



# IMPACT

## Mathematics

COURSE 1

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STANDARDS	PAGE REFERENCES
<b>Number &amp; Operation</b>	
<b>Read, write, represent and compare positive rational numbers expressed as fractions, decimals, percents and ratios; write positive integers as products of factors; use these representations in real-world and mathematical situations.</b>	
<p>6.1.1.1 Locate positive rational numbers on a number line and plot pairs of positive rational numbers on a coordinate grid.</p>	<p><b>Student Edition:</b> 88-89, 90, 358-359, 491-494, 495-499, 509-512, 515-518, 519-521 <i>On Your Own Exercises</i> 100,102, 503-508, 524-527 <i>Inquiry Investigation</i> 522-523</p> <p><b>Teacher Guide:</b> 509B A 492, 495, 511, 513, 520; DU 88-91, 490-494, 497-499, 511-512, 513-514, 515-517, 519-521; QQ 508, 527; RAL 499, 516</p>

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<p>6.1.1.2</p> <p>Compare positive rational numbers represented in various forms. Use the symbols &lt; and &gt;.</p> <p><i>For example:</i> <math>\frac{1}{2} &gt; 0.36</math>.</p>	<p><b>Student Edition:</b> 64-65, 357-361 <i>On Your Own Exercises</i> 68-73, 100-104, 362-367 <i>Inquiry Investigation</i> 82-83</p> <p><b>Teacher Guide:</b> A 64; DU 64-65; QQ 73; RAL 359; T 65, 359, 360</p>
<p>6.1.1.3</p> <p>Understand that percent represents parts out of 100 and ratios to 100.</p> <p><i>For example:</i> 75% is equivalent to the ratio 75 to 100, which is equivalent to the ratio 3 to 4.</p>	<p><b>Student Edition:</b> 348-351, 352-354, 354-357 <i>On Your Own Exercises</i> 362-367</p> <p><b>Teacher Edition:</b> A 353, 356; DU 349-351, 353-354; T 357</p>
<p>6.1.1.4</p> <p>Determine equivalences among fractions, decimals and percents; select among these representations to solve problems.</p> <p><i>For example:</i> Since <math>\frac{1}{10}</math> is equivalent to 10%, if a woman making \$25 an hour gets a 10% raise, she will make an additional \$2.50 an hour, because \$2.50 is <math>\frac{1}{10}</math> of \$25.</p>	<p><b>Student Edition:</b> 61-63, 88-91, 91-93, 94-97, 354-357 <i>On Your Own Exercises</i> 68-73, 100-104, 362-367</p> <p><b>Teacher Guide:</b> A 91, 93, 356; DU 61-63, 88-91, 355-357; MB 62; QQ 73, RAL 61, 90, 94, 355; T92</p>
<p>6.1.1.5</p> <p>Factor whole numbers; express a whole number as a product of prime factors with exponents.</p> <p><i>For example:</i> <math>24 = 2^3 \times 3</math>.</p>	<p><b>Student Edition:</b> 113-116 <i>On Your Own Exercises</i> 117-119</p> <p><b>Teacher Guide:</b> A 114; DU 114-116; QQ 119; RAL 113, 115</p>
<p>6.1.1.6</p> <p>Determine greatest common factors and least common multiples. Use common factors and common multiples to do arithmetic with fractions and find equivalent fractions.</p> <p><i>For example:</i> Factor the numerator and denominator of a fraction to determine an equivalent fraction.</p>	<p><b>Student Edition:</b> 61-63, 64-65 <i>Math Link</i> 63</p> <p><b>Teacher Guide:</b> ML 63; TT 62; WU 64</p>
<p>6.1.1.7</p> <p>Convert between equivalent representations of positive rational numbers.</p> <p><i>For example:</i> Express <math>\frac{10}{7}</math> as <math>\frac{7+3}{7} = \frac{7}{7} + \frac{3}{7} = 1\frac{3}{7}</math>.</p>	<p><b>Student Edition:</b> 58-60, 352-354 <i>On Your Own Exercises</i> 68-73</p> <p><b>Teacher Guide:</b> A 59; DU 59-60; MB 60; QQ 73</p>

