

M08.A-N The Number System			
Big Idea			
M08.A-N.1 Demonstrate an understanding of rational and irrational numbers.			
M08.A-N.1.1 Apply concepts of rational and irrational numbers.		<i>How do I apply concepts of rational and irrational numbers?</i>	
Concepts	Competencies	Resources	Assessments
<p>M08.A-N.1.1.1 Determine whether a number is rational or irrational. For rational numbers, show that the decimal expansion terminates or repeats (limit repeating decimals to thousandths).</p> <p>M08.A-N.1.1.2 Convert a terminating or repeating decimal to a rational number (limit repeating decimals to thousandths).</p> <p>M08.A-N.1.1.3 Estimate the value of irrational numbers without a calculator (limit whole number radicand to less than 144). <i>Example: $\sqrt{5}$ is between 2 and 3 but closer to 2.</i></p> <p>M08.A-N.1.1.4 Use rational approximations of irrational numbers to compare and order irrational numbers.</p> <p>M08.A-N.1.1.5 Locate/identify rational and irrational numbers at their approximate locations on a number line.</p>	<p>CC.2.1.8.E.1 Distinguish between rational and irrational numbers using their properties.</p> <p>CC.2.1.8.E.4 Estimate irrational numbers by comparing them to rational numbers.</p>	<p>Textbook: <i>Math in Focus</i> Course 2 Book A Chapter 1 The Real Number System Sections 1.1, 1.2, 1.3, 1.4 Course 2 Chapter 1 Pre-Test</p> <ul style="list-style-type: none"> Transitional guide <p>Textbook: <i>Math in Focus</i> Course 3 Book A Accessing prior knowledge p. 3 Section 1.6</p> <ul style="list-style-type: none"> Extra Practice Workbook Enrichment Workbook Re-teaching Workbook Activities Workbook Online resources (HMH) <p>Exact Path Diagnostics</p>	<p>District created curriculum based assessment on the real number system</p> <p>District created cumulative assessment</p> <p>Exact Path Benchmark</p> <p>PSSA</p>
Vocabulary: rational numbers, irrational numbers, real numbers, integers, natural numbers, whole numbers, square root, cube root, terminating decimal, repeating decimal			

M08.B-E Expressions and Equations	
Big Idea	
M08.B-E.1 Demonstrate an understanding of expressions and equations with radicals and integer exponents.	
M08.B-E.1.1 Represent and use expressions and equations to solve	<i>How do we represent and use expressions and equations to solve</i>

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problems involving radicals and integer exponents.		problems involving radicals and integer exponents?	
Concepts	Competencies	Resources	Assessments
<p>M08.B-E.1.1.1 Apply one or more properties of integer exponents to generate equivalent numerical expressions without a calculator (with final answers expressed in exponential form with positive exponents). Properties will be provided. <i>Example: $3^{12} \times 3^{-15} = 3^{-3} = 1/(3^3)$</i></p> <p>M08.B-E.1.1.2 Use square root and cube root symbols to represent solutions to equations of the form $x^2 = p$ and $x^3 = p$, where p is a positive rational number. Evaluate square roots of perfect squares (up to and including 12^2) and cube roots of perfect cubes (up to and including 5^3) without a calculator. <i>Example: If $x^2 = 25$ then $x = \pm\sqrt{25}$.</i></p> <p>M08.B-E.1.1.3 Estimate very large or very small quantities by using numbers expressed in the form of a single digit times an integer power of 10 and express how many times larger or smaller one number is than another. <i>Example: Estimate the population of the United States as 3×10^8 and the population of the world as 7×10^9 and determine that the world population is more than 20 times larger than the United States' population.</i></p> <p>M08.B-E.1.1.4 Perform operations with numbers expressed in scientific notation, including</p>	<p>CC.2.2.8.B.1 Apply concepts of radicals and integer exponents to generate equivalent expressions.</p>	<p>Textbook: <i>Math in Focus</i> Course 3 Book A Chapter 1 Exponents Course 3 Chapter 1 Pre-Test Sections 1.1, 1.2, 1.3, 1.4, 1.5</p> <ul style="list-style-type: none"> • Extra Practice Workbook • Enrichment Workbook • Re-teaching Workbook • Activities Workbook • Online resources (HMH) <p>Chapter 2 Scientific Notation Course 3 Chapter 2 Pre-Test Sections 2.1, 2.2, 2.3</p> <ul style="list-style-type: none"> • Extra Practice Workbook • Enrichment Workbook • Re-teaching Workbook • Activities Workbook • Online resources (HMH) <p>Exact Path Diagnostics</p>	<p>District created curriculum based assessment on exponents</p> <p>District created curriculum based assessment on scientific notation</p> <p>District created cumulative assessment</p> <p>Exact Path Benchmark</p> <p>PSSA</p>

