



# Math Connects

Concepts, Skills, and Problem Solving

Course **2**

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STANDARDS	PAGE REFERENCES
<b>Number &amp; Operation</b>	
<p>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.</p>	
<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> 80-83, 84-87, 88-92, 120, 121, 672, 705 #4-#8 <i>Mid-Chapter Quiz</i> 100 #16-#20 <i>Practice Test</i> 123 #9-#11 <b>Teacher Edition:</b> A 87; AA 92; AE 81, 89, 90; FMC 89; ODI 84a, 88a</p>
<p>6.1.1.2 Compare positive rational numbers represented in various forms. Use the symbols &lt; and &gt;.  <i>For example:</i> <math>\frac{1}{2} &gt; 0.36</math>.</p>	<p><b>Student Edition:</b> 84-87, 120, 200 #43, 204 #34-#39, 209 #38-#43, 215-220, 224, 671, 679, 707 #18, 740-741 <i>Mid-Chapter Quiz</i> 100 <i>Practice Test</i> 225 #22-#24 <b>Teacher Edition:</b> AA 200; AE 84, 85, 216, 217; TNT 84, 216</p>

STANDARDS	PAGE REFERENCES
<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> 202-205, 206-210, 223, 226 #2, 328-332, 678, 684, 707 #9-#13, 720 #2, 732 #1 <i>Practice Test</i> 225</p> <p><b>Teacher Edition:</b> AA 202; AE 203, 330; FMC 203, 207, 329; T 202</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> 196-200, 202-205, 206-210, 223, 224, 328-332, 677, 678, 684, 707 <i>Mid-Chapter Quiz</i> 201 <i>Practice Test</i> 225</p> <p><b>Teacher Edition:</b> AE 197, 203, 207; FMC 197, 203, 207; PA 200; T 328; TNT 199</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> 30-33, 37 #42-#45, 71, 181-184, 222, 668, 676 <i>Math Lab</i> 180 <i>Mid-Chapter Quiz</i> 48 #2-#3, 201 #5-#8 <i>Practice Test</i> 75 #2-#3 <i>Reading to Solve Problems</i> 185</p> <p><b>Teacher Edition:</b> A 180; AE 31, 182; FMC 182; PA 33; T 181</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> 186-189, 192-195, 211-214, 222, 223, 224, 676, 677, 678 <i>Mid-Chapter Quiz</i> 201 <i>Practice Test</i> 225 <i>Reading to Solve Problems</i> 185</p> <p><b>Teacher Edition:</b> AE 186, 187, 192, 212; F 190; FMC 187, 193; TNT 187, 188, 194</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> 192-195, 196-200, 202-205, 206-210, 223, 224, 328-332, 336, 677, 678, 684 <i>Mid-Chapter Quiz</i> 201 <i>Practice Test</i> 225</p> <p><b>Teacher Edition:</b> AE 193, 197, 198, 203, 329; TNT 199, 209</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.

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.

*For example:* 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).

**Student Edition:**

282-286, 320-326, 334, 681, 709 #1-#2, 724 #5  
*Mid-Chapter Quiz* 317 #1-#6  
*Practice Test* 337  
*Spreadsheet Lab* 327

**Teacher Edition:**

A 286; AE 283, 322; DI 285; FMC 283; ODI 282a; PA 325

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.

*For example:* 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  $\frac{2}{5}$  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.

**Student Edition:**

328-332, 336, 350-354, 366, 385, 709 #15-#17, 710 #2, 720 #2, 732 #1  
*Practice Test* 337 #17-#20, 389 #9  
*Reading to Solve Problems* 349

**Teacher Edition:**

AE 329, 330, 352, 366; DI 330; F 349; FMC 329, 351

6.1.2.3

Determine the rate for ratios of quantities with different units.

*For example:* 60 miles in 3 hours is equivalent to 20 miles in one hour (20 mph).

**Student Edition:**

287-292, 293-297, 320-326, 334, 336, 682, 709 #3-#4  
*Mid-Chapter Quiz* 317  
*Practice Test* 337 #3-#6  
*Real-World Example* 144  
*Spreadsheet Lab* 327