## STANDARDS

## PAGE REFERENCES

**Understand the concept of ratio and its relationship to fractions and to the multiplication and division of whole numbers. Use ratios to solve real-world and mathematical problems.**

<p>6.1.2.1 Identify and use ratios to compare quantities; understand that comparing quantities using ratios is not the same as comparing quantities using subtraction.</p> <p><i>For example:</i> In a classroom with 15 boys and 10 girls, compare the numbers by subtracting (there are 5 more boys than girls) or by dividing (there are 1.5 times as many boys as girls). The comparison using division may be expressed as a ratio of boys to girls (3 to 2 or 3:2 or 1.5 to 1).</p>	<p><b>Student Edition:</b> 294-296, 297-299 <i>On Your Own Exercises</i> 302-307</p> <p><b>Teacher Guide:</b> A 298; DU 295-296; RAL 296, 297; T 294</p>
<p>6.1.2.2 Apply the relationship between ratios, equivalent fractions and percents to solve problems in various contexts, including those involving mixtures and concentrations.</p> <p><i>For example:</i> If 5 cups of trail mix contains 2 cups of raisins, the ratio of raisins to trail mix is 2 to 5. This ratio corresponds to the fact that the raisins are <math>\frac{2}{5}</math> of the total, or 40% of the total. And if one trail mix consists of 2 parts peanuts to 3 parts raisins, and another consists of 4 parts peanuts to 8 parts raisins, then the first mixture has a higher concentration of peanuts.</p>	<p><b>Student Edition:</b> 288-289, 290-294, 294-296, 297-299, 299-301, 308-311, 312-313 <i>On Your Own Exercises</i> 302-307, 316-320 <i>Inquiry Investigation</i> 314-315</p> <p><b>Teacher Edition:</b> 290B, 308B A 291, 298, 315; DU 291-294, 295-296, 298-299, 299-301; KV 289; MB 292; RAL 295, 296, 299, 314; T 294</p>
<p>6.1.2.3 Determine the rate for ratios of quantities with different units.</p> <p><i>For example:</i> 60 miles in 3 hours is equivalent to 20 miles in one hour (20 mph).</p>	<p><b>Student Edition:</b> 299-301, 325-326, 327-331, 332-334 <i>On Your Own Exercises</i> 304-305, 335-340, 339 #23</p> <p><b>Teacher Edition:</b> A 328, 329; DU 299-301, 325-326, 328-331; MB 325; RAL 299</p>