problems where both decimal and scientific notation are used. Express answers in scientific notation and choose units of appropriate size for measurements of very large or very small quantities (e.g., use millimeters per year for seafloor spreading). Interpret scientific notation that has been generated by technology (e.g., interpret 4.7EE9 displayed on a calculator as 4.7×10^9).			
Vocabulary: expressions, equations, radicals, scientific notation, exponents, exponential form, integer exponents, absolute value, perfect square, perfect cube			

M08.B-E Expressions and Equations			
Big Idea			
M08.B-E.2 Understand the connections between proportional relationships, lines, and linear equations.			
M08.B-E.2.1 Analyze and describe linear relationships between two variables, using slope.		<i>How do we analyze and describe linear relationships between two variables, using slope?</i>	
Concepts	Competencies	Resources	Assessments
M08.B-E.2.1.1 Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways. <i>Example: Compare a distance-time graph to a distance-time equation to determine which of two moving objects has greater speed.</i> M08.B-E.2.1.2 Use similar right triangles to show and explain why the slope m is the same between any two distinct points on a non-	CC.2.2.8.B.2 Understand the connections between proportional relationships, lines, and linear equations.	Textbook: <i>Math in Focus</i> Course 3 Book A Chapter 4 Lines and Linear Equations Course 3 Chapter 4 Pre-Test Sections 4.1, 4.2, 4.3, 4.4, 4.5 <ul style="list-style-type: none"> • Extra Practice Workbook • Enrichment Workbook • Re-teaching Workbook • Activities Workbook • Online resources (HMH) Exact Path Diagnostics	District created curriculum based assessment on equations on lines and linear equations District created cumulative assessment Exact Path Benchmark PSSA

vertical line in the coordinate plane. M08.B-E.2.1.3 Derive the equation $y = mx$ for a line through the origin and the equation $y = mx + b$ for a line intercepting the vertical axis at b .			
Vocabulary: slope, rate of change, unit rate, proportion, coordinate plane, origin, vertical axis, horizontal axis, right triangles, similar, parallel lines, perpendicular lines, x-intercept, y-intercept, linear			

M08.B-E Expressions and Equations			
Big Idea			
M08.B-E.3 Analyze and solve linear equations and pairs of simultaneous linear equations.			
M08.B-E.3.1 Write, solve, graph, and interpret linear equations in one or two variables, using various methods.	<i>How do we write, solve, graph, and interpret linear equations in one or two variables using various methods?</i>		
Concepts	Competencies	Resources	Assessments
M08.B-E.3.1.1 Write and identify linear equations in one variable with one solution, infinitely many solutions, or no solutions. Show which of these possibilities is the case by successively transforming the given equation into simpler forms until an equivalent equation of the form $x = a$, $a = a$, or $a = b$ results (where a and b are different numbers). M08.B-E.3.1.2 Solve linear equations that have rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms. M08.B-E.3.1.3 Interpret solutions to a system of two linear equations in two variables as	CC.2.2.8.B.3 Analyze and solve linear equations and pairs of simultaneous linear equations.	Textbook: <i>Math in Focus</i> Course 3 Book A Chapter 3 Algebraic Linear Equations Course 3 Chapter 3 Pre-Test Sections 3.1, 3.2, 3.3, 3.4 <ul style="list-style-type: none"> • Extra Practice Workbook • Enrichment Workbook • Re-teaching Workbook • Activities Workbook • Online resources (HMH) Chapter 5 Systems of Linear Equations Course 3 Chapter 5 Pre-Test Sections 5.1, 5.2, 5.3, 5.4, 5.5 <ul style="list-style-type: none"> • Extra Practice Workbook • Enrichment Workbook • Re-teaching Workbook 	District created curriculum based assessment on equations District created curriculum based assessment on systems

