



IMPACT Mathematics

COURSE 3

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STANDARDS	PAGE REFERENCES
NUMBER AND OPERATIONS	
Understand real number concepts	
<p>N.ME.08.01 Understand the meaning of a square root of a number and its connection to the square whose area is the number; understand the meaning of a cube root and its connection to the volume of a cube.</p>	<p>Student Edition: <i>Explore</i> 185 <i>Think & Discuss</i> 192 Teacher Guide: I 185; TD 192</p>
<p>N.ME.08.02 Understand meanings for zero and negative integer exponents.</p>	<p>Student Edition: <i>Develop & Understand</i> 150 #1-#5 <i>On Your Own Exercises</i> 162 #2, #3 <i>Share & Summarize</i> 152 #1 <i>Think & Discuss</i> 149 Teacher Guide: DU 150; TD 149</p>

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<p>N.ME.08.03 Understand that in decimal form, rational numbers either terminate or eventually repeat, and that calculators truncate or round repeating decimals; locate rational numbers on the number line; know fraction forms of common repeating decimals, e.g., $0.1 = \frac{1}{9}$; $0.3 = \frac{1}{3}$.</p>	<p>Teacher Guide: MB 185</p> <p>Also see <i>Impact Mathematics, Course 1</i> © 2009 and <i>Math Connects: Concepts, Skills, and Problem Solving Course 3</i> © 2009.</p>
<p>N.ME.08.04 Understand that irrational numbers are those that cannot be expressed as the quotient of two integers, and cannot be represented by terminating or repeating decimals; approximate the position of familiar irrational numbers, e.g., $\sqrt{2}$, $\sqrt{3}$, π, on the number line.</p>	<p>Teacher Guide: MB 185</p> <p>Also see <i>Impact Mathematics, Course 1</i> © 2009 and <i>Math Connects: Concepts, Skills, and Problem Solving Course 3</i> © 2009.</p>
<p>N.FL.08.05 Estimate and solve problems with square roots and cube roots using calculators.</p>	<p>Student Edition: <i>Develop & Understand</i> 187 #18-#21</p> <p>Also see <i>Impact Mathematics, Course 1</i> © 2009 and <i>Math Connects: Concepts, Skills, and Problem Solving Course 3</i> © 2009.</p>
<p>N.FL.08.06 Find square roots of perfect squares and approximate the square roots of non-perfect squares by locating between consecutive integers, e.g., $\sqrt{130}$ is between 11 and 12.</p>	<p>See <i>Impact Mathematics, Course 1</i> © 2009 and <i>Math Connects: Concepts, Skills, and Problem Solving Course 3</i> © 2009.</p>
<p>Solve problems</p>	
<p>N.MR.08.07 Understand percent increase and percent decrease in both sum and product form, e.g., 3% increase of a quantity x is $x + .03x = 1.03x$.</p>	<p>Student Edition: 123-124</p> <p>Teacher Guide: MB 124</p>
<p>N.MR.08.08 Solve problems involving percent increases and decreases.</p>	<p>Student Edition: <i>Develop & Understand</i> 124, 125, 126 <i>On Your Own Exercises</i> 134 #1-#3, 135 #7-#9 <i>Review & Self-Assessment</i> 140 #2</p> <p>Teacher Guide: DU 12,4 125, 126</p>
<p>N.FL.08.09 Solve problems involving compounded interest or multiple discounts.</p>	<p>Student Edition: <i>Develop & Understand</i> 127-128, 129 <i>On Your Own Exercises</i> 134 #4, #5, 137 #10 <i>Review & Self-Assessment</i> 141 #4 <i>Share & Summarize</i> 129 <i>Think & Discuss</i> 127</p> <p>Teacher Guide: DU 127, 129; TD 127</p>

