2021

Benchmarks for Excellent Student Thinking (B.E.S.T.)

Mathematics

Access Points-Alternate Academic Achievement Standards (AP-AAAS)

Grades 3-12

Grade 3 B.E.S.T. Standards Access Points

Number Sense and Operations

MA.3.NSO.1 Understand the place value of four-digit numbers.	
MA.3.NSO.1.1	Read and write numbers from 0 to 10,000 using standard form, expanded form and word form.
	Access Point MA.3.NSO.1.AP.1 Read and generate numbers from 0 to 1,000 using standard form and expanded form.
MA.3.NSO.1.2	Compose and decompose four-digit numbers in multiple ways using thousands, hundreds, tens and ones. Demonstrate each composition or decomposition using objects, drawings, and expressions or equations.
	Access Point MA.3.NSO.1.AP.2 Compose and decompose numbers up to 1,000 using thousands, hundreds, tens and ones. Demonstrate each composition or decomposition with objects, drawings, expressions or equations.
MA.3.NSO.1.3	Plot, order and compare whole numbers up to 10,000.
	Access Point MA.3.NSO.1.AP.3 Plot, order and compare whole numbers up to 1,000.
MA.3.NSO.1.4	Round whole numbers from 0 to 1,000 to the nearest 10 or 100.
	Access Point MA.3.NSO.1.AP.4 Round whole numbers from 0 to 1,000 to the nearest 100 with visual support.
MA.3.NSO.2 Add and subtract multi-digit whole numbers. Build an understanding of multiplication and division operations.	
MA.3.NSO.2.1	Add and subtract multi-digit whole numbers including using a standard algorithm with procedural fluency.
	Access Point MA.3.NSO.2.AP.1 Apply a strategy to add and subtract two two-digit whole numbers.
MA.3.NSO.2.2	Explore multiplication of two whole numbers with products from 0 to 144, and related division facts.

	Access Point MA.3.NSO.2.AP.2 Explore the concept of multiplication of two single-digit whole numbers using objects.
MA.3.NSO.2.3	Multiply a one-digit whole number by a multiple of 10, up to 90, or a multiple of 100, up to 900, with procedural reliability.
	Access Point MA.3.NSO.2.AP.3 Explore multiplying a one-digit whole number by 10.
MA.3.NSO.2.4	Multiply two whole numbers from 0 to 12 and divide using related facts with procedural reliability.
	Access Point MA.3.NSO.2.AP.4 Explore the relationship between multiplication and division in order to multiply and divide. Multiplication may not exceed two single-digit whole numbers and their related division facts.

Fractions

MA.3.FR.1 Understand fractions as numbers and represent fractions.	
MA.3.FR.1.1	Represent and interpret unit fractions in the form $\frac{1}{n}$ as the quantity formed by one part when a whole is partitioned into *n* equal parts.
	Access Point MA.3.FR.1.AP.1 Explore unit fractions in the form $\frac{1}{n}$ as the quantity formed by one part when a whole is partitioned into *n* equal parts. Denominators are limited to 2, 3 and 4.
MA.3.FR.1.2	Represent and interpret fractions, including fractions greater than one, in the form of $\frac{m}{n}$ as the result of adding the unit fraction $\frac{1}{n}$ to itself *m* times.
	Access Point MA.3.FR.1.AP.2 Explore fractions, less than or equal to a whole, in the form of $\frac{m}{n}$ as the result of adding the unit fraction $\frac{1}{n}$ to itself *m* times. Denominators are limited to 2, 3 and 4.

MA.3.FR.1.3	Read and write fractions, including fractions greater than one, using standard form, numeral-word form and word form.
	Access Point MA.3.FR.1.AP.3 Read and generate fractions, less than or equal to a whole, using standard form.
MA.3.FR.2 Order and compare fractions and identify equivalent fractions.	
MA.3.FR.2.1	Plot, order and compare fractional numbers with the same numerator or the same denominator.
	Access Point MA.3.FR.2.AP.1 Compare fractional numbers with the same denominator. Denominators are limited to 2, 3 and 4.
MA.3.FR.2.2	Identify equivalent fractions and explain why they are equivalent.
	Access Point MA.3.FR.2.AP.2 Using a visual model, recognize fractions less than a whole that are equivalent to fractions with denominators of 2, 3 or 4 (e.g., $\frac{4}{8}$ is equivalent to $\frac{1}{2}$).

Algebraic Reasoning

MA.3.AR.1 Solve multiplication and division problems.	
MA.3.AR.1.1	Apply the distributive property to multiply a one-digit number and two-digit number. Apply properties of multiplication to find a product of one-digit whole numbers.
	Access Point MA.3.AR.1.AP.1 Apply the commutative property of multiplication to find a product of one-digit whole numbers.
MA.3.AR.1.2	Solve one- and two-step real-world problems involving any of four operations with whole numbers.
	Access Point MA.3.AR.1.AP.2a Solve one- and two-step addition and subtraction real-world problems within 100.
	MA.3.AR.1.AP.2b Solve one-step multiplication and division real-world problems. Multiplication may not exceed two single-digit whole numbers and their related division facts.

MA.3.AR.2 Develop an understanding of equality and multiplication and division.	
MA.3.AR.2.1	Restate a division problem as a missing factor problem using the relationship between multiplication and division.
	Access Point MA.3.AR.2.AP.1 Explore division as multiplication with a missing factor using the relationship between multiplication and division.
MA.3.AR.2.2	Determine and explain whether an equation involving multiplication or division is true or false.
	Access Point MA.3.AR.2.AP.2 Determine if multiplication or division equations with no more than three terms are true or false. Multiplication may not exceed two single-digit whole numbers and their related division facts.
MA.3.AR.2.3	Determine the unknown whole number in a multiplication or division equation, relating three whole numbers, with the unknown in any position.
	Access Point MA.3.AR.2.AP.3 Determine the unknown whole number in a multiplication or division equation, relating three whole numbers, with the product or quotient unknown (e.g., $2 \times 5 =$ __, $10 \div 5 =$ __). Multiplication may not exceed two single-digit whole numbers and their related division facts.
MA.3.AR.3 Identify numerical patterns, including multiplicative patterns.	
MA.3.AR.3.1	Determine and explain whether a whole number from 1 to 1,000 is even or odd.
	Access Point MA.3.AR.3.AP.1 Determine whether a whole number from 1 to 100 is even or odd.
MA.3.AR.3.2	Determine whether a whole number from 1 to 144 is a multiple of a given one-digit number.
	Access Point MA.3.AR.3.AP.2 Explore that a whole number is a multiple of each of its factors. Factors not to exceed single-digit whole numbers.

MA.3.AR.3.3	Identify, create and extend numerical patterns.
	Access Point MA.3.AR.3.AP.3 Extend a numerical pattern when given a one-step addition rule (e.g., when given the pattern 5, 10, 15, use the rule add 5 to extend the pattern).

Measurement

MA.3.M.1 Measure attributes of objects and solve problems involving measurement.	
MA.3.M.1.1	Select and use appropriate tools to measure the length of an object, the volume of liquid within a beaker and temperature.
	Access Point MA.3.M.1.AP.1a Select and use appropriate tools to measure the length (i.e., inches, feet, yards) of an object.
	MA.3.M.1.AP.1b Explore selecting and using appropriate tools to measure liquid volume (i.e., gallons, quarts, pints, cups) and temperature in degrees Fahrenheit.
MA.3.M.1.2	Solve real-world problems involving any of the four operations with whole-number lengths, masses, weights, temperatures or liquid volumes.
	Access Point MA.3.M.1.AP.2a Solve one- and two-step addition and subtraction real-world problems within 100 with whole number lengths (i.e., inches, feet, yards), temperatures (i.e., degrees Fahrenheit) or liquid volumes (i.e., gallons, quarts, pints, cups).
	MA.3.M.1.AP.2b Solve one-step multiplication and division real-world problems with whole number lengths (i.e., inches, feet, yards), temperatures (i.e., degrees Fahrenheit) or liquid volumes (i.e., gallons, quarts, pints and cups). Multiplication may not exceed two single-digit whole numbers and their related division facts.
MA.3.M.2 Tell and write time and solve problems involving time.	
MA.3.M.2.1	Using analog and digital clocks, tell and write time to the nearest minute using a.m. and p.m. appropriately.
	Access Point MA.3.M.2.AP.1 Using analog and digital clocks, express the time to the nearest five minutes using a.m. and p.m. appropriately.