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<p>points of intersection of their graphs because points of intersection satisfy both equations simultaneously.</p> <p>M08.B-E.3.1.4 Solve systems of two linear equations in two variables algebraically and estimate solutions by graphing the equations. Solve simple cases by inspection. <i>Example: $3x + 2y = 5$ and $3x + 2y = 6$ have no solution because $3x + 2y$ cannot simultaneously be 5 and 6.</i></p> <p>M08.B-E.3.1.5 Solve real-world and mathematical problems leading to two linear equations in two variables. <i>Example: Given coordinates for two pairs of points, determine whether the line through the first pair of points intersects the line through the second pair.</i></p>		<ul style="list-style-type: none"> Activities Workbook Online resources (HMH) 	
Vocabulary: linear equations, distributive property, coefficient, like terms, variables			

M08.B-F Functions			
Big Idea			
M08.B-F.1 Analyze and interpret functions.			
M08.B-F.1.1 Define, evaluate, and compare functions displayed algebraically, graphically, or numerically in tables or by verbal descriptions.	<i>How do we define, evaluate, and compare functions displayed algebraically, graphically, or numerically in tables or by verbal descriptions?</i>		
Concepts	Competencies	Resources	Assessments
<p>M08.B-F.1.1.1 Determine whether a relation is a function.</p> <p>M08.B-F.1.1.2 Compare properties of two functions, each represented in a different way (i.e., algebraically, graphically,</p>	<p>CC.2.2.8.C.1 Define, evaluate, and compare functions.</p>	<p>Textbook: <i>Math in Focus</i> Course 3 Book A Chapter 6 Functions Course 3 Chapter 6 Pre-Test Sections 6.1, 6.2, 6.3, 6.4</p> <ul style="list-style-type: none"> Extra Practice Workbook 	<p>District created curriculum based assessment on functions</p> <p>District created cumulative assessment</p>

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numerically in tables, or by verbal descriptions). <i>Example: Given a linear function represented by a table of values and a linear function represented by an algebraic expression, determine which function has the greater rate of change.</i> M08.B-F.1.1.3 Interpret the equation $y = mx + b$ as defining a linear function whose graph is a straight line; give examples of functions that are not linear.		<ul style="list-style-type: none"> • Enrichment Workbook • Re-teaching Workbook • Activities Workbook • Online resources (HMH) 	
Vocabulary: function, relation, linear equation			

M08.B-F Functions			
Big Idea			
M08.B-F.2 Use functions to model relationships between quantities.			
M08.B-F.2.1 Represent or interpret functional relationships between quantities using tables, graphs, and descriptions.	<i>How do we represent or interpret functional relationships between quantities using tables, graphs, and descriptions?</i>		
Concepts	Competencies	Resources	Assessments
M08.B-F.2.1.1 Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (x, y) values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models and in terms of its graph or a table of values. M08.B-F.2.1.2 Describe qualitatively the functional	CC.2.2.8.C.2 Use concepts of functions to model relationships between quantities.	Textbook: <i>Math in Focus</i> Course 3 Book A Course 3 Chapter 6 Pre-Test Chapter 6 Functions Sections 6.2, 6.3, 6.4 <ul style="list-style-type: none"> • Extra Practice Workbook • Enrichment Workbook • Re-teaching Workbook • Activities Workbook • Online resources (HMH) 	District created curriculum based assessment on functions District created cumulative assessment

relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear). Sketch or determine a graph that exhibits the qualitative features of a function that has been described verbally.			
Vocabulary: relations, functions, domain, range, rate of change			

M08.C-G Geometry			
Big Idea			
M08.C-G.1 Demonstrate an understanding of geometric transformations			
M08.C-G.1.1 Apply properties of geometric transformations to verify congruence or similarity.		<i>How do we apply properties of geometric transformations to verify congruence or similarity?</i>	
Concepts	Competencies	Resources	Assessments
M08.C-G.1.1.1 Identify and apply properties of rotations, reflections, and translations. <i>Example: Angle measures are preserved in rotations, reflections, and translations.</i> M08.C-G.1.1.2 Given two congruent figures, describe a sequence of transformations that exhibits the congruence between them. M08.C-G.1.1.3 Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates. M08.C-G.1.1.4 Given two similar two-dimensional figures, describe a sequence of transformations that exhibits the similarity between them.	CC.2.3.8.A.2 Understand and apply congruence, similarity, and geometric transformations using various tools.	Textbook: <i>Math in Focus</i> Course 3 Book B Chapter 8 Geometric Transformations Course 3 Chapter 8 Pre-Test Sections 8.1, 8.2, 8.3, 8.4, 8.5 <ul style="list-style-type: none"> • Extra Practice Workbook • Enrichment Workbook • Re-teaching Workbook • Activities Workbook • Online resources (HMH) Chapter 9 Functions Course 3 Chapter 9 Pre-Test Sections 9.1, 9.2, 9.3 <ul style="list-style-type: none"> • Extra Practice Workbook • Enrichment Workbook • Re-teaching Workbook • Activities Workbook 	District created curriculum based assessment on geometric transformations District created cumulative assessment