STANDARDS	PAGE REFERENCES
<p>6.1.2.4</p> <p>Use reasoning about multiplication and division to solve ratio and rate problems.</p> <p><i>For example:</i> If 5 items cost \$3.75, and all items are the same price, then 1 item costs 75 cents, so 12 items cost \$9.00.</p>	<p><b>Student Edition:</b> 288-289, 290-294, 294-296, 297-299, 299-301, 308-311, 312-313</p> <p><i>On Your Own Exercises</i> 302-307, 316-320</p> <p><i>Inquiry Investigation</i> 314-315</p> <p><b>Teacher Edition:</b> 290B, 308B</p> <p>A 291, 298, 315; DU 291-294, 295-296, 298-299, 299-301; KV 289; MB 292; RAL 295, 296, 299, 314; T 294</p>
<p><b>Multiply and divide decimals, fractions and mixed numbers; solve real-world and mathematical problems using arithmetic with positive rational numbers.</b></p>	
<p>6.1.3.1</p> <p>Multiply and divide decimals and fractions, using efficient and generalizable procedures, including standard algorithms.</p>	<p><b>Student Edition:</b> 222-225, 226-229, 229-232, 242-245, 245-247, 248-250, 251-254, 254-256</p> <p><i>On Your Own Exercises</i> 233-241, 257-264</p> <p><b>Teacher Guide:</b> 242B</p> <p>A 222, 226, 227; DU 222-225, 243-245, 245-247, 248-250, 251-254; MB 232; QQ 264; RAL 225, 251; T 245, 254; TT 230</p>
<p>6.1.3.2</p> <p>Use the meanings of fractions, multiplication, division and the inverse relationship between multiplication and division to make sense of procedures for multiplying and dividing fractions.</p> <p><i>For example:</i> Just as <math>\frac{12}{4}=3</math> means <math>12=3\times 4</math>, <math>\frac{2}{3}\div\frac{4}{5}=\frac{5}{6}</math> means <math>\frac{5}{6}\times\frac{4}{5}=\frac{2}{3}</math>.</p>	<p><b>Student Edition:</b> 222-225, 226-229, 229-232</p> <p><i>On Your Own Exercises</i> 233-241</p> <p><b>Teacher Guide:</b> A 222, 226, 227; DU 222-225; MB 232; RAL 225, 231; TT 230</p>
<p>6.1.3.3</p> <p>Calculate the percent of a number and determine what percent one number is of another number to solve problems in various contexts.</p> <p><i>For example:</i> If John has \$45 and spends \$15, what percent of his money did he keep?</p>	<p><b>Student Edition:</b> 368-371, 372-375, 380-384, 384-387</p> <p><i>On Your Own Exercises</i> 376-379, 390-392</p> <p><i>Inquiry Investigation</i> 388-389</p> <p><b>Teacher Guide:</b> 368B</p> <p>A 374, 380, 383; DU 372-375, 382-384, 385-387; QQ 379, 392; RAL 371, 375, 385; T 371, 384</p>

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<p>6.1.3.4</p> <p>Solve real-world and mathematical problems requiring arithmetic with decimals, fractions and mixed numbers.</p>	<p><b>Student Edition:</b>  198-201, 201-204, 205-207, 216-219, 219-221, 222-225, 226-229, 229-232, 242-245, 245-247, 248-250, 251-254, 254-256</p> <p><i>Inquiry Investigation</i> 208-209</p> <p><i>On Your Own Exercises</i> 210-214, 233-241, 257-264</p> <p><b>Teacher Guide:</b>  198B, 216B, 242B</p> <p>A 201, 207, 220, 221, 222, 226, 227; DU 199-201, 202-204, 206-207, 217-219, 220-221, 222-225, 243-245, 245-247, 251-254; MB 217, 232; QQ 215; RAL 200, 204, 205, 218, 225, 231, 251; T198, 219, 254; TT230</p>
<p>6.1.3.5</p> <p>Estimate solutions to problems with whole numbers, fractions and decimals and use the estimations to assess the reasonableness of computations and of results in the context of the problem.</p> <p><i>For example:</i> The sum <math>\frac{1}{3} + 0.25</math> can be estimated to be between <math>\frac{1}{2}</math> and 1, and this estimate can be used as a check on the result of a more detailed calculation.</p>	<p><b>Student Edition:</b>  242-245, 248-250, 251-254</p> <p><i>On Your Own Exercises</i> 257-264</p> <p><b>Teacher Guide:</b>  DU 243-244, 251-254; EP 242</p>
<p>Algebra</p> <p><b>Recognize and represent relationships between varying quantities; translate from one representation to another; use patterns, tables, graphs and rules to solve real-world and mathematical problems.</b></p>	
<p>6.2.1.1</p> <p>Understand that a variable can be used to represent a quantity that can change, often in relationship to another changing quantity. Use variables in various contexts.</p> <p><i>For example:</i> If a student earns \$7 an hour in a job, the amount of money earned can be represented by a variable and is related to the number of hours worked, which also can be represented by a variable.</p>	<p><b>Student Edition:</b>  308, 495-499, 552-554</p> <p><i>On Your Own Exercises</i> 503-508, 557 #19</p> <p><b>Teacher Guide:</b>  A 495; DU 497-498, 553-554; RAL 499</p>

