

## Scope and Sequence for Grades 7 and 8 Series

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CCS: Common Core Standards

DMC: *Dimensions Math*, Common Core Series

NEM: *New Elementary Mathematics*

CCS		DMC		NEM	
		7	8	1	2
	Numbers and the four operations				
	Review the idea of place value.			✓	
	Review the use of the four operations for calculations with positive whole numbers, fractions, and decimals.			✓	
	Review factors and multiple	✓		✓	
	Recognize prime numbers.	✓		✓	
	Express a composite number as the product of prime numbers using exponential notation.	✓		✓	
	Find the greatest common factor and least common multiple using prime factorization.	✓		✓	
	Find square roots and cube roots using prime factorization.	✓		✓	
7.NS.1	Understand negative numbers.	✓		✓	
7.NS.1	Use a number line to order integers.	✓		✓	
7.NS.1a	Find the absolute value of an integer.	✓		✓	
7.NS.1a,b	Find the additive inverse of a number.	✓			
7.NS.1a,c	Understand the absolute value of the difference between two integers as the distance between them.	✓			
7.NS.1d	Add and subtract integers.	✓		✓	
7.NS.2a,b,c	Multiply and divide integers.	✓		✓	
7.NS.2c	Apply order of operations to expressions with integers.	✓		✓	
7.NS.2b	Understand rational numbers.	✓		✓	
7.NS.2	Review simplest form of a fraction.	✓		✓	
7.NS.2b,c	Perform the four operations on rational numbers.	✓		✓	
7.NS.2d	Convert rational numbers to terminating or recurring decimal numbers.	✓		✓	
7.NS.3	Solve word problems involving rational numbers.	✓		✓	
8.NS.1	Understand irrational numbers and the difference between rational and irrational numbers.		✓	✓	
8.NS.2	Estimate the value of irrational square roots.		✓		
	Round numbers to a specified number of decimal places.	✓		✓	
	Understand accuracy of measurement indicated by the number of significant figures or digits.		✓	✓	
	Round numbers to a specified number of significant figures.		✓	✓	
	Understand potential rounding and truncation errors resulting from calculator use.		✓		
	Rate, ratio, proportion, and speed				
	Relate ratios to fractions.	✓		✓	
	Find the ratio of two or more quantities.	✓		✓	
	Find equivalent ratios and simplify ratios.	✓		✓	
7.EE.3	Solve problems involving ratios.	✓		✓	✓
7.EE.3	Solve problems involving an increase or decrease in ratio.	✓		✓	

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7.RP.1	Recognize and use common measures of rate.	✓		✓	
7.RP.1	Convert rate units (e.g. km/h to m/s).	✓		✓	
7.RP.1 7.EE.2,3	Solve problems involving rate.	✓		✓	✓
	Understand concepts of speed, uniform speed, and average speed.	✓		✓	
7.EE.2,3	Solve problems involving speed and average speed.	✓		✓	
7.RP.2a	Determine whether two quantities are in direct proportion or inverse proportion from a graph, a table, or an equation.	✓			✓
7.RP.2b	Identify the constant of proportionality.	✓			
7.RP.2d	Represent proportional relationship on coordinate graphs.	✓			
7.RP.2c	Represent the proportional relationship with an equation.	✓			
7.RP.3	Solve problems involving direct and inverse proportions.	✓		✓	
	Percentage				
	Express a percentage as a fraction or a decimal and vice versa.	✓		✓	
	Express one quantity as a percentage of another.	✓		✓	
	Compare quantities by percentages.	✓		✓	
7.EE.2,3 7.RP.3	Solve problems involving reverse percentages (find the total given the percentage and quantity of a part).	✓		✓	✓
7.EE.2,3 7.RP.3	Solve problems involving increasing or decreasing a quantity by a given percentage.	✓		✓	✓
7.EE.2,3 7.RP.3	Solve problems involving discount and sales tax.	✓		✓	✓
7.EE.2,3 7.RP.3	Solve problems involving percentages in practical situations.	✓		✓	✓
	Algebraic representation and formulas				
7.EE.4	Use letters to represent numbers or variable.	✓		✓	
	Interpret algebraic notations.	✓		✓	
7.EE.2,3,4a	Express basic arithmetical processes algebraically.	✓		✓	
7.EE.3	Evaluate algebraic expressions and formulas using substitution.	✓		✓	
	Find the terms in a sequence.	✓		✓	
	Find the formula for the general term of a sequence.	✓		✓	
7.EE.4a	Solve problems involving sequences and number patterns.	✓		✓	
	Algebraic manipulation				
7.EE.3	Add and subtract linear algebraic expressions.			✓	
7.EE.3,4a	Use the distributive law to expand algebraic expressions of the form $\pm a(b \pm c)$ .	✓	✓	✓	✓
7.EE.3,4a	Simplify simple linear algebraic expressions.	✓	✓	✓	✓
	Expand the product of two algebraic expressions e.g. $(a + b)(x + y)$ .		✓		✓
	Recognize and apply the special products: $(a \pm b)^2 = a \pm 2ab + b^2$ ; $(a + b)(a - b) = a^2 - b^2$ .		✓		✓
	Factorize linear algebraic expressions in the form $ax + bx + kay + kby$ , where $a$ , $b$ , and $k$ are constants.	✓	✓	✓	✓
	Factorize algebraic expressions of the form: $a^2x^2 - b^2y^2$ ; $a^2 \pm 2ab \pm b^2$ ; $ax^2 \pm bx \pm c$ .		✓		✓
	Simplify algebraic fractions.		✓		✓
	Multiply and divide algebraic fractions.		✓		✓