		<ul style="list-style-type: none"> Online resources (HMH) 	
Vocabulary: transformations, rotations, reflections, translations, dilation, congruent, similarity, similar			

M08.C-G Geometry			
Big Idea			
M08.C-G.2 Understand and apply the Pythagorean theorem			
M08.C-G.2.1 Solve problems involving right triangles by applying the Pythagorean theorem.		<i>How do we solve problems involving right triangles by applying the Pythagorean theorem?</i>	
Concepts	Competencies	Resources	Assessments
M08.C-G.2.1.1 Apply the converse of the Pythagorean theorem to show a triangle is a right triangle. M08.C-G.2.1.2 Apply the Pythagorean theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions. (<i>Figures provided for problems in three dimensions will be consistent with Eligible Content in grade 8 and below.</i>) M08.C-G.2.1.3 Apply the Pythagorean theorem to find the distance between two points in a coordinate system.	CC.2.3.8.A.3 Understand and apply the Pythagorean Theorem to solve problems.	Textbook: <i>Math in Focus</i> Course 3 Book B Chapter 7 The Pythagorean Theorem Course 3 Chapter 7 Pre-Test Sections 7.1, 7.2 <ul style="list-style-type: none"> Extra Practice Workbook Enrichment Workbook Re-teaching Workbook Activities Workbook Online resources (HMH) 	District created curriculum based assessment on Pythagorean theorem District created cumulative assessment
Vocabulary: Pythagorean theorem, leg, hypotenuse, right triangle			

M08.C-G Geometry			
Big Idea			
M08.C-G.3 Solve real-world and mathematical problems involving volume.			
M08.C-G.3.1 Apply volume formulas of cones, cylinders, and spheres.		<i>How do we apply volume formulas of cones, cylinders, and spheres?</i>	
Concepts	Competencies	Resources	Assessments
M08.C-G.3.1.1 Apply formulas for the volumes of cones, cylinders, and spheres to solve real-world and mathematical problems. Formulas will be provided.	CC.2.3.8.A.1 Apply the concepts of volume of cylinders, cones, and spheres to solve real-world and mathematical problems.	Textbook: <i>Math in Focus</i> Course 3 Book B Chapter 7 The Pythagorean Theorem Sections 7.3, 7.4 <ul style="list-style-type: none"> • Extra Practice Workbook • Enrichment Workbook • Re-teaching Workbook • Activities Workbook • Online resources (HMH) 	District created curriculum based assessment on Pythagorean theorem District created cumulative assessment
Vocabulary: volume, cone, sphere, cylinder, chord			

M08.D-S Statistics and Probability			
Big Idea			
M08.D-S.1 Investigate patterns of association in bivariate data.			
M08.D-S.1.1 Analyze and interpret bivariate data displayed in multiple representations.		<i>How do we analyze and interpret bivariate data displayed in multiple representations?</i>	
Concepts	Competencies	Resources	Assessments
M08.D-S.1.1.1 Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities. Describe patterns such as clustering, outliers, positive or negative correlation, linear association, and nonlinear association. M08.D-S.1.1.2 For scatter plots that suggest a linear association,	CC.2.4.8.B.1 Analyze and/or interpret bivariate data displayed in multiple representations.	Textbook: <i>Math in Focus</i> Course 3 Book B Chapter 10 Statistics Course 3 Chapter 10 Pre-Test Sections 10.1, 10.2, 10.3 <ul style="list-style-type: none"> • Extra Practice Workbook • Enrichment Workbook • Re-teaching Workbook • Activities Workbook • Online resources (HMH) 	District created curriculum based assessment on bivariate data District created cumulative assessment

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<p>identify a line of best fit by judging the closeness of the data points to the line.</p> <p>M08.D-S.1.1.3 Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept. <i>Example: In a linear model for a biology experiment, interpret a slope of 1.5 cm/hr as meaning that an additional hour of sunlight each day is associated with an additional 1.5 cm in mature plant height.</i></p>			
<p>Vocabulary: bivariate data, scatter plot, linear model, correlation, positive correlation, negative correlation, linear association, nonlinear association, clustering, outlier, pattern, two-way table, correlation coefficient, experimental probability, theoretical probability</p>			