MA.3.M.2.2	Solve one- and two-step real-world problems involving elapsed time.
	Access Point MA.3.M.2.AP.2 Solve for end time in one-step real-world problems when given start time and elapsed time in whole hours or minutes within the hour.

Geometric Reasoning

MA.3.GR.1 Describe and identify relationships between lines and classify quadrilaterals.	
MA.3.GR.1.1	Describe and draw points, lines, line segments, rays, intersecting lines, perpendicular lines and parallel lines. Identify these in two-dimensional figures.
	Access Point MA.3.GR.1.AP.1 Identify points, lines, line segments, perpendicular lines and parallel lines. Identify these in two-dimensional figures.
MA.3.GR.1.2	Identify and draw quadrilaterals based on their defining attributes. Quadrilaterals include parallelograms, rhombi, rectangles, squares and trapezoids.
	Access Point MA.3.GR.1.AP.2 Identify quadrilaterals based on their defining attributes. Quadrilaterals include parallelograms, rhombi, rectangles, squares and trapezoids.
MA.3.GR.1.3	Draw line(s) of symmetry in a two-dimensional figure and identify line-symmetric two-dimensional figures.
	Access Point MA.3.GR.1.AP.3 Identify line-symmetric two-dimensional figures.
MA.3.GR.2 Solve problems involving the perimeter and area of rectangles.	
MA.3.GR.2.1	Explore area as an attribute of a two-dimensional figure by covering the figure with unit squares without gaps or overlaps. Find areas of rectangles by counting unit squares.
	Access Point MA.3.GR.2.AP.1 Explore area as an attribute of a two-dimensional figure that can be measured by covering the figure with unit squares without gaps or overlaps.

MA.3.GR.2.2	Find the area of a rectangle with whole-number side lengths using a visual model and a multiplication formula.
	Access Point MA.3.GR.2.AP.2 Find the area of a rectangle with whole-number side lengths by counting unit squares. Explore that the area is the same as what would be found by multiplying the side lengths.
MA.3.GR.2.3	Solve mathematical and real-world problems involving the perimeter and area of rectangles with whole-number side lengths using a visual model and a formula.
	Access Point MA.3.GR.2.AP.3 Solve mathematical and real-world problems involving the perimeter and area of rectangles with whole-number side lengths using a visual model.
MA.3.GR.2.4	Solve mathematical and real-world problems involving the perimeter and area of composite figures composed of non-overlapping rectangles with whole-number side lengths.
	Access Point MA.3.GR.2.AP.4 Explore the perimeter and area of composite figures composed of two non-overlapping rectangles with whole-number side lengths.

Data Analysis and Probability

MA.3.DP.1 Collect, represent and interpret numerical and categorical data.	
MA.3.DP.1.1	Collect and represent numerical and categorical data with whole-number values using tables, scaled pictographs, scaled bar graphs or line plots. Use appropriate titles, labels and units.
	Access Point MA.3.DP.1.AP.1a Sort and represent categorical data (up to four categories) with whole-number values using tables, pictographs or bar graphs. Select appropriate title, labels and units.
	MA.3.DP.1.AP.1b Explore representing numerical data with whole-number values using line plots.

MA.3.DP.1.2	Interpret data with whole-number values represented with tables, scaled pictographs, circle graphs, scaled bar graphs or line plots by solving one- and two-step problems.
	Access Point MA.3.DP.1.AP.2a Interpret data with whole-number values represented with tables, pictographs or bar graphs to solve one-step "how many more" and "how many less" problems.
	MA.3.DP.1.AP.2b Interpret data with whole-number values represented with scaled pictographs or scaled bar graphs. For scaled pictographs, symbols used may only represent quantities of 2, 5 or 10 and only whole symbols may be used. For scaled bar graphs, intervals may only represent quantities of 2, 5 or 10.
	MA.3.DP.1.AP.2c Explore interpreting data with whole-number values represented with line plots.

Grade 4 B.E.S.T. Standards Access Points

Number Sense and Operations

MA.4.NSO.1 Understand place value for multi-digit numbers.	
MA.4.NSO.1.1	Express how the value of a digit in a multi-digit whole number changes if the digit moves one place to the left or right.
	Access Point MA.4.NSO.1.AP.1 Explore how the value of a digit in a multi-digit whole number changes if the digit moves one place to the left.
MA.4.NSO.1.2	Read and write multi-digit whole numbers from 0 to 1,000,000 using standard form, expanded form and word form.
	Access Point MA.4.NSO.1.AP.2 Read and generate numbers from 0 to 10,000 using standard form and expanded form.
MA.4.NSO.1.3	Plot, order and compare multi-digit whole numbers up to 1,000,000.
	Access Point MA.4.NSO.1.AP.3 Plot, order and compare multi-digit whole numbers up to 10,000.

MA.4.NSO.1.4	Round whole numbers from 0 to 10,000 to the nearest 10, 100 or 1,000.
	Access Point MA.4.NSO.1.AP.4 Round whole numbers from 100 to 10,000 to the nearest 1,000 with visual support.
MA.4.NSO.1.5	Plot, order and compare decimals up to the hundredths.
	Access Point MA.4.NSO.1.AP.5 Explore decimals less than one up to the hundredths.
MA.4.NSO.2 Build an understanding of operations with multi-digit numbers including decimals.	
MA.4.NSO.2.1	Recall multiplication facts with factors up to 12 and related division facts with automaticity.
	Access Point MA.4.NSO.2.AP.1 Recall multiplication facts of one-digit whole numbers multiplied by 1, 2, 5 and 10.
MA.4.NSO.2.2	Multiply two whole numbers, up to three digits by up to two digits, with procedural reliability.
	Access Point MA.4.NSO.2.AP.2 Explore multiplication of two whole numbers, up to two digits by one digit.
MA.4.NSO.2.3	Multiply two whole numbers, each up to two digits, including using a standard algorithm with procedural fluency.
	Access Point MA.4.NSO.2.AP.3 Apply a strategy to multiply two whole numbers up to two digits by one digit.
MA.4.NSO.2.4	Divide a whole number up to four digits by a one-digit whole number with procedural reliability. Represent remainders as fractional parts of the divisor.
	Access Point MA.4.NSO.2.AP.4 Explore division of two whole numbers up to two digits by one digit with no remainder.

MA.4.NSO.2.5	Explore the multiplication and division of multi-digit whole numbers using estimation, rounding and place value.
	Access Point MA.4.NSO.2.AP.5 Explore the estimation of products and quotients of two whole numbers up to two digits by one digit.
MA.4.NSO.2.6	Identify the number that is one-tenth more, one-tenth less, one-hundredth more and one-hundredth less than a given number.
	Access Point MA.4.NSO.2.AP.6 Identify the number that is one-tenth more and one-tenth less than a given number (i.e., 0.1, 0.2, 0.3, 0.4, 0.5, 0.6, 0.7, 0.8, 0.9).
MA.4.NSO.2.7	Explore the addition and subtraction of multi-digit numbers with decimals to the hundredths.
	Access Point MA.4.NSO.2.AP.7 Explore the addition and subtraction of decimals less than one to the tenths (e.g., 0.3 + 0.5) and hundredths (e.g., 0.25 − 0.12).

Fractions

MA.4.FR.1 Develop an understanding of the relationship between different fractions and the relationship between fractions and decimals.	
MA.4.FR.1.1	Model and express a fraction, including mixed numbers and fractions greater than one, with the denominator 10 as an equivalent fraction with the denominator 100.
	Access Point MA.4.FR.1.AP.1 Using a visual model, recognize fractions less than one, with the denominator 10 as an equivalent fraction with the denominator 100 (e.g., $\frac{\mathbf{2}}{\mathbf{10}}$ is equivalent to $\frac{\mathbf{20}}{\mathbf{100}}$).