**Teacher Edition:**

AE 288, 293, 294, 322; FMC 288; PA 325; TNT 144

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> 287-292, 298-303, 304-309, 320-326, 335, 336, 682, 683, 684, 709 #7-#10 <i>Mid-Chapter Quiz</i> 317 <i>Practice Test</i> 337 #7-#10 <i>Spreadsheet Lab</i> 327</p> <p><b>Teacher Edition:</b> AE 288, 289, 299, 300, 306, 322; FMC 299; TNT 305</p>
<p>Multiply and divide decimals, fractions and mixed numbers; solve real-world and mathematical problems using arithmetic with positive rational numbers.</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> 252-257, 265-270, 274, 680, 681, 708 #9, #12, 736, 737, 738 <i>Math Lab</i> 250-251 <i>Practice Test</i> 275 <i>Reading to Solve Problems</i> 264</p> <p><b>Teacher Edition:</b> A 251; AE 253, 254, 266; DI 250, 269; FMC 253; PA 257</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> 252-257, 258-263, 265-270, 274, 680, 681, 708 #9-#12 <i>Math Lab</i> 250-251 <i>Practice Test</i> 275 <i>Reading to Solve Problems</i> 264</p> <p><b>Teacher Edition:</b> AA 257; AE 253, 254, 259; DI 250; PA 262; RC 265; T 264; TNT 254</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> 344-348, 350-354, 361-365, 385, 386, 684, 685 <i>Math Lab</i> 342-343 <i>Mid-Chapter Quiz</i> 368 <i>Practice Test</i> 389 <i>Reading to Solve Problems</i> 349</p> <p><b>Teacher Edition:</b> A 343, 348; AE 345, 350, 351, 363; FMC 362; T 349; TNT 342</p>

STANDARDS	PAGE REFERENCES
<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> 30-33, 95-99, 103-106, 107-111, 114-118, 236-241, 242-246, 252-257, 265-270, 736, 737, 738 <i>Math Lab</i> 250-251 <i>Reading to Solve Problems</i> 264</p> <p><b>Teacher Edition:</b> AE 116, 237; FMC 31, 108; T 264; TNT 245</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> 230-235, 355-360, 365 #39, 366-367, 385, 386, 679, 685, 686, 735 <i>Mid-Chapter Quiz</i> 368 #11-#17 <i>Practice Test</i> 389 #4-#8</p> <p><b>Teacher Edition:</b> AA 367; AE 355, 357, 366; DI 366; FMC 266, 356; T 230, 366; TNT 231, 234, 358</p>
<p><b>Algebra</b></p> <p>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.</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> 8-9, 44-47, 49-52, 63-67, 70, 73, 128-133, 669 <i>Algebra Lab</i> 62 <i>Mid-Chapter Quiz</i> 48 #15-#20 <i>Practice Test</i> 75 #9-#16</p> <p><b>Teacher Edition:</b> A 9; AE 45, 49, 64, 128; DI 50; FMC 45; PA 61</p>
<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 <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> 63-67, 74, 163-167, 172, 174 #1, 671, 704 #12, 730-731 <i>Graphing Calculator Lab</i> 68-69, 168-169 <i>Practice Test</i> 75 #24-#25, 173 #25</p> <p><b>Teacher Edition:</b> A 69; AA 65; AE 63, 165; FMC 64, 164; TNT 66</p>

STANDARDS	PAGE REFERENCES
<p style="text-align: center;">Use properties of arithmetic to generate equivalent numerical expressions and evaluate expressions involving positive rational numbers</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> 8-9, 30-33, 38-41, 53-56, 72, 73, 668, 669, 670 <i>Practice Test</i> 75 #7-#8, #18-#19</p> <p><b>Teacher Edition:</b> AA 55, 56; AE 39, 53, 54; FMC 39, 54, 152; TNT 152</p>
<p style="text-align: center;">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.</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> 50, 51 #20-#21, 66 #13, #21, 67 #24-#26, 128-133, 139 #21-#24, 140 #37-#45, 145 #19-#22, 154 #28-#29, 160 #32, 674, 706 #1-#2, 741 #13-#15</p> <p><i>Graphing Calculator Lab</i> 68-69 <i>Practice Test</i> 75 #24, 173 #3-#6</p> <p><b>Teacher Edition:</b> AE 129, 130; DI 50; TNT 131</p>
<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> 49-52, 73, 136-141, 142-146, 151-155, 170-171, 674, 675, 706</p> <p><i>Algebra Lab</i> 134-135 <i>Mid-Chapter Quiz</i> 147 <i>Practice Test</i> 75 #13-#16, 173</p> <p><b>Teacher Edition:</b> AE 49, 50, 137, 143, 152; TNT 136</p>