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	Simplify and add or subtract simple algebraic fractions with numerical denominators.		✓		✓
	Simplify and add or subtract algebraic fractions with linear or quadratic denominators.		✓		✓
	Change the subject of a formula, including those involving square roots.		✓		✓
	Solutions of linear equations and inequalities				
7.EE.4a	Solve linear equations with one unknown.	✓	✓	✓	✓
8.EE.7a	Simplify a linear equation to determine if it has one solution, no solution, or an infinite number of solutions.		✓		
7.EE.4a	Find the value of an unknown quantity in a formula.	✓		✓	
7.EE.4a	Solve simple fractional equations that can be reduced to linear equations, e.g. $\frac{x}{3} + \frac{x-2}{4} = 3$ or $\frac{3}{x-2} = 6$ .	✓		✓	
7.EE.2,4a	Construct simple linear equations from given situations and solve these equations.	✓		✓	
7.EE.4b	Solve simple inequalities such as $ax > b$ , where $a > 0$ .	✓			✓
7.EE.4b	Solve word problems involving simple inequalities.	✓			✓
7.EE.4b	Solve simple inequalities such as $ax > b$ , where $a < 0$ .	✓			✓
7.EE.4b	Solve linear inequalities in one unknown, e.g. $ax + b < c$ .	✓			✓
7.EE.4b	Solve word problems involving inequalities.	✓			✓
8.EE.8a	Solve simultaneous linear equations in two unknowns using the graphical method.		✓		✓
8.EE.8a 8.EE.7b	Solve simultaneous linear equations in two unknowns using the substitution and elimination methods.		✓		✓
8.EE.8c	Formulate a pair of linear equations in two unknowns to solve problems.		✓		✓
	Exponents (Indices)				
8.EE.1	State and apply the laws of exponents		✓		✓
8.EE.1	Use positive, zero, and negative integral exponents.		✓		✓
8.EE.1	Simplify expressions involving integral exponents.		✓		✓
8.EE.2	Solve simple equations involving integer exponents.		✓		✓
8.EE.2	Use fractional exponents.		✓		
8.EE.2	Simplify expressions involving fractional exponents.		✓		
8.EE.2	Evaluate algebraic expressions with exponents.		✓		
	Solve equations involving fractional exponents.		✓		
	Understand examples of very small or very large numbers and measurements, such as nanometer or gigabyte.		✓		
8.EE.3	Represent numbers using the standard form $A \times 10^n$ where $1 \leq A < 10$ and $n$ is an integer.		✓		✓
8.EE.4	Add and subtract numbers in standard form.		✓		✓
8.EE.4	Multiply and divide numbers in standard form.		✓		✓
	Solutions of simple quadratic equations				
	Solve quadratic equations in one unknown by factorization.		✓		✓
	Formulate a quadratic equation in one unknown to solve problems.		✓		✓
	Solve quadratic equations in one unknown by completing the square, using the quadratic formula, or drawing a graph.		✓		
	Solve fractional equations that can be transformed to quadratic equations.		✓		✓