MA.4.FR.1.2	Use decimal notation to represent fractions with denominators of 10 or 100, including mixed numbers and fractions greater than 1, and use fractional notation with denominators of 10 or 100 to represent decimals.
	Access Point MA.4.FR.1.AP.2 Use decimal notation to represent fractions less than one with denominators of 10 or 100 and use fractional notation with denominators of 10 or 100 to represent decimals less than one.
MA.4.FR.1.3	Identify and generate equivalent fractions, including fractions greater than one. Describe how the numerator and denominator are affected when the equivalent fraction is created.
	Access Point MA.4.FR.1.AP.3 Using a visual model, generate fractions less than a whole that are equivalent to fractions with denominators 2, 3, 4, 6, 8 or 10. Explore how the numerator and denominator are affected when the equivalent fraction is created.
MA.4.FR.1.4	Plot, order and compare fractions, including mixed numbers and fractions greater than one, with different numerators and different denominators.
	Access Point MA.4.FR.1.AP.4a Explore mixed numbers and fractions greater than one.
	MA.4.FR.1.AP.4b Using visual models, compare fractions less than one with different numerators and different denominators. Denominators limited to 2, 3, 4, 6, 8 or 10.

MA.4.FR.2 Build a foundation of addition, subtraction and multiplication operations with fractions.	
MA.4.FR.2.1	Decompose a fraction, including mixed numbers and fractions greater than one, into a sum of fractions with the same denominator in multiple ways. Demonstrate each decomposition with objects, drawings and equations.
	Access Point MA.4.FR.2.AP.1 Decompose a fraction less than one into a sum of unit fractions with the same denominator (e.g., $\frac{3}{4} = \frac{1}{4} + \frac{1}{4} + \frac{1}{4}$). Denominators limited to 2, 3, 4, 6, 8 or 10. Demonstrate each decomposition with objects, drawings or equations.
MA.4.FR.2.2	Add and subtract fractions with like denominators, including mixed numbers and fractions greater than one, with procedural reliability.
	Access Point MA.4.FR.2.AP.2 Explore adding and subtracting fractions less than one with like denominators. Denominators limited to 2, 3, 4, 6, 8 or 10.
MA.4.FR.2.3	Explore the addition of a fraction with denominator of 10 to a fraction with denominator of 100 using equivalent fractions.
	Access Point MA.4.FR.2.AP.3 Explore the addition of a fraction with denominator of 10 to a fraction with denominator of 100 using visual models to find equivalent fractions.
MA.4.FR.2.4	Extend previous understanding of multiplication to explore the multiplication of a fraction by a whole number or a whole number by a fraction.
	Access Point MA.4.FR.2.AP.4 Explore the multiplication of a unit fraction by a whole number (e.g., $3 \times \frac{1}{4}$, $2 \times \frac{1}{6}$, $5 \times \frac{1}{2}$). Denominators limited to 2, 3, 4, 6, 8 or 10.

Algebraic Reasoning

MA.4.AR.1 Represent and solve problems involving the four operations with whole numbers and fractions.	
MA.4.AR.1.1	Solve real-world problems involving multiplication and division of whole numbers including problems in which remainders must be interpreted within the context.
	Access Point MA.4.AR.1.AP.1 Solve one-step real-world problems involving multiplication and division of whole numbers. Multiplication may not exceed two-digit by one-digit and division must be related to one-digit by one-digit multiplication facts.
MA.4.AR.1.2	Solve real-world problems involving addition and subtraction of fractions with like denominators, including mixed numbers and fractions greater than one.
	Access Point MA.4.AR.1.AP.2 Solve one-step real-world problems involving addition and subtraction of fractions less than one with like denominators. Denominators limited to 2, 3, 4, 6, 8 or 10.
MA.4.AR.1.3	Solve real-world problems involving multiplication of a fraction by a whole number or a whole number by a fraction.
	Access Point MA.4.AR.1.AP.3 Solve one-step real-world problems involving multiplication of a unit fraction by a whole number (e.g., $3 \times \frac{1}{4}$, $2 \times \frac{1}{6}$, $5 \times \frac{1}{2}$). Denominators limited to 2, 3, 4, 6, 8 or 10.

Measurement

MA.5.M.1 Convert measurement units to solve multi-step problems.	
MA.5.M.1.1	Solve multi-step real-world problems that involve converting measurement units to equivalent measurements within a single system of measurement.
	Access Point MA.5.M.1.AP.1a Using a conversion sheet, convert within a single system of measurement using the units: miles, yards, feet, inches; pounds, ounces; gallons, quarts, pints, cups; and hours, minutes. Only whole number measurements may be used.
	MA.5.M.1.AP.1b Using a conversion sheet, solve one-and two-step real-world problems that involve converting measurement units (i.e., miles, yards, feet, inches; pounds, ounces; gallons, quarts, pints, cups; and hours, minutes) to equivalent measurements within a single system of measurement. Only whole number measurements may be used.
MA.5.M.2 Solve problems involving money.	
MA.5.M.2.1	Solve multi-step real-world problems involving money using decimal notation.
	Access Point MA.5.M.2.AP.1 Solve one- and two-step addition and subtraction real-world problems involving money using decimal notation with all terms less than $20.00 (e.g., $11.74 + $5.31, $10.99 − $3.26).

Geometric Reasoning

MA.5.GR.1 Classify two-dimensional figures and three-dimensional figures based on defining attributes.	
MA.5.GR.1.1	Classify triangles or quadrilaterals into different categories based on shared defining attributes. Explain why a triangle or quadrilateral would or would not belong to a category.
	Access Point MA.5.GR.1.AP.1a Sort triangles into different categories based on the size of their angles. Triangles include acute, obtuse and right.
	MA.5.GR.1.AP.1b Sort quadrilaterals into different categories based on shared defining attributes. Explore why a quadrilateral would or would not belong to a category. Quadrilaterals include parallelograms, rhombi, rectangles, squares and trapezoids.
MA.5.GR.1.2	Identify and classify three-dimensional figures into categories based on their defining attributes. Figures are limited to right pyramids, right prisms, right circular cylinders, right circular cones and spheres.
	Access Point MA.5.GR.1.AP.2 Identify and sort three-dimensional figures into categories based on their defining attributes. Figures are limited to right rectangular pyramids, right rectangular prisms, right circular cylinders, right circular cones and spheres.
MA.5.GR.2 Find the perimeter and area of rectangles with fractional or decimal side lengths.	
MA.5.GR.2.1	Find the perimeter and area of a rectangle with fractional or decimal side lengths using visual models and formulas.
	Access Point MA.5.GR.2.AP.1 Find the perimeter and area of a rectangle with decimal side lengths using a visual model and calculator.

MA.5.GR.3 Solve problems involving the volume of right rectangular prisms.	
MA.5.GR.3.1	Explore volume as an attribute of three-dimensional figures by packing them with unit cubes without gaps. Find the volume of a right rectangular prism with whole-number side lengths by counting unit cubes.
	Access Point MA.5.GR.3.AP.1 Explore volume as an attribute of three-dimensional figures that can be measured by packing them with unit cubes without gaps.
MA.5.GR.3.2	Find the volume of a right rectangular prism with whole-number side lengths using a visual model and a formula.
	Access Point MA.5.GR.3.AP.2 Find the volume of a right rectangular prism with whole-number side lengths by counting unit cubes. Explore that the volume is the same as what would be found by multiplying the edge lengths.
MA.5.GR.3.3	Solve real-world problems involving the volume of right rectangular prisms, including problems with an unknown edge length, with whole-number edge lengths using a visual model or a formula. Write an equation with a variable for the unknown to represent the problem.
	Access Point MA.5.GR.3.AP.3 Solve real-world problems involving the volume of right rectangular prisms with given whole-number edge lengths using a visual model or formula.
MA.5.GR.4 Plot points and represent problems on the coordinate plane.	
MA.5.GR.4.1	Identify the origin and axes in the coordinate system. Plot and label ordered pairs in the first quadrant of the coordinate plane.
	Access Point MA.5.GR.4.AP.1 Explore the first quadrant of the coordinate plane including the origin, axes and points located by using ordered pairs.