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<p>6.2.1.2</p> <p>Represent the relationship between two varying quantities with function rules, graphs and tables; translate between any two of these representations.</p> <p><i>For example:</i> Describe the terms in the sequence of perfect squares</p> <p><math>t = 1, 4, 9, 16, \dots</math> by using the rule <math>t = n^2</math> for <math>n = 1, 2, 3, 4, \dots</math></p>	<p><b>Student Edition:</b> 149-152, 152-156, 160-162, 550-552, 552-554 <i>Inquiry Investigation</i> 157-159 <i>On Your Own Exercises</i> 166-173, 555-559</p> <p><b>Teacher Guide:</b> DU 149-151, 161-162; RAL 158,160</p>
<p><b>Use properties of arithmetic to generate equivalent numerical expressions and evaluate expressions involving positive rational numbers</b></p>	
<p>6.2.2.1</p> <p>Apply the associative, commutative and distributive properties and order of operations to generate equivalent expressions and to solve problems involving positive rational numbers.</p> <p><i>For example:</i> <math>\frac{32}{15} \times \frac{5}{6} = \frac{32 \times 5}{15 \times 6} = \frac{2 \times 16 \times 5}{3 \times 5 \times 3 \times 2} = \frac{16}{9} \times \frac{2}{2} \times \frac{5}{5} = \frac{16}{9}</math>.</p> <p><i>Another example:</i> Use the distributive law to write:</p> $\frac{1}{2} + \frac{1}{3} \left( \frac{9}{2} - \frac{15}{8} \right) = \frac{1}{2} + \frac{1}{3} \times \frac{9}{2} - \frac{1}{3} \times \frac{15}{8} = \frac{1}{2} + \frac{3}{2} - \frac{5}{8} = 2 - \frac{5}{8} = 1\frac{3}{8}$	<p><b>Student Edition:</b> 126-129, 130-132, 174-178, 179-183 <i>On Your Own Exercises</i> 187-190</p> <p><b>Teacher Edition:</b> A 176, 177, 180, 182; DU 175-178, 179; RAL 174, 175, 178, 183;</p>
<p><b>Understand and interpret equations and inequalities involving variables and positive rational numbers. Use equations and inequalities to represent real-world and mathematical problems; use the idea of maintaining equality to solve equations. Interpret solutions in the original context.</b></p>	
<p>6.2.3.1</p> <p>Represent real-world or mathematical situations using equations and inequalities involving variables and positive rational numbers.</p> <p><i>For example:</i> The number of miles <math>m</math> in a <math>k</math> kilometer race is represented by the equation <math>m = 0.62 k</math>.</p>	<p><b>Student Edition:</b> 149-152, 152-156, 160-162, 550-552, 552-554 <i>Inquiry Investigation</i> 157-159 <i>On Your Own Exercises</i> 166-173, 555-559</p> <p><b>Teacher Guide:</b> DU 149-151, 161-162; RAL 158,160</p>