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	Graphs of linear functions and relations.				
	Plot coordinate points on a graph.	✓			✓
7.RP.2a	Plot a graph of a set of ordered pairs satisfying a linear function.	✓			✓
7.RP.2b 8.SP.3	Find the slope (gradient) of a straight line on a graph as the ratio of vertical change to horizontal change.	✓			✓
8.F.1	Understand the definition of a function.		✓		
8.EE.5 8.F.4 8.SP.3	Create a table of a set of ordered pairs based on a description between two proportional quantities, draw a linear graph, and derive a linear equation.		✓		
8.F.2	Compare equations and graphs of functions.		✓		
8.EE.6	Derive the equation $y = mx + b$ for a linear graph where $m$ is the slope and $b$ is the $y$ -intercept.		✓		
8.EE.6	Find the slope and $y$ -intercept of a function in the form $y = mx + b$ where $m$ and $b$ are constants.		✓		
8.EE.6 8.F.3	Draw a graph of a linear function given the slope and $y$ -intercept or the equation $y = mx + b$ .		✓		
8.EE.6	Use similar triangles to explain why the slope is the same between any two points on a linear graph.		✓		
8.EE.5 8.F.5	Interpret and draw distance-time graphs (travel graphs).		✓		✓
8.EE.5 8.F.4	Solve problems involving rate of change (speed) in distance-time graphs.		✓		✓
8.G.8	Find the length of a line segment given the coordinates of the end points.		✓		
8.F.3	Understand that the graph of a quadratic function is a curve.		✓		✓
	Interpret and find the equation of a straight line graph in the form $y = mx + c$ given two points on the line.		✓		
	Mensuration				
	Convert between units of area ( $\text{cm}^2$ , $\text{mm}^2$ , $\text{m}^2$ , $\text{km}^2$ ) and volume ( $\text{cm}^3$ , $\text{mm}^3$ , $\text{m}^3$ ).	✓		✓	
7.G.6	Solve problems involving the perimeter and area of simple and composite plane figures consisting of parallelograms, triangles, and/or trapezoids.	✓		✓	
7.G.1	Understand the scale factor of a scale drawing and maps.	✓			
7.G.1	Draw a simple scale drawing.	✓			
7.G.1	Calculate the actual distance between two points and the area of a region from a scale drawing.	✓			
	Sketch prisms and use nets to visualize their surface areas.	✓		✓	
7.G.3	Identify the 2-dimensional figure resulting from the cross section of a prism.	✓		✓	
7.G.3	Describe the two-dimensional figures that result from slicing three dimensional figures.	✓			
7.G.4	Solve problems involving volumes and surface areas of simple and composite solids involving prisms.	✓		✓	
7.G.4	Understand the formulas for circumference and area of a circle and the meaning of $\pi$ .	✓			
8.G.9	Find the volume and surface areas of cylinders.		✓		
8.G.9	Find volumes and surface areas of pyramids, cones, and spheres.		✓		✓

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8.G.9	Solve problems involving surface areas and volumes of simple and composite solids involving prisms, cylinders, pyramids, cones, and spheres.		✓		✓
	Symmetries of solid figures				
	Identify line and rotation symmetries of plane figures.			✓	
	Identify plane symmetry and axes of rotational symmetry of solid figures.			✓	
	Give the number of planes and axes of symmetry and the order of rotational symmetry of given figures.			✓	
	Angles, triangles, and polygons				
	Describe points, lines, and line segments	✓		✓	
	Describe points, lines, line segments, rays, and planes.	✓			
	Describe angles	✓		✓	
	Identify different types of angles (acute, right, obtuse, and reflex).	✓		✓	
	Classify triangles based on their sides and angles.	✓		✓	
	Identify different types of quadrilaterals and explore their properties.	✓		✓	
7.G.2	Construct perpendicular bisectors, angle bisectors, triangles, and simple quadrilaterals using compasses, ruler, set squares and protractors, where appropriate.	✓			
7.G.2	Understand when given measures are sufficient to determine a unique triangle, more than one triangle, or no triangle	✓			
7.G.2	Construct simple geometric figures using technology	✓			
7.G.5	Understand the properties and find unknown angles in problems involving complementary angles, supplementary angles, adjacent angles on a line, and vertically opposite angles.	✓		✓	
8.G.5	Understand angle properties and find unknown angles in problems involving angles formed by two parallel lines and a transversal (corresponding, alternate, and interior angles).		✓	✓	
8.G.5	Understand the angle properties and find unknown angles of triangles and special quadrilaterals.		✓	✓	
	Understand the angle properties of regular pentagon, hexagon, octagon, and decagon.		✓	✓	
	Find the angles sum of interior and exterior angles of any convex polygon.		✓	✓	
	Congruence and Similarity				
	Recognize congruent figures.		✓	✓	
8.G.1	Match sides and angles of two congruent polygons.		✓	✓	
8.G.1	Use properties of congruent figures to find unknown sides and angles.		✓	✓	
8.G.1,2	Identify reflection, translation, and rotation of congruent figures.		✓		✓
8.G.3	Draw the reflection, translation, and rotation of a simple plane figure in the x-y plane.		✓		✓
8.G.2	Draw the image of a congruent figure involving combined operations.		✓		✓
8.G.4	Recognize similar figures.		✓	✓	
8.G.4	Use properties of similar polygons (corresponding angles are equal and corresponding sides are proportional) to find unknown sides and angles.		✓	✓	
8.G.4	Identify enlargement of a given plane figure by a scale factor.		✓		✓
8.G.4	Draw the enlargement of a simple plane figure in the x-y plane.		✓		✓
8.G.4	Draw the image of a figure involving combined movements.		✓		✓