MA.5.GR.4.2	Represent mathematical and real-world problems by plotting points in the first quadrant of the coordinate plane and interpret coordinate values of points in the context of the situation.
	Access Point MA.5.GR.4.AP.2 Plot and label ordered pairs in the first quadrant of the coordinate plane.

Data Analysis and Probability

MA.5.DP.1 Collect, represent and interpret data and find the mean, mode, median or range of a data set.	
MA.5.DP.1.1	Collect and represent numerical data, including fractional and decimal values, using tables, line graphs or line plots.
	Access Point MA.5.DP.1.AP.1 Sort and represent numerical data, including fractional values using tables or line plots (when given a scaled number line). Data set to include only whole numbers, halves and quarters.
MA.5.DP.1.2	Interpret numerical data, with whole-number values, represented with tables or line plots by determining the mean, mode, median or range.
	Access Point MA.5.DP.1.AP.2 Interpret numerical data, with whole-number values, represented with tables or line plots by determining the mean, mode or range. Line plot scales to include only whole numbers, halves and quarters.

Grade 6

Number Sense and Operations

MA.6.NSO.1 Extend knowledge of numbers to negative numbers and develop an understanding of absolute value.	
MA.6.NSO.1.1	Extend previous understanding of numbers to define rational numbers. Plot, order and compare rational numbers.
	Access Point MA.6.NSO.1.AP.1 Plot, order and compare rational numbers (positive and negative integers within 10 from 0, fractions with common denominators, decimals up to the hundredths and percentages) in the same form.

MA.6.NSO.1.2	Given a mathematical or real-world context, represent quantities that have opposite direction using rational numbers. Compare them on a number line and explain the meaning of zero within its context.
	Access Point MA.6.NSO.1.AP.2 Represent positive and negative numbers in the same form on a number line given a real-world situation and explain the meaning of zero within its context.
MA.6.NSO.1.3	Given a mathematical or real-world context, interpret the absolute value of a number as the distance from zero on a number line. Find the absolute value of rational numbers.
	Access Point MA.6.NSO.1.AP.3 Find absolute value of the numbers from –30 to 30 using a number line.
MA.6.NSO.1.4	Solve mathematical and real-world problems involving absolute value, including the comparison of absolute value.
	Access Point MA.6.NSO.1.AP.4 Use manipulatives, models or tools to compare absolute value in mathematical and real-world problems.
MA.6.NSO.2 Add, subtract, multiply and divide positive rational numbers.	
MA.6.NSO.2.1	Multiply and divide positive multi-digit numbers with decimals to the thousandths, including using a standard algorithm with procedural fluency.
	Access Point MA.6.NSO.2.AP.1 Solve one-step multiplication and division problems involving positive decimals whose place value ranges from the tens to the hundredths places.
MA.6.NSO.2.2	Extend previous understanding of multiplication and division to compute products and quotients of positive fractions by positive fractions, including mixed numbers, with procedural fluency.
	Access Point MA.6.NSO.2.AP.2 Use tools to calculate the product and quotient of positive fractions by positive fractions, including mixed numbers, using the standard algorithms.

MA.6.NSO.2.3	Solve multi-step real-world problems involving any of the four operations with positive multi-digit decimals or positive fractions, including mixed numbers.
	Access Point MA.6.NSO.2.AP.3a Solve one-step real-world problems involving any of the four operations with positive decimals ranging from the hundreds to hundredth place value.
	MA.6.NSO.2.AP.3b Solve one-step real-world problems involving any of the four operations with positive fractions and mixed numbers with like denominators.
MA.6.NSO.3 Apply properties of operations to rewrite numbers in equivalent forms.	
MA.6.NSO.3.1	Given a mathematical or real-world context, find the greatest common factor and least common multiple of two whole numbers.
	Access Point MA.6.NSO.3.AP.1 Use tools to find the greatest common factor and least common multiple of two whole numbers 50 or less.
MA.6.NSO.3.2	Rewrite the sum of two composite whole numbers having a common factor, as a common factor multiplied by the sum of two whole numbers.
	Access Point MA.6.NSO.3.AP.2 Use the distributive property to express a number as the sum of two whole numbers multiplied by a common factor.
MA.6.NSO.3.3	Evaluate positive rational numbers and integers with natural number exponents.
	Access Point MA.6.NSO.3.AP.3a Identify what an exponent represents (e.g., $8^3 = 8 \times 8 \times 8$).
	MA.6.NSO.3.AP.3b Solve numerical expressions involving whole-number bases and exponents (e.g., $5 + 2^4 \times 6 = 101$).

MA.6.NSO.3.4	Express composite whole numbers as a product of prime factors with natural number exponents.
	Access Point MA.6.NSO.3.AP.4 Use a tool to show the prime factors of a number (e.g., 20 = 2 × 2 × 5).
MA.6.NSO.3.5	Rewrite positive rational numbers in different but equivalent forms including fractions, terminating decimals and percentages.
	Access Point MA.6.NSO.3.AP.5 Rewrite a number 3 or less, as a fraction, decimal or a percent.
MA.6.NSO.4 Extend understanding of operations with integers.	
MA.6.NSO.4.1	Apply and extend previous understandings of operations with whole numbers to add and subtract integers with procedural fluency.
	Access Point MA.6.NSO.4.AP.1 Use tools to add and subtract integers between 50 and −50.
MA.6.NSO.4.2	Apply and extend previous understandings of operations with whole numbers to multiply and divide integers with procedural fluency.
	Access Point MA.6.NSO.4.AP.2 Use tools to multiply and divide integers between 20 and −20.
MA.6.AR.1 Apply previous understanding of arithmetic expressions to algebraic expressions.	
MA.6.AR.1.1	Given a mathematical or real-world context, translate written descriptions into algebraic expressions and translate algebraic expressions into written descriptions.
	Access Point MA.6.AR.1.AP.1 Write or select an algebraic expression that represents a real-world situation.
MA.6.AR.1.2	Translate a real-world written description into an algebraic inequality in the form of $xx > oo$, $xx < oo$, $xx \geq oo$ or $xx \leq oo$. Represent the inequality on a number line.
	Access Point MA.6.AR.1.AP.2 Write or select an inequality that represents a real-world situation.

MA.6.AR.1.3	Evaluate algebraic expressions using substitution and order of operations.
	Access Point MA.6.AR.1.AP.3 Solve an expression using substitution with no more than two operations.
MA.6AR.1.4	Apply the properties of operations to generate equivalent algebraic expressions with integer coefficients.
	Access Point MA.6.AR.1.AP.4 Use tools or models to combine like terms in an expression with no more than four operations.
MA.6.AR.2 Develop an understanding for solving equations and inequalities. Write and solve one-step equations in one variable.	
MA.6.AR.2.1	Given an equation or inequality and a specified set of integer values, determine which values make the equation or inequality true or false.
	Access Point MA.6.AR.2.AP.1 Choose which values, from a set of five or fewer integers, make an equation or inequality true.
MA.6.AR.2.2	Write and solve one-step equations in one variable within a mathematical or real-world context using addition and subtraction, where all terms and solutions are integers.
	Access Point MA.6.AR.2.AP.2 Solve real-world, one-step linear equations using addition and subtraction involving integers.
MA.6.AR.2.3	Write and solve one-step equations in one variable within a mathematical or real-world context using multiplication and division, where all terms and solutions are integers.
	Access Point MA.6.AR.2.AP.3 Solve real-world, one-step linear equations using multiplication and division involving integers.
MA.6.AR.2.4	Determine the unknown decimal or fraction in an equation involving any of the four operations, relating three numbers, with the unknown in any position.
	Access Point MA.6.AR.2.AP.4 Solve a one-step equation using fractions with like denominators or decimals with place value ranging from the thousand to the thousandths.