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<p>6.2.3.2</p> <p>Solve equations involving positive rational numbers using number sense, properties of arithmetic and the idea of maintaining equality on both sides of the equation. Interpret a solution in the original context and assess the reasonableness of results.</p> <p><i>For example:</i> A cellular phone company charges \$0.12 per minute. If the bill was \$11.40 in April, how many minutes were used?</p>	<p><b>Student Edition:</b>  40-44, 44-47, 534-536, 536-538, 546-549, 550-552, 553-554, 560-563, 563-565, 566-567  <i>On Your Own Exercises</i> 48-51, 541-545, 555-559, 568-572  <i>Inquiry Investigation</i> 539-540  <i>Review and Self-Assessment</i> 573-575</p> <p><b>Teacher Guide:</b>  A 534; DU 41-43, 535, 537-538, 547-549, 550-552, 553-554, 563-565, 567; QQ 545, 559, 572; RAL 42, 537, 549, 564</p>
<p>Geometry &amp; Measurement</p>	
<p><b>Calculate perimeter, area, surface area and volume of two- and three-dimensional figures to solve real-world and mathematical problems.</b></p>	
<p>6.3.1.1</p> <p>Calculate the surface area and volume of prisms and use appropriate units, such as <math>\text{cm}^2</math> and <math>\text{cm}^3</math>. Justify the formulas used. Justification may involve decomposition, nets or other models.</p> <p><i>For example:</i> The surface area of a triangular prism can be derived by decomposing the surface into two triangles and three rectangles.</p>	<p><b>Student Edition:</b>  434-437, 437-440  <i>On Your Own Exercises</i> 444-447  <i>Review and Self-Assessment</i> 464-465</p> <p><b>Teacher Guide:</b>  434B  DU 435-437, 438-440; QQ 447; RAL 435</p>
<p>6.3.1.2</p> <p>Calculate the area of quadrilaterals. Quadrilaterals include squares, rectangles, rhombuses, parallelograms, trapezoids and kites. When formulas are used, be able to explain why they are valid.</p> <p><i>For example:</i> The area of a kite is one-half the product of the lengths of the diagonals, and this can be justified by decomposing the kite into two triangles.</p>	<p><b>Student Edition:</b>  409-412, 413-416, 416-419  <i>On Your Own Exercises</i> 425-433</p> <p><b>Teacher Guide:</b>  409B  A 412; DU 410-412; QQ 433; T 410</p>
<p>6.3.1.3</p> <p>Estimate the perimeter and area of irregular figures on a grid when they cannot be decomposed into common figures and use correct units, such as <math>\text{cm}</math> and <math>\text{cm}^2</math>.</p>	<p><b>Student Edition:</b>  40-44, 419-421, 422-424  <i>On Your Own Exercises</i> 425-433</p> <p><b>Teacher Edition:</b>  A 424; DU 41-44, 420-421, 422-424; RAL 45, 422; T 419</p>

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<b>Understand and use relationships between angles in geometric figures.</b>	
<p>6.3.2.1 Solve problems using the relationships between the angles formed by intersecting lines.</p> <p><i>For example:</i> If two streets cross, forming four corners such that one of the corners forms an angle of <math>120^\circ</math>, determine the measures of the remaining three angles.</p> <p><i>Another example:</i> Recognize that pairs of interior and exterior angles in polygons have measures that sum to <math>180^\circ</math>.</p>	<p><b>Student Edition:</b> 25-29, 30-34 <i>On Your Own Exercises</i> 35-39</p> <p><b>Teacher Guide:</b> A 31; DU 28-29, 30-34; MB 27; RAL 26, 30, 33</p>
<p>6.3.2.2 Determine missing angle measures in a triangle using the fact that the sum of the interior angles of a triangle is <math>180^\circ</math>. Use models of triangles to illustrate this fact.</p> <p><i>For example:</i> Cut a triangle out of paper, tear off the corners and rearrange these corners to form a straight line.</p> <p><i>Another example:</i> Recognize that the measures of the two acute angles in a right triangle sum to <math>90^\circ</math>.</p>	<p><b>Student Edition:</b> 24-29, 30-34 <i>On Your Own Exercises</i> 35-39</p> <p><b>Teacher Guide:</b> DU 28-29, 30-34; MB 27; RAL 26, 33; T 34</p>
<p>6.3.2.3 Develop and use formulas for the sums of the interior angles of polygons by decomposing them into triangles.</p>	<p><b>Student Edition:</b> 4-8, 8-11, 12-15 <i>Inquiry Investigation</i> 16-17 <i>On Your Own Exercises</i> 18-23</p> <p><b>Teacher Edition:</b> A 11; DU 7-8, 10-11; RAL 8, 9, 16</p>
<b>Choose appropriate units of measurement and use ratios to convert within measurement systems to solve real-world and mathematical problems.</b>	
<p>6.3.3.1 Solve problems in various contexts involving conversion of weights, capacities, geometric measurements and times within measurement systems using appropriate units.</p>	<p><b>Student Edition:</b> 449-453, 454-456 <i>On Your Own Exercises</i> 257 #3-#8, 457-460</p> <p><b>Teacher Guide:</b> 449B A 453; DU 450-453; QQ 461; RAL 450, 456; T254</p>