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	Use similar and congruent figures to make designs and tessellations.			✓	
	Pythagoras' Theorem				
8.G.6	Explain a proof of Pythagoras' Theorem.		✓		
8.G.7	Apply Pythagoras' Theorem to solve problems.		✓		✓
	Determine whether a triangle is right angled given the lengths of its three sides.		✓		✓
8.G.6	Explain a proof of the converse of Pythagoras' Theorem.		✓		
8.NS.2	Use Pythagoras' Theorem to locate irrational numbers on a number line.		✓		
	Data Analysis				
7.SP.1	Understand different data collection methods (experimental measures, observation of outcomes, surveys, publications).	✓			
7.SP.2, 3	Use dot plots to observe patterns of distribution in small samples of data.	✓			
7.SP.4	Understand the mean and median as a measure of center.	✓			✓
7.SP.2, 4	Use mean and median to compare sets of data.				✓
7.SP.2, 4	Understand variation in data and calculate the mean absolute deviation of sets of data.	✓			
	Calculate the mode of a set of data.	✓			✓
	Compare usefulness of mean, median, and mode.	✓			✓
8.SP.4	Organize data and display data in tables and two-way tables.		✓		✓
	Construct and interpret bar graphs.		✓		✓
8.SP.4	Construct and interpret group frequency table and histograms with equal intervals to represent the group frequency table.		✓		✓
8.SP.4	Interpret relative frequencies for association between two variables.		✓		✓
8.SP.1,	Construct and interpret scatter plots and		✓		
8.SP.2,3	Informally fit a straight line when the plot suggests a linear association; interpret the slope and intercept.		✓		
8.SP.3	Construct and interpret line graphs for data.		✓		
	Construct pie charts and pictograms				✓
	Calculate the mean, median, and mode of frequency distributions.				✓
	Probability				
7.SP.5	Understand probability as a measure of chance.	✓			
	Define the terms sample space, outcome, and event.	✓			
7.SP.6	Collect data from a chance event and predict the probability of a chance event from its relative frequency of occurrence.	✓			
7.SP.7a	Find the theoretical probability of a single event, compare it to experimental probability.	✓			
	List the sample space for a simple chance situation.	✓			
7.SP.5, 7b	Understand the basic properties of probability.	✓			
7.SP. 8a	Calculate the probability of a simple combined event using a possibility diagram or a tree diagram.	✓			
7.SP.8b	Identify mutually exclusive events and independent events.	✓			
7.SP.8b, 8c	Understand and apply the addition of probabilities for two mutually exclusive events.	✓			
7.SP.8b, 8c	Understand and apply the multiplication of probabilities for independent events.	✓			
7.SP.8c	Apply probability of mutually exclusive and independent events to solve problems.	✓			

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	Set language and set notation				
	Use set language and set notation to describe a set of objects, its elements, and its subsets.	✓			
	Solutions of quadratic equations and inequalities				
	Solve quadratic equations by factorization, completing the square, quadratic formula, and graphical method.		✓		
	Solve fractional equations that can be transformed to quadratic equations.		✓		
	Apply quadratic equations to solve everyday problems.		✓		
	Graphs of non-linear functions and relations				
	Draw the graph of a quadratic function $y = ax^2 + bx + c$ where $a > 0$ and where $a < 0$ by finding and plotting ordered pairs.		✓		✓
	Find the maximum or minimum point, $x$ -intercepts, $y$ -intercept, and the line of symmetry of graphs of quadratic functions.		✓		✓
	Congruent and similar triangles and plane figures				
	Understand and use tests for congruent triangles.				✓
	Determine whether two triangles are similar.				✓
	Solve problems involving congruent or similar triangles.				✓
	Determine whether two plane figures or solids are similar.				✓
	Solve problems involving the ratio of areas and of lengths of two similar plane figures.				✓
	Solve problems involving the ratio of volumes and the ratio of lengths of two similar solids.				✓
	Polynomials, identities, and binomial expansion				
	Identify the terms and the degree of a polynomial.				✓
	Add, subtract, multiply, and divide polynomials.				✓
	Distinguish between equations and identities.				✓
	Find unknown coefficients of terms and constant terms in identities.				✓
	Trigonometry				
	Use trigonometric ratios (sine, cosine, and tangent) of acute angles to calculate unknown sides and angles in right-angled triangles.				✓
	Solve problems involving bearings and navigation.				
	Solve problems involving angles of elevation and depression.				✓
	Apply trigonometry to solve simple 3-dimensional problems involving angles between straight lines.				✓