STANDARDS	PAGE REFERENCES
<b>Geometry &amp; Measurement</b>	
<b>Calculate perimeter, area, surface area and volume of two- and three-dimensional figures to solve real-world and mathematical problems.</b>	
<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> 613-618, 630, 646, 649-653, 662, 700, 703, 715 #5-#7, 722, 748 <i>Measurement Lab</i> 600-601, 654-655 <i>Practice Test</i> 631 #17-#18</p> <p><b>Teacher Edition:</b> A 618; AE 614, 650; DI 615; FMC 614, 650; T 646; TNT 614</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> 156-161, 572-576, 578-582, 627, 675, 697, 728 #10 <i>Graphing Calculator Lab</i> 624-625 <i>Measurement Lab</i> 577 <i>Mid-Chapter Quiz</i> 602 <i>Practice Test</i> 630 #1, #3</p> <p><b>Teacher Edition:</b> AE 158, 573, 579; DI 582; FMC 573; ODI 572a; TNT 580</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 cm and <math>\text{cm}^2</math>.</p>	<p><b>Student Edition:</b> 575 #20-#21, 581 #11, 587 #34, 599 #20-#21 <i>Real-World Example</i> 580</p> <p><b>Teacher Edition:</b> AA 599; AE 580</p>
<b>Understand and use relationships between angles in geometric figures.</b>	
<p>6.3.2.1</p> <p>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> 510-513, 514-517, 523 #29, 536 #24, 551 #34, 563, 564, LA10-LA13, 693, 713 #2, #8, 732 #5 <i>Practice Test</i> 567 #1-#5</p> <p><b>Teacher Edition:</b> A 513; AA 513, 536; AE 512, LA11; FMC 511</p>

STANDARDS	PAGE REFERENCES
<p>6.3.2.2</p> <p>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> 524-529, 530, 564, 694, 713 #5, 732 #5 <i>Mid-Chapter Quiz</i> 539 #7-#9 <i>Practice Test</i> 567 #7-#8</p> <p><b>Teacher Edition:</b> AA 529; AE 525; FMC 525; ODI 524a; T 530</p>
<p>6.3.2.3</p> <p>Develop and use formulas for the sums of the interior angles of polygons by decomposing them into triangles.</p>	<p><b>Student Edition:</b> 534, 547-551, 566, 695, 713 #11 <i>Geometry Lab</i> 532 <i>Practice Test</i> 567 #13</p> <p><b>Teacher Edition:</b> F 533; FMC 547; PA 529, 548</p>
<p style="text-align: center;">Choose appropriate units of measurement and use ratios to convert within measurement systems to solve real-world and mathematical problems.</p>	
<p>6.3.3.1</p> <p>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> 149 #6, 245 #34, 298-303, 304-309, 320-326, 335, 683, 709 #10, 725 #14, 733 #6-#7 <i>Practice Test</i> 337 <i>Spreadsheet Lab</i> 327</p> <p><b>Teacher Edition:</b> AA 302; AE 299, 300, 306, 307; PA 302</p>
<p>6.3.3.2</p> <p>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> 10-11, 12-13, 230-235, 247 #8, 248-249, 302 #33, 308 #27, 584-588, 589-593, 621 #21-#24, 638 #38-#40, 708 #1, #7, 714 #4 <i>Mini Lab</i> 636 <i>Real-World Example</i> 307</p> <p><b>Teacher Edition:</b> AA 235; AE 232; FMC 231, 590, 620; T 230; TNT 248</p>

## STANDARDS

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## Data Analysis &amp; Probability

Use probabilities to solve real-world and mathematical problems; represent probabilities using fractions, decimals and percents.

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.

*For example:* A  $6 \times 6$  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.

**Student Edition:**

190-191, 465-470, 471-474, 499, 500, 691, 712 #4-#7, 729 #22

*Practice Test* 503 #5-#9

**Teacher Edition:**

A 470; AA 468; AE 190, 466, 467, 471; FMC 472; PA 474; TNT 465, 467

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.

*For example:* Each outcome for a balanced number cube has probability  $\frac{1}{6}$ , and the probability of rolling an even number is  $\frac{1}{2}$ .

**Student Edition:**

460-464, 465-470, 471-474, 480-483, 484, 486-490, 499, 690, 712, 723 #2

*Mid-Chapter Quiz* 479

*Practice Test* 503

*Probability Lab* 491

**Teacher Edition:**

A 464; AE 461, 467, 481, 484, 488; FMC 487

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.

*For example:* 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.

**Student Edition:**

484-485, 486-490, 501

*Probability Lab* 491

**Teacher Edition:**

A 490, 491; AA 485; AE 484; DI 491; F 484; FMC 487; T 486; 491; TNT 484, 486

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<p>6.4.1.4</p> <p>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>  486-490, 502, 692, 712 #10, 733 #9  <i>Practice Test</i> 503 #15  <i>Probability Lab</i> 491 #8</p> <p><b>Teacher Edition:</b>  A 490; AA 489, 490; AE 487, 488; DI 491;  FMC 487; ODI 486a; TNT 486</p>