.</p>	<p><b>Quick Review Math Handbook:</b> Book 3, pp. 355-356</p>
<p><b>8.G.2</b> Classify figures in terms of congruence and similarity, and apply these relationships to the solution of problems.</p>	<p><b>Student Edition:</b> <b>Course 2:</b> Lesson 7.1, pp. 451-463; Lesson 7.2, pp. 472-475; Lesson 8.2, pp. 548-550 <b>Quick Review Math Handbook:</b> Book 3, pp. 424-425</p>
<p><b>8.G.3</b> Demonstrate an understanding of the relationships of angles formed by intersecting lines, including parallel lines cut by a transversal.</p>	<p><b>Student Edition:</b> <b>Course 1:</b> Lesson 8.1, pp. 472-473 (intersecting) <i>Parallel lines cut by a transversal is not covered.</i></p>
<p><b>8.G.4</b> Demonstrate an understanding of the Pythagorean theorem. Apply the theorem to the solution of problems.</p>	<p><b>Student Edition:</b> The Pythagorean Theorem is covered in Course 1 and Course 2. It is reviewed in Course 3, Lesson 3.3, p. 202. <b>Quick Review Math Handbook:</b> Book 3, pp. 394-396</p>
<p><b>8.G.5</b> Use a straightedge, compass, or other tools to formulate and test conjectures, and to draw geometric figures.</p>	<p><b>Student Edition:</b> Lesson 5.1, pp. 289-296 <b>Course 2:</b> Lesson 7.4, p. 454, pp. 501-502; Lesson 7.2, p. 475 <b>Quick Review Math Handbook:</b> Book 3, pp. 444-448</p>
<p><b>8.G.6</b> Predict the results of transformations on unmarked or coordinate planes and draw the transformed figure, e.g., predict how tessellations transform under translations, reflections, and rotations.</p>	<p><b>Student Edition:</b> Lesson 5.1, pp. 289-296; Lesson 5.2, pp. 302-308; Lesson 5.3, pp. 313-321; Lesson 5.5, pp. 340-345</p>

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<b>8.G.7</b>	Identify three-dimensional figures (e.g., prisms, pyramids) by their physical appearance, distinguishing attributes, and spatial relationships such as parallel faces.	<b>Student Edition:</b> <b>Course 2:</b> Lesson 2.3, pp. 109-116 <b>Quick Review Math Handbook:</b> Book 3, pp. 356-357
<b>8.G.8</b>	Recognize and draw two-dimensional representations of three-dimensional objects, e.g., nets, projections, and perspective drawings.	<b>Student Edition:</b> Course 2: Lesson 2.4, pp. 130-133 <b>Quick Review Math Handbook:</b> Book 3, pp. 378-380
<p><b>Measurement</b> Understand measurable attributes of objects and the units, systems, and processes of measurement Apply appropriate techniques, tools and formulas to determine measurements</p> <hr/> <p><i>Students engage in problem solving, communicating, reasoning, connecting, and representing as they:</i></p>		
<b>8.M.1</b>	Select, convert (within the same system of measurement), and use appropriate units of measurement or scale.	<b>Student Edition:</b> <b>Course 2:</b> Lesson 2.3, pp. 114-115; Lesson 2.4, pp. 131-133; Lesson 5.1, pp. 301-302, pp. 314-317 <b>Quick Review Math Handbook:</b> Book 3, pp. 412-413, pp. 416-418, p. 420
<b>8.M.2</b>	Given the formulas, convert from one system of measurement to another. Use technology as appropriate.	<b>Student Edition:</b> <b>Course 2:</b> Lesson 5.1, p. 318 <b>Quick Review Math Handbook:</b> Book 3, p. 414, p. 420
<b>8.M.3</b>	Demonstrate an understanding of the concepts and apply formulas and procedures for determining measures, including those of area and perimeter/circumference of parallelograms, trapezoids, and circles. Given the formulas, determine the surface area and volume of rectangular prisms, cylinders, and spheres. Use technology as appropriate.	<b>Student Edition:</b> <b>Course 1:</b> Lesson 8.2, pp. 482-489; Lesson 8.3, pp. 495-507; Lesson 8.4, pp. 515-524 (area and perimeter of parallelograms, circles) <b>Course 2:</b> Lesson 2.3, pp. 110-118 (volume of rectangular prisms and cylinders) <b>Quick Review Math Handbook:</b> Book 3, pp. 373-376, p. 392, pp. 383-384 <i>Volume and surface area of spheres is not covered.</i>
<b>8.M.4</b>	Use ratio and proportion (including scale factors) in the solution of problems, including problems involving similar plane figures and indirect measurement.	<b>Student Edition:</b> Lesson 5.5, pp. 330-333, Appendix, pp. 660-663

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<p><b>8.M.5</b> Use models, graphs, and formulas to solve simple problems involving rates, e.g., velocity and density.</p>	<p><b>Student Edition:</b>  <b>Course 2:</b> Lesson 5.1, pp. 301-311; Lesson 3.2, pp. 322-327  <b>Quick Review Math Handbook:</b>            Book 3, pp. 308-311</p>
<p><b>Data Analysis, Statistics, and Probability</b>            Formulate questions that can be addressed with data and collect, organize, and display relevant data to answer them            Select and use appropriate statistical methods to analyze data            Develop and evaluate inferences and predictions that are based on data            Understand and apply basic concepts of probability</p> <hr/> <p><i>Students engage in problem solving, communicating, reasoning, connecting, and representing as they:</i></p>	
<p><b>8.D.1</b> Describe the characteristics and limitations of a data sample. Identify different ways of selecting a sample, e.g., convenience sampling, responses to a survey, random sampling.</p>	<p><b>Student Edition:</b>  <b>Course 2:</b> Lesson 10.3, pp. 692–699  <b>Quick Review Math Handbook:</b>            Book 3, pp. 196-199</p>
<p><b>8.D.2</b> Select, create, interpret, and utilize various tabular and graphical representations of data, e.g., circle graphs, Venn diagrams, scatterplots, stem-and-leaf plots, box-and-whisker plots, histograms, tables, and charts. Differentiate between continuous and discrete data and ways to represent them.</p>	<p><b>Student Edition:</b>            Lesson 8.2, p. 537  <b>Course 2:</b> Lesson 10.4, pp. 710-717  <b>Quick Review Math Handbook:</b>            Book 3, pp. 202-212</p>
<p><b>8.D.3</b> Find, describe, and interpret appropriate measures of central tendency (mean, median, and mode) and spread (range) that represent a set of data. Use these notions to compare different sets of data.</p>	<p><b>Student Edition:</b>  <b>Course 1:</b> Lesson 6.2, pp. 362-376  <b>Quick Review Math Handbook:</b>            Book 3, pp. 222-228</p>
<p><b>8.D.4</b> Use tree diagrams, tables, organized lists, basic combinatorics (“fundamental counting principle”), and area models to compute probabilities for simple compound events, e.g., multiple coin tosses or rolls of dice.</p>	<p><b>Student Edition:</b>  <b>Course 2:</b> Lesson 10.1, pp. 666-671; Lesson 10.2, pp. 675-677  <b>Quick Review Math Handbook:</b>            Book 3, pp. 232-238</p>