MA.6.AR.3 Understand ratio and unit rate concepts and use them to solve problems.	
MA.6.AR.3.1	Given a real-world context, write and interpret ratios to show the relative sizes of two quantities using appropriate notation: aa, oo to bb, or $oo{:}bb$ where $bb \neq 0$
	Access Point MA.6.AR.3.AP.1 Given a real-world context, write and interpret ratios to show the relative sizes of two quantities using notation: a/b, a to b, or a:b where b ≠ 0 with guidance and support.
MA.6.AR.3.2	Given a real-world context, determine a rate for a ratio of quantities with different units. Calculate and interpret the corresponding unit rate
	Access Point MA.6.AR.3.AP.2 Given a rate, calculate the unit rate for a ratio with different units.
MA.6.AR.3.3	Extend previous understanding of fractions and numerical patterns to generate or complete a two- or three-column table to display equivalent part-to-part ratios and part-to-part-to-whole ratios.
	Access Point MA.6.AR.3.AP.3 Given a visual representation, write or select a ratio that describes the ratio relationship between part-to-part and part-to-whole ratios.
MA.6.AR.3.4	Apply ratio relationships to solve mathematical and real-world problems involving percentages using the relationship between two quantities.
	Access Point MA.6.AR.3.AP.4 Calculate a percentage of quantity as rate per 100 using models (e.g., percent bars or 10 × 10 grids).

MA.6.AR.3.5	Solve mathematical and real-world problems involving ratios, rates and unit rates, including comparisons, mixtures, ratios of lengths and conversions within the same measurement system.
	Access Point MA.6.AR.3.AP.5a Use tools, models or manipulatives to solve problems involving ratio relationships including mixtures and ratios of length.
	MA.6.AR.3.AP.5b Use tools, models or manipulatives to solve ratio, rate or unit rate problems involving conversions within the same measurement system.

Geometric Reasoning

MA.6.GR.1 Apply previous understanding of the coordinate plane to solve problems.	
MA.6.GR.1.1	Extend previous understanding of the coordinate plane to plot rational number ordered pairs in all four quadrants and on both axes. Identify the x- or y-axis as the line of reflection when two ordered pairs have an opposite x- or y-coordinate.
	Access Point MA.6.GR.1.AP.1 Plot integer ordered pairs in all four quadrants and on both axes.
MA.6.GR.1.2	Find distances between ordered pairs, limited to the same x-coordinate or the same y-coordinate, represented on the coordinate plane.
	Access Point MA.6.GR.1.AP.2 Count the distance between two ordered pairs with the same x-coordinate or the same y-coordinate.
MA.6.GR.1.3	Solve mathematical and real-world problems by plotting points on a coordinate plane, including finding the perimeter or area of a rectangle.
	Access Point MA.6.GR.1.AP.3 Given a rectangle plotted on the coordinate plane, find the perimeter or area of the rectangle.

MA.6.GR.2 Model and solve problems involving two-dimensional figures and three-dimensional figures.	
MA.6.GR.2.1	Derive a formula for the area of a right triangle using a rectangle. Apply a formula to find the area of a triangle.
	Access Point MA.6.GR.2.AP.1 Given the formula, find the area of a triangle.
MA.6.GR.2.2	Solve mathematical and real-world problems involving the area of quadrilaterals and composite figures by decomposing them into triangles or rectangles.
	Access Point MA.6.GR.2.AP.2 Decompose quadrilaterals and composite figures into simple shapes (rectangles or triangles) to measure area.
MA.6.GR.2.3	Solve mathematical and real-world problems involving the volume of right rectangular prisms with positive rational number edge lengths using a visual model and a formula.
	Access Point MA.6.GR.2.AP.3 Given a real-world problem, find the volume of a rectangular prism using a visual model and the formula.
MA.6.GR.2.4	Given a mathematical or real-world context, find the surface area of right rectangular prisms and right rectangular pyramids using the figure's net.
	Access Point MA.6.GR.2.AP.4 Find the surface area of right rectangular prisms by adding the areas of the shapes forming the two-dimensional net.
MA.6.DP.1 Develop an understanding of statistics and determine measures of center and measures of variability. Summarize statistical distributions graphically and numerically.	
MA.6.DP.1.1	Recognize and formulate a statistical question that would generate numerical data.
	Access Point MA.6.DP.1.AP.1 Identify statistical questions from a list that would generate numerical data.

MA.6.DP.1.2	Given a numerical data set within a real-world context, find and interpret mean, median, mode and range.
	Access Point MA.6.DP.1.AP.2a Use tools to identify and calculate the mean, median, mode and range represented in a set of data with no more than five elements.
	MA.6.DP.1.AP.2b Identify and explain what the mean and mode represent in a set of data with no more than five elements.
MA.6.DP.1.3	Given a box plot within a real-world context, determine the minimum, the lower quartile, the median, the upper quartile and the maximum. Use this summary of the data to describe the spread and distribution of the data.
	Access Point MA.6.DP.1.AP.3 Given a box plot, identify the value of the minimum, the lower quartile, the median, the upper quartile and the maximum.
MA.6.DP.1.4	Given a histogram or line plot within a real-world context, qualitatively describe and interpret the spread and distribution of the data, including any symmetry, skewness, gaps, clusters, outliers and the range.
	Access Point MA.6.DP.1.AP.4 Given a histogram or a line plot, describe the physical features of the graph.
MA.6.DP.1.5	Create box plots and histograms to represent sets of numerical data within real-world contexts.
	Access Point MA.6.DP.1.AP.5 Create histograms to represent sets of numerical data with 10 or fewer elements.
MA.6.DP.1.6	Given a real-world scenario, determine and describe how changes in data values impact measures of center and variation.
	Access Point MA.6.DP.1.AP.6 Calculate and identify changes (increase or decrease) in the median, mode or range when a data value is added or subtracted from a data set.

Grade 7

Number Sense and Operations

MA.7.NSO.1 Rewrite numbers in equivalent forms.	
MA.7.NSO.1.1	Know and apply the Laws of Exponents to evaluate numerical expressions and generate equivalent numerical expressions, limited to whole-number exponents and rational number bases.
	Access Point MA.7.NSO.1.AP.1 Use properties of whole number exponents to produce equivalent expressions.
MA.7.NSO.1.2	Rewrite rational numbers in different but equivalent forms including fractions, mixed numbers, repeating decimals and percentages to solve mathematical and real-world problems.
	Access Point MA.7.NSO.1.AP.2 Rewrite positive rational numbers in different but equivalent forms such as fractions, mixed numbers, repeating decimals and/or percentages to solve problems.
MA.7.NSO.2 Add, subtract, multiply and divide rational numbers.	
MA.7.NSO.2.1	Solve mathematical problems using multi-step order of operations with rational numbers including grouping symbols, whole-number exponents and absolute value.
	Access Point MA.7.NSO.2.AP.1 Solve mathematical problems, using no more than four operations, with rational numbers including grouping symbols, whole-number exponents and absolute value.
MA.7.NSO.2.2	Add, subtract, multiply and divide rational numbers with procedural fluency.
	Access Point MA.7.NSO.2.AP.2 Using tools or models, add, subtract, multiply and divide rational numbers.
MA.7.NSO.2.3	Solve real-world problems involving any of the four operations with rational numbers.
	Access Point MA.7.NSO.2.AP.3 Using tools or models, solve real-world problems involving any of the four operations with rational numbers.

Algebraic Reasoning

MA.7.AR.1 Rewrite algebraic expressions in equivalent forms.	
MA.7.AR.1.1	Apply properties of operations to add and subtract linear expressions with rational coefficients.
	Access Point MA.7.AR.1.AP.1 Add and subtract linear expressions that include like terms.
MA.7.AR.1.2	Determine whether two linear expressions are equivalent.
	Access Point MA.7.AR.1.AP.2 Use tools or manipulatives to compare two linear expressions, with no more than two operations, to determine whether they are equivalent.
MA.7.AR.2 Write and solve equations and inequalities in one variable.	
MA.7.AR.2.1	Write and solve one-step inequalities in one variable within a mathematical context and represent solutions algebraically or graphically.
	Access Point MA.7.AR.2.AP.1 Select a one-step inequality from a list that represents a real-world situation and given a set of three or fewer values, use substitution to solve.
MA.7.AR.2.2	Write and solve two-step equations in one variable within a mathematical or real-world context, where all terms are rational numbers.
	Access Point MA.7.AR.2.AP.2a Set up two-step equations in one variable based on real-world problems.
	MA.7.AR.2.AP.2b Solve two-step equations in one variable based on real-world problems, where all terms have positive integer coefficients.
MA.7.AR.3 Use percentages and proportional reasoning to solve problems.	
MA.7.AR.3.1	Apply previous understanding of percentages and ratios to solve multi-step real-world percent problems.
	Access Point MA.7.AR.3.AP.1 Solve simple percentage problems in real-world contexts.