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N.MR.08.10 Calculate weighted averages such as course grades, consumer price indices, and sports ratings.	See <i>Impact Mathematics, Course 1</i> © 2009 and <i>Math Connects: Concepts, Skills, and Problem Solving Course 3</i> © 2009.
N.FL.08.11 Solve problems involving ratio units, such as miles per hour, dollars per pound, or persons per square mile.*	See <i>Impact Mathematics, Course 1</i> © 2009 and <i>Math Connects: Concepts, Skills, and Problem Solving Course 3</i> © 2009.
ALGEBRA	
Understand the concept of non-linear functions using basic examples	
A.RP.08.01 Identify and represent linear functions, quadratic functions, and other simple functions including inversely proportional relationships ($y = k/x$); cubics ($y = ax^3$); roots ($y = \sqrt{x}$); and exponentials ($y = a^x$, $a > 0$); using tables, graphs, and equations.*	Student Edition: 69 <i>Develop & Understand</i> 69, 170, 171, 176, 177-178, 413, 414, 430, 434, 435 <i>Share & Summarize</i> 393 <i>Think & Discuss</i> 69 Teacher Guide: DU 69, 170, 171, 176, 177, 413, 414, 430, 434, 435
A.PA.08.02 For basic functions, e.g., simple quadratics, direct and indirect variation, and population growth, describe how changes in one variable affect the others.	Student Edition: 7 <i>Develop & Understand</i> 15 <i>On Your Own Exercises</i> 22 #14 <i>Share & Summarize</i> 175 <i>Think & Discuss</i> 172
A.PA.08.03 Recognize basic functions in problem context, e.g., area of a circle is πr^2 , volume of a sphere is $4/3 \pi r^3$, and represent them using tables, graphs, and formulas.	The topics on the following page references can be expanded to meet this objective. Student Edition: <i>Develop & Understand</i> 171, 392 <i>Think & Discuss</i> 206
A.RP.08.04 Use the vertical line test to determine if a graph represents a function in one variable.	The following function page references can be extended to include the vertical line test. Student Edition: <i>Develop & Understand</i> 530 #5 <i>On Your Own Exercises</i> 544 #18
Understand and represent quadratic functions	
A.RP.08.05 Relate quadratic functions in factored form and vertex form to their graphs, and vice versa; in particular, note that solutions of a quadratic equation are the x-intercepts of the corresponding quadratic function.	Student Edition: <i>Develop & Understand</i> 408, 409 <i>On Your Own Exercises</i> 418 #2-#12 <i>Share & Summarize</i> 409 Teacher Guide: DU 408, 409

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<p>A.RP.08.06 Graph factorable quadratic functions, finding where the graph intersects the x-axis and the coordinates of the vertex; use words “parabola” and “roots”; include functions in vertex form and those with leading coefficient -1, e.g., $y = x^2 - 36$, $y = (x - 2)^2 - 9$; $y = -x^2$; $y = -(x - 3)^2$.</p>	<p>Student Edition: 391, 403 <i>Develop & Understand</i> 404-405, 408, 409 <i>Share & Summarize</i> 406, 409</p> <p>Teacher Guide: DU 404, 408, 409</p>
Recognize, represent, and apply common formulas	
<p>A.FO.08.07 Recognize and apply the common formulas: $(a + b)^2 = a^2 + 2ab + b^2$ $(a - b)^2 = a^2 - 2ab + b^2$ $(a + b)(a - b) = a^2 - b^2$; represent geometrically.</p>	<p>Student Edition: <i>Develop & Understand</i> 480 <i>On Your Own Exercises</i> 487 #8-#17 <i>Share & Summarize</i> 480 <i>Think & Discuss</i> 479</p> <p>Teacher Guide: DU 480</p>
<p>A.FO.08.08 Factor simple quadratic expressions with integer coefficients, e.g., $x^2 + 6x + 9$, $x^2 + 2x - 3$, and $x^2 - 4$; solve simple quadratic equations, e.g., $x^2 = 16$ or $x^2 = 5$ (by taking square roots); $x^2 - x - 6 = 0$, $x^2 - 2x = 15$ (by factoring); verify solutions by evaluation.</p>	<p>Student Edition: 481 <i>Develop & Understand</i> 482, 483 <i>On Your Own Exercises</i> 487 #19-25</p> <p>Teacher Guide: DU 482, 483</p>
<p>A.FO.08.09 Solve applied problems involving simple quadratic equations.</p>	<p>Student Edition: <i>Develop & Understand</i> 410-411, 505, 506 <i>On Your Own Exercises</i> 421 #13, 425 #30, 490 #48, 499 #30 <i>Share & Summarize</i> 412</p>
Understand solutions and solve equations, simultaneous equations, and linear inequalities	
<p>A.FO.08.10 Understand that to solve the equation $f(x) = g(x)$ means to find all values of x for which the equation is true, e.g., determine whether a given value, or values from a given set, is a solution of an equation (0 is a solution of $3x^2 + 2 = 4x + 2$, but 1 is not a solution).</p>	<p>The following page references can be expanded to include equations set equal to each other.</p> <p>Student Edition: 312-316, 467-472 <i>On Your Own Exercises</i> 322 #1-#10, 473 #2-#17</p>