STANDARDS	PAGE REFERENCES
<p>6.3.3.2 Estimate weights, capacities and geometric measurements using benchmarks in measurement systems with appropriate units.</p> <p><i>For example:</i> Estimate the height of a house by comparing to a 6-foot man standing nearby.</p>	<p><b>Student Edition:</b> 449-453, 454-456 <i>On Your Own Exercises</i> 257 #3-#8, 457-460</p> <p><b>Teacher Guide:</b> 449B A 453; DU 450-453; QQ 461; RAL 450, 456; T254</p>
<b>Data Analysis &amp; Probability</b>	
<b>Use probabilities to solve real-world and mathematical problems; represent probabilities using fractions, decimals and percents.</b>	
<p>6.4.1.1 Determine the sample space (set of possible outcomes) for a given experiment and determine which members of the sample space are related to certain events. Sample space may be determined by the use of tree diagrams, tables or pictorial representations.</p> <p><i>For example:</i> A <math>6 \times 6</math> table with entries such as (1,1), (1,2), (1,3), ..., (6,6) can be used to represent the sample space for the experiment of simultaneously rolling two number cubes.</p>	<p><b>Student Edition:</b> 617-620, 621-625, 628-632 <i>Inquiry Investigation</i> 626-627 <i>On Your Own Exercises</i> 633-637</p> <p><b>Teacher Guide:</b> 617B A 619, 631; DU 618-620, 621-625, 628-631; T 620, 632</p>
<p>6.4.1.2 Determine the probability of an event using the ratio between the size of the event and the size of the sample space; represent probabilities as percents, fractions and decimals between 0 and 1 inclusive. Understand that probabilities measure likelihood.</p> <p><i>For example:</i> Each outcome for a balanced number cube has probability <math>\frac{1}{6}</math>, and the probability of rolling an even number is <math>\frac{1}{2}</math>.</p>	<p><b>Student Edition:</b> 621-625, 628-632 <i>Inquiry Investigation</i> 626-627 <i>On Your Own Exercises</i> 633-637</p> <p><b>Teacher Guide:</b> 617B DU 621-625; MB 621, 622; RAL 617, 623</p>
<p>6.4.1.3 Perform experiments for situations in which the probabilities are known, compare the resulting relative frequencies with the known probabilities; know that there may be differences.</p> <p><i>For example:</i> Heads and tails are equally likely when flipping a fair coin, but if several different students flipped fair coins 10 times, it is likely that they will find a variety of relative frequencies of heads and tails.</p>	<p><b>Student Edition:</b> 617-620, 621-625, 628-632 <i>Inquiry Investigation</i> 626-627 <i>On Your Own Exercises</i> 633-637</p> <p><b>Teacher Edition:</b> 617B A 619, 631; DU 618-620, 621-625, 628-631; T 620, 632</p>

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<p>6.4.1.4 Calculate experimental probabilities from experiments; represent them as percents, fractions and decimals between 0 and 1 inclusive. Use experimental probabilities to make predictions when actual probabilities are unknown.</p> <p><i>For example:</i> Repeatedly draw colored chips with replacement from a bag with an unknown mixture of chips, record relative frequencies, and use the results to make predictions about the contents of the bag.</p>	<p><b>Student Edition:</b> 621-625, 628-632 <i>Inquiry Investigation</i> 626-627 <i>On Your Own Exercises</i> 633-637</p> <p><b>Teacher Guide:</b> 617B DU 621-625; MB 621, 622; RAL 617, 623</p>

### Codes Used for Teacher Edition pages

*Impact Mathematics, Course 1* © 2009

A	Assessment
DU	Develop & Understand
EP	Estimate Products
KV	Key Vocabulary
MB	Mathematical Background
ML	Math Link
QQ	Quick Quiz
RAL	Reaching All Learners
T	Troubleshooting
TT	Teacher Tips