MA.7.AR.3.2	Apply previous understanding of ratios to solve real-world problems involving proportions.
	Access Point MA.7.AR.3.AP.2 Solve simple ratio problems in real-world contexts.
MA.7.AR.3.3	Solve mathematical and real-world problems involving the conversion of units across different measurement systems.
	Access Point MA.7.AR.3.AP.3 Use tools to solve real-world problems involving conversion of units in the same measurement system.
MA.7.AR.4 Analyze and represent two-variable proportional relationships.	
MA.7.AR.4.1	Determine whether two quantities have a proportional relationship by examining a table, graph or written description.
	Access Point MA.7.AR.4.AP.1 Given a table or a graph, determine whether two quantities have a proportional relationship.
MA.7.AR.4.2	Determine the constant of proportionality within a mathematical or real-world context given a table, graph or written description of a proportional relationship.
	Access Point MA.7.AR.4.AP.2 Identify the constant of proportionality when given a table or graph of a proportional relationship.
MA.7.AR.4.3	Given a mathematical or real-world context, graph proportional relationships from a table, equation or a written description.
	Access Point MA.7.AR.4.AP.3 Given a table or equation, graph a proportional relationship.
MA.7.AR.4.4	Given any representation of a proportional relationship, translate the representation to a written description, table or equation.
	Access Point MA.7.AR.4.AP.4 Given a table representation of a proportional relationship, translate the relationship into an equation or a graph.

MA.7.AR.4.5	Solve real-world problems involving proportional relationships.
	Access Point MA.7.AR.4.AP.5 Solve simple real-world problems involving proportional relationships.

Geometric Reasoning

MA.7.GR.1 Solve problems involving two-dimensional figures, including circles.	
MA.7.GR.1.1	Apply formulas to find the areas of trapezoids, parallelograms and rhombi.
	Access Point MA.7.GR.1.AP.1 Given the formulas, find the area of parallelograms and rhombi.
MA.7.GR.1.2	Solve mathematical or real-world problems involving the area of polygons or composite figures by decomposing them into triangles or quadrilaterals.
	Access Point MA.7.GR.1.AP.2 Decompose complex shapes (polygon, trapezoid, and pentagon) into simple shapes (rectangles, squares, triangles) to measure area.
MA.7.GR.1.3	Explore the proportional relationship between circumferences and diameters of circles. Apply a formula for the circumference of a circle to solve mathematical and real-world problems.
	Access Point MA.7.GR.1.AP.3 Apply a given formula for the circumference of a circle to solve mathematical problems.
MA.7.GR.1.4	Explore and apply a formula to find the area of a circle to solve mathematical and real-world problems.
	Access Point MA.7.GR.1.AP.4 Apply a given formula to find the area of a circle to solve mathematical problems.
MA.7.GR.1.5	Solve mathematical and real-world problems involving dimensions and areas of geometric figures, including scale drawings and scale factors.
	Access Point MA.7.GR.1.AP.5 Use a scale factor to draw a scale drawing of a real-world two-dimensional polygon on graph paper.

MA.7.GR.2 Solve problems involving three-dimensional figures, including right circular cylinders.	
MA.7.GR.2.1	Given a mathematical or real-world context, find the surface area of a right circular cylinder using the figure's net.
	Access Point MA.7.GR.2.AP.1 Match the parts of a given formula to the right circular cylinder using the figure's net.
MA.7.GR.2.2	Solve real-world problems involving surface area of right circular cylinders.
	Access Point MA.7.GR.2.AP.2 Given the formula, use tools to find the surface area of a right circular cylinder using the figure's net.
MA.7.GR.2.3	Solve mathematical and real-world problems involving volume of right circular cylinders.
	Access Point MA.7.GR.2.AP.3 Given a formula, use tools to calculate the volume of right circular cylinders.

Data Analysis and Probability

MA.7.DP.1 Represent and interpret numerical and categorical data.	
MA.7.DP.1.1	Determine an appropriate measure of center or measure of variation to summarize numerical data, represented numerically or graphically, taking into consideration the context and any outliers.
	Access Point MA.7.DP.1.AP.1 Use context to determine the appropriate measure of center (mean or median) or range to summarize a numerical data set with 10 or fewer elements, represented numerically or graphically.
MA.7.DP.1.2	Given two numerical or graphical representations of data, use the measure(s) of center and measure(s) of variability to make comparisons, interpret results and draw conclusions about the two populations.
	Access Point MA.7.DP.1.AP.2 Given two numerical or graphical representations of data in the same form, compare the mean, median or range of each representation.

MA.7.DP.1.3	Given categorical data from a random sample, use proportional relationships to make predictions about a population.
	Access Point MA.7.DP.1.AP.3 Given data from a random sample of the population, select from a list an appropriate prediction about the population based on the data.
MA.7.DP.1.4	Use proportional reasoning to construct, display and interpret data in circle graphs.
	Access Point MA.7.DP.1.AP.4 Use proportional reasoning to interpret data in a pie chart.
MA.7.DP.1.5	Given a real-world numerical or categorical data set, choose and create an appropriate graphical representation.
	Access Point MA.7.DP.1.AP.5 Given a data set, select an appropriate graphical representation (histogram, bar chart, or line plot).
MA.7.DP.2 Develop an understanding of probability. Find and compare experimental and theoretical probabilities.	
MA.7.DP.2.1	Determine the sample space for a simple experiment.
	Access Point MA.7.DP.2.AP.1 Use tree diagrams, frequency tables, organized lists, and/or simulations to collect data from a simple experiment.
MA.7.DP.2.2	Given the probability of a chance event, interpret the likelihood of it occurring. Compare the probabilities of chance events.
	Access Point MA.7.DP.2.AP.2 Given the probability of a simple chance event written as a fraction, percentage or decimal between 0 and 1, determine how likely is it that an event will occur.
MA.7.DP.2.3	Find the theoretical probability of an event related to a simple experiment.
	Access Point MA.7.DP.2.AP.3 Determine the theoretical probability of a simple chance event.

MA.7.DP.2.4	Use a simulation of a simple experiment to find experimental probabilities and compare them to theoretical probabilities.
	Access Point MA.7.DP.2.AP.4 Conduct a simple experiment to find experimental probabilities.

Grade 8

Number Sense and Operations

MA.8.NSO.1 Solve problems involving rational numbers, including numbers in scientific notation, and extend the understanding of rational numbers to irrational numbers.	
MA.8.NSO.1.1	Extend previous understanding of rational numbers to define irrational numbers within the real number system. Locate an approximate value of a numerical expression involving irrational numbers on a number line.
	Access Point MA.8.NSO.1.AP.1 Locate approximations of irrational numbers on a number line.
MA.8.NSO.1.2	Plot, order and compare rational and irrational numbers, represented in various forms.
	Access Point MA.8.NSO.1.AP.2 Use appropriate tools to plot, order, and compare simple square roots and cube roots for quantities less than 100.
MA.8.NSO.1.3	Extend previous understanding of the Laws of Exponents to include integer exponents. Apply the Laws of Exponents to evaluate numerical expressions and generate equivalent numerical expressions, limited to integer exponents and rational number bases, with procedural fluency.
	Access Point MA.8.NSO.1.AP.3 Use the properties of integer exponents and product/quotient of powers with like bases to produce equivalent expressions.

MA.8.NSO.1.4	Express numbers in scientific notation to represent and approximate very large or very small quantities. Determine how many times larger or smaller one number is compared to a second number.
	Access Point MA.8.NSO.1.AP.4 Multiply a single-digit number by the power of 10 using a calculator.
MA.8.NSO.1.5	Add, subtract, multiply and divide numbers expressed in scientific notation with procedural fluency.
	Access Point MA.8.NSO.1.AP.5 Perform operations with numbers expressed in scientific notation using a calculator.
MA.8.NSO.1.6	Solve real-world problems involving operations with numbers expressed in scientific notation.
	Access Point MA.8.NSO.1.AP.6 Given a real-world problem, perform operations with numbers expressed in scientific notation using a calculator and interpret the answer in context.
MA.8.NSO.1.7	Solve multi-step mathematical and real-world problems involving the order of operations with rational numbers including exponents and radicals.
	Access Point MA.8.NSO.1.AP.7 Use tools to solve multi-step mathematical problems, with four or fewer steps, involving the order of operations with rational numbers including exponents and perfect squares and/or square roots.