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<p>A.FO.08.11 Solve simultaneous linear equations in two variables by graphing, by substitution, and by linear combination; estimate solutions using graphs; include examples with no solutions and infinitely many solutions.</p>	<p>Student Edition: 349 <i>Develop & Understand</i> 343, 344-345, 350, 351, 354, 355 <i>Example</i> 353 <i>On Your Own Exercises</i> 361 #2, 362, #4-#17, 365 #20-#23 <i>Think & Discuss</i> 350, 352 Teacher Guide: DU 343, 344, 350, 351, 354, 355</p>
<p>A.FO.08.12 Solve linear inequalities in one and two variables, and graph the solution sets.</p>	<p>Student Edition: 331 <i>Develop & Understand</i> 328, 330, 331, 332, 333, 334, 335 <i>Example</i> 334 <i>On Your Own Exercises</i> 337-338 <i>Share & Summarize</i> 333 <i>Think & Discuss</i> 329 Teacher Guide: DU 328, 330, 331, 332, 333, 334, 335</p>
<p>A.FO.08.13 Set up and solve applied problems involving simultaneous linear equations and linear inequalities.</p>	<p>Student Edition: <i>Develop & Understand</i> 327, 333 #15, #16, 345 #8, 346, 347, 351 #6 <i>On Your Own Exercises</i> 337 #11, #12, 339 #32, 340 #37, 361 #3, 362 #4, #7, 363 #16, 354 #17, 365 #20-#22</p>
<p>GEOMETRY</p>	
<p>Understand and use the Pythagorean Theorem</p>	
<p>G.GS.08.01 Understand at least one proof of the Pythagorean Theorem; use the Pythagorean Theorem and its converse to solve applied problems including perimeter, area, and volume problems.</p>	<p>See <i>Impact Mathematics, Course 2</i> © 2009 and <i>Math Connects: Concepts, Skills, and Problem Solving Course 3</i> © 2009.</p>
<p>G.LO.08.02 Find the distance between two points on the coordinate plane using the distance formula; recognize that the distance formula is an application of the Pythagorean Theorem.</p>	<p>See <i>Impact Mathematics, Course 2</i> © 2009 and <i>Math Connects: Concepts, Skills, and Problem Solving Course 3</i> © 2009.</p>

STANDARDS	PAGE REFERENCES
Solve problems about geometric figures	
<p>G.SR.08.03 Understand the definition of a circle; know and use the formulas for circumference and area of a circle to solve problems.</p>	<p>Student Edition: On Your Own Exercises 22 #13</p> <p>Also see <i>Impact Mathematics, Course 1</i> © 2009 and <i>Math Connects: Concepts, Skills, and Problem Solving Course 3</i> © 2009.</p>
<p>G.SR.08.04 Find area and perimeter of complex figures by sub-dividing them into basic shapes (quadrilaterals, triangles, circles).</p>	<p>The figures on the following pages can be used to meet this objective.</p> <p>Student Edition: 220, 231, 240, 252, 254, 255, 294, 298, 307</p> <p>Also see <i>Impact Mathematics, Course 1</i> © 2009 and <i>Math Connects: Concepts, Skills, and Problem Solving Course 3</i> © 2009.</p>
<p>G.SR.08.05 Solve applied problems involving areas of triangles, quadrilaterals, and circles.</p>	<p>Also see <i>Impact Mathematics, Course 1</i> © 2009 and <i>Math Connects: Concepts, Skills, and Problem Solving Course 3</i> © 2009.</p>
Understand concepts of volume and surface area, and apply formulas	
<p>G.SR.08.06 Know the volume formulas for generalized cylinders ((area of base) x height), generalized cones and pyramids ($\frac{1}{3}$ (area of base) x height), and spheres ($\frac{4}{3} \pi$ (radius)³) and apply them to solve problems.</p>	<p>See <i>Impact Mathematics, Course 1 and Course 2</i> © 2009 and <i>Math Connects: Concepts, Skills, and Problem Solving Course 3</i> © 2009.</p>
<p>G.SR.08.07 Understand the concept of surface area, and find the surface area of prisms, cones, spheres, pyramids, and cylinders.</p>	<p>See <i>Impact Mathematics, Course 1 and Course 2</i> © 2009 and <i>Math Connects: Concepts, Skills, and Problem Solving Course 3</i> © 2009.</p>
Visualize solids	
<p>G.SR.08.08 Sketch a variety of two-dimensional representations of three-dimensional solids including orthogonal views (top, front, and side), picture views (projective or isometric), and nets; use such two-dimensional representations to help solve problems.</p>	<p>See <i>Impact Mathematics, Course 2</i> © 2009 and <i>Math Connects: Concepts, Skills, and Problem Solving Course 3</i> © 2009.</p>
Understand and apply concepts of transformation and symmetry	
<p>G.TR.08.09 Understand the definition of a dilation from a point in the plane, and relate it to the definition of similar polygons.</p>	<p>Student Edition: 294</p>