Algebraic Reasoning

MA.8.AR.1 Generate equivalent algebraic expressions.	
MA.8.AR.1.1	Apply the Laws of Exponents to generate equivalent algebraic expressions, limited to integer exponents and monomial bases.
	Access Point MA.8.AR.1.AP.1 Use the properties of integer exponents and product/quotient of powers with like bases to produce equivalent algebraic expressions limited to positive exponents and monomial bases.

MA.8.AR.1.2	Apply properties of operations to multiply two linear expressions with rational coefficients.
	Access Point MA.8.AR.1.AP.2 Use the distributive property to multiply a monomial by a binomial linear expression.
MA.8.AR.1.3	Rewrite the sum of two algebraic expressions having a common monomial factor as a common factor multiplied by the sum of two algebraic expressions.
	Access Point MA.8.AR.1.AP.3 Rewrite the sum of two linear algebraic expressions having a common whole number monomial factor as the common factor multiplied by the sum of two linear algebraic expressions.
MA.8.AR.2 Solve multi-step one-variable equations and inequalities	
MA.8.AR.2.1	Solve multi-step linear equations in one variable, with rational number coefficients. Include equations with variables on both sides.
	Access Point MA.8.AR.2.AP.1a Set up multi-step equations in one variable, with integers coefficients. Include equations with variables on both sides.
	MA.8.AR.2.AP.1b Solve multi-step equations in one variable, with integers coefficients. Include equations with variables on both sides.
MA.8.AR.2.2	Solve two-step linear inequalities in one variable and represent solutions algebraically and graphically.
	Access Point MA.8.AR.2.AP.2 Select a two-step inequality from a list that represents a real-world situation and use substitution to solve.
MA.8.AR.2.3	Given an equation in the form of $xx^2 = pp$ and $xx^3 = qq$, where pp is a whole number and qq is an integer, determine the real solutions.
	Access Point MA.8.AR.2.AP.3 Given an equation in the form of $x^2 = p$ and $x^3 = q$, use tools to determine real solutions where p is a perfect square up to 144 and q is a perfect cube from –125 to 125.

MA.8.AR.3 Extend understanding of proportional relationships to two-variable linear equations.	
MA.8.AR.3.1	Determine if a linear relationship is also a proportional relationship.
	Access Point MA.8.AR.3.AP.1 Given a table, a graph, or equation, determine whether two quantities have a proportional relationship.
MA.8.AR.3.2	Given a table, graph or written description of a linear relationship, determine the slope.
	Access Point MA.8.AR.3.AP.2 Given a table or graph of a linear relationship, identify the slope.
MA.8.AR.3.3	Given a table, graph or written description of a linear relationship, write an equation in slope-intercept form.
	Access Point MA.8.AR.3.AP.3 Given a table or graph of a linear relationship, identify from a list, the equation in slope-intercept form.
MA.8.AR.3.4	Given a mathematical or real-world context, graph a two-variable linear equation from a written description, a table or an equation in slope-intercept form.
	Access Point MA.8.AR.3.AP.4 Graph a two-variable linear equation from a table or an equation in slope-intercept form.
MA.8.AR.3.5	Given a real-world context, determine and interpret the slope and *tt*-intercept of a two-variable linear equation from a written description, a table, a graph or an equation in slope-intercept form.
	Access Point MA.8.AR.3.AP.5 Given a real-world context, identify the slope and *y*-intercept of a two-variable linear equation from a table, a graph or an equation in slope-intercept form.

MA.8.AR.4 Develop an understanding of two-variable systems of equations.	
MA.8.AR.4.1	Given a system of two linear equations and a specified set of possible solutions, determine which ordered pairs satisfy the system of linear equations.
	Access Point MA.8.AR.4.AP.1a Given a system of two linear equations displayed on a graph, identify the solution of a system as the point where the two lines intersect.
	MA.8.AR.4.AP.1b Identify the coordinates of the point of intersection for two linear equations plotted on a coordinate plane.
MA.8.AR.4.2	Given a system of two linear equations represented graphically on the same coordinate plane, determine whether there is one solution, no solution or infinitely many solutions.
	Access Point MA.8.AR.4.AP.2 Given a system of two linear equations represented graphically on the same coordinate plane, identify whether there is one solution or no solution.
MA.8.AR.4.3	Given a mathematical or real-world context, solve systems of two linear equations by graphing.
	Access Point MA.8.AR.4.AP.3 Given two sets of coordinates for two lines, plot the lines on a coordinate plane and describe or select the solution to a system of linear equations.
MA.8.F.1 Define, evaluate and compare functions.	
MA.8.F.1.1	Given a set of ordered pairs, a table, a graph or mapping diagram, determine whether the relationship is a function. Identify the domain and range of the relation.
	Access Point MA.8.F.1.AP.1a Given a set of ordered pairs, a table or mapping diagram identify whether the relationship is a function.
	MA.8.F.1.AP.1b Given a set of ordered pairs, a table or mapping diagram identify the domain and range of the relation.

MA.8.F.1.2	Given a function defined by a graph or an equation, determine whether the function is a linear function. Given an input-output table, determine whether it could represent a linear function.
	Access Point MA.8.F.1.AP.2 Given a function displayed as a graph or an equation, identify whether the function is a linear function.
MA.8.F.1.3	Analyze a real-world written description or graphical representation of a functional relationship between two quantities and identify where the function is increasing, decreasing or constant.
	Access Point MA.8.F.1.AP.3 Given a functional relationship displayed as a graph, identify where the function is increasing, decreasing or constant.

Geometric Reasoning

MA.8.GR.1 Develop an understanding of the Pythagorean Theorem and angle relationships involving triangles.	
MA.8.GR.1.1	Apply the Pythagorean Theorem to solve mathematical and real-world problems involving unknown side lengths in right triangles.
	Access Point MA.8.GR.1.AP.1 Find the hypotenuse of a two-dimensional right triangle using the Pythagorean Theorem.
MA.8.GR.1.2	Apply the Pythagorean Theorem to solve mathematical and real-world problems involving the distance between two points in a coordinate plane.
	Access Point MA.8.GR.1.AP.2 Given the Pythagorean Theorem, determine lengths/distances between two points in a coordinate system by forming right triangles, with natural number side lengths.

MA.8.GR.1.3	Use the Triangle Inequality Theorem to determine if a triangle can be formed from a given set of sides. Use the converse of the Pythagorean Theorem to determine if a right triangle can be formed from a given set of sides.
	Access Point MA.8.GR.1.AP.3a Measure the sides of triangles to establish facts about the Triangle Inequality Theorem (i.e., the sum of two side lengths is greater than the third side).
	MA.8.GR.1.AP.3b Substitute the side lengths of a given figure into the Pythagorean Theorem to determine if a right triangle can be formed.
MA.8.GR.1.4	Solve mathematical problems involving the relationships between supplementary, complementary, vertical or adjacent angles.
	Access Point MA.8.GR.1.AP.4 Identify supplementary, complementary, vertical or adjacent angle relationships.
MA.8.GR.1.5	Solve problems involving the relationships of interior and exterior angles of a triangle.
	Access Point MA.8.GR.1.AP.5 Given an image, solve simple problems involving the relationships of interior and exterior angles of a triangle.
MA.8.GR.1.6	Develop and use formulas for the sums of the interior angles of regular polygons by decomposing them into triangles.
	Access Point MA.8.GR.1.AP.6 Use tools to calculate the sum of the interior angles of regular polygons when given the formula.
MA.8.GR.2 Understand similarity and congruence using models and transformations.	
MA.8.GR.2.1	Given a preimage and image generated by a single transformation, identify the transformation that describes the relationship.
	Access Point MA.8.GR.2.AP.1 Given two figures on a coordinate plane, identify if the image is translated, rotated or reflected.