STANDARDS	PAGE REFERENCES
<p>G.TR.08.10 Understand and use reflective and rotational symmetries of two-dimensional shapes and relate them to transformations to solve problems.</p>	<p>Student Edition: 263, 273, 275 <i>Develop & Understand</i> 264, 265, 277, 278 <i>On Your Own Exercises</i> 268 #5-#7, 271 #16</p> <p>Teacher Guide: DU 264, 265, 277, 278</p>
DATA AND PROBABILITY	
Draw, explain, and justify conclusions based on data	
<p>D.AN.08.01 Determine which measure of central tendency (mean, median, mode) best represents a data set, e.g., salaries, home prices, for answering certain questions; justify the choice made.</p>	<p>Student Edition: <i>Develop & Understand</i> 603-604 <i>On Your Own Exercises</i> 613 #2</p> <p>Teacher Guide: DU 603</p> <p>Also see <i>Impact Mathematics, Course 1</i> © 2009 and <i>Math Connects: Concepts, Skills, and Problem Solving Course 3</i> © 2009.</p>
<p>D.AN.08.02 Recognize practices of collecting and displaying data that may bias the presentation or analysis.</p>	<p>See <i>Impact Mathematics, Course 1 and Course 2</i> © 2009 and <i>Math Connects: Concepts, Skills, and Problem Solving Course 3</i> © 2009.</p>
Understand probability concepts for simple and compound events	
<p>D.PR.08.03 Compute relative frequencies from a table of experimental results for a repeated event. Interpret the results using relationship of probability to relative frequency.*</p>	<p>See <i>Impact Mathematics, Course 1</i> © 2009 and <i>Math Connects: Concepts, Skills, and Problem Solving Course 3</i> © 2009.</p>
<p>D.PR.08.04 Apply the Basic Counting Principle to find total number of outcomes possible for independent and dependent events, and calculate the probabilities using organized lists or tree diagrams.</p>	<p>Student Edition: 585 <i>Develop & Understand</i> 586, 587 <i>On Your Own Exercises</i> 596 #3, #4 <i>Share & Summarize</i> 588</p> <p>Teacher Guide: DU 586, 587</p>
<p>D.PR.08.05 Find and/or compare the theoretical probability, the experimental probability, and/or the relative frequency of a given event.*</p>	<p>Student Edition: <i>Develop & Understand</i> 592, 594 <i>On Your Own Exercises</i> 597 #8, #9</p> <p>Teacher Guide: DU 592, 594</p>

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<p>D.PR.08.06 Understand the difference between independent and dependent events, and recognize common misconceptions involving probability, e.g., Alice rolls a 6 on a die three times in a row; she is just as likely to roll a 6 on the fourth roll as she was on any previous roll.</p>	<p>The following page references can be used during teacher/class discussion to meet this objective.</p> <p>Student Edition: <i>Develop & Understand</i> 581, 582, 583, 584, 587, 590 <i>On Your Own Exercises</i> 595 #1, 596 #4, #5, 598 #10</p>

* *revised expectations in italics*