MA.8.GR.2.2	Given a preimage and image generated by a single dilation, identify the scale factor that describes the relationship.
	Access Point MA.8.GR.2.AP.2 Given a preimage and image describe the effect the dilation has on the two figures.
MA.8.GR.2.3	Describe and apply the effect of a single transformation on two-dimensional figures using coordinates and the coordinate plane.
	Access Point MA.8.GR.2.AP.3 Dilate common polygons using graph paper and identifying the coordinates of the vertices.
MA.8.GR.2.4	Solve mathematical and real-world problems involving proportional relationships between similar triangles.
	Access Point MA.8.GR.2.AP.4 Use tools to solve mathematical problems using proportions between similar triangles.

Data Analysis and Probability

MA.8.DP.1 Represent and investigate numerical bivariate data	
MA.8.DP.1.1	Given a set of real-world bivariate numerical data, construct a scatter plot or a line graph as appropriate for the context.
	Access Point MA.8.DP.1.AP.1 Graph bivariate data using a scatter plot.
MA.8.DP.1.2	Given a scatter plot within a real-world context, describe patterns of association.
	Access Point MA.8.DP.1.AP.2 Given a scatter plot, identify whether the patterns of association are no association, positive association, negative association, linear or nonlinear.
MA.8.DP.1.3	Given a scatter plot with a linear association, informally fit a straight line.
	Access Point MA.8.DP.1.AP.3 Given a scatter plot with a linear association, use tools to draw or place a line of best fit.
MA.8.DP.2 Represent and find probabilities of repeated experiments.	
MA.8.DP.2.1	Determine the sample space for a repeated experiment.
	Access Point MA.8.DP.2.AP.1 Use a tool (table, list or tree diagram) to record results of a repeated experiment.

MA.8.DP.2.2	Find the theoretical probability of an event related to a repeated experiment.
	Access Point MA.8.DP.2.AP.2 Select the theoretical probability of an event from a list.
MA.8.DP.2.3	Solve real-world problems involving probabilities related to single or repeated experiments, including making predictions based on theoretical probability.
	Access Point MA.8.DP.2.AP.3 Compare actual results of an experiment with its theoretical probability (e.g., make a statement that describes the relationship between the actual results of an experiment with its theoretical probability [e.g., more, less, same, different, equal]).

9-12 Overview

9-12 Number Sense and Operations Strand

MA.912.NSO.1 Generate equivalent expressions and perform operations with expressions involving exponents, radicals or logarithms.	
MA.912.NSO.1.1	Extend previous understanding of the Laws of Exponents to include rational exponents. Apply the Laws of Exponents to evaluate numerical expressions and generate equivalent numerical expressions involving rational exponents.
	Access Point MA.912.NSO.1.AP.1 Evaluate numerical expressions involving rational exponents.
MA.912.NSO.1.2	Generate equivalent algebraic expressions using the properties of exponents.
	Access Point MA.912.NSO.1.AP.2 Identify equivalent algebraic expressions using properties of exponents.

MA.912.NSO.1.3	Generate equivalent algebraic expressions involving radicals or rational exponents using the properties of exponents. Radicands are limited to monomial algebraic expressions.
	Access Point MA.912.NSO.1.AP.3 Using properties of exponents, identify equivalent algebraic expressions involving radicals and rational exponents. Radicands are limited to monomial algebraic expression.
MA.912.NSO.1.4	Apply previous understanding of operations with rational numbers to add, subtract, multiply and divide numerical radicals.
	Access Point MA.912.NSO.1.AP.4 Apply previous understanding of operations with rational numbers to add and subtract numerical radicals that are in radical form.
MA.912.NSO.1.5	Add, subtract, multiply and divide algebraic expressions involving radicals. Radicands are limited to monomial algebraic expressions.
	Access Point MA.912.NSO.1.AP.5 Add and subtract algebraic expressions involving radicals. Radicands are limited to monomial algebraic expressions.
MA.912.NSO.1.6	Given a numerical logarithmic expression, evaluate and generate equivalent numerical expressions using the properties of logarithms or exponents.
	Access Point MA.912.NSO.1.AP.6 Given a numerical logarithmic expression, identify an equivalent numerical expression using the properties of logarithms or exponents.
MA.912.NSO.1.7	Given an algebraic logarithmic expression, generate an equivalent algebraic expression using the properties of logarithms or exponents.
	Access Point MA.912.NSO.1.AP.6 Given an algebraic logarithmic expression, identify an equivalent algebraic expression using the properties of logarithms or exponents.

MA.912.NSO.2 Represent and perform operations with expressions within the complex number system.	
MA.912.NSO.2.1	Extend previous understanding of the real number system to include the complex number system. Add, subtract, multiply and divide complex numbers.
	Access Point MA.912.NSO.2.AP.1 Extend previous understanding of the real number system to include the complex number system. Add and subtract complex numbers.
MA.912.NSO.2.2	Represent addition, subtraction, multiplication and conjugation of complex numbers geometrically on the complex plane.
	Access Point MA.912.NSO.2.AP.2 Represent addition and subtraction of complex numbers geometrically on the complex plane.

9-12 Algebraic Reasoning Strand

MA.912.AR.1 Interpret and rewrite algebraic expressions and equations in equivalent forms.	
MA.912.AR.1.1	Identify and interpret parts of an equation or expression that represent a quantity in terms of a mathematical or real-world context, including viewing one or more of its parts as a single entity.
	Access Point MA.912.AR.1.AP.1 Identify a part(s) of an equation or expression and explain the meaning within the context of a problem.
MA.912.AR.1.2	Rearrange equations or formulas to isolate a quantity of interest.
	Access Point MA.912.AR.1.AP.2 Rearrange an equation or a formula for a specific variable.
MA.912.AR.1.3	Add, subtract and multiply polynomial expressions with rational number coefficients.
	Access Point MA.912.AR.1.AP.3 Add, subtract and multiply polynomial expressions with integer coefficients.

MA.912.AR.1.4	Divide a polynomial expression by a monomial expression with rational number coefficients.
	Access Point MA.912.AR.1.AP.4 Divide a polynomial expression by a monomial expression with integer coefficients.
MA.912.AR.1.5	Divide polynomial expressions using long division, synthetic division and algebraic manipulation.
	Access Point MA.912.AR.1.AP.5 Divide polynomial expressions using long division, synthetic division and algebraic manipulation where the denominator is a linear expression.
MA.912.AR.1.6	Solve mathematical and real-world problems involving addition, subtraction, multiplication or division of polynomials.
	Access Point MA.912.AR.1.AP.6 Solve mathematical and/or real-world problems involving addition, subtraction, multiplication or division of polynomials with integer coefficients.
MA.912.AR.1.7	Rewrite a polynomial expression as a product of polynomials over the real number system.
	Access Point MA.912.AR.1.AP.7 Factor a quadratic expression.
MA.912.AR.1.8	Rewrite a polynomial expression as a product of polynomials over the real or complex number system.
	Access Point MA.912.AR.1.AP.8 Select a polynomial expression as a product of polynomials with integer coefficients over the real or complex number system.
MA.912.AR.1.9	Apply previous understanding of rational number operations to add, subtract, multiply and divide rational expressions.
	Access Point MA.912.AR1.AP.9 Apply previous understanding of rational number operations with common denominators to add and subtract rational expressions.

MA.912.AR.2 Write, solve and graph linear equations, functions and inequalities in one and two variables.	
MA.912.AR.2.1	Given a real-world context, write and solve one-variable multi-step linear equations.
	Access Point MA.912.AR.2.AP.1 Given an equation in a real-world context, solve one-variable multi-step linear equations.
MA.912.AR.2.2	Write a linear two-variable equation to represent relationships between quantities from a graph, a written description or a table of values within a mathematical or real-world context.
	Access Point MA.912.AR.2.AP.2 Select a linear two-variable equation to represent relationships between quantities from a graph, a written description or a table of values within a mathematical or real-world context.
MA.912.AR.2.3	Write a linear two-variable equation for a line that is parallel or perpendicular to a given line and goes through a given point.
	Access Point MA.912.AR.2.AP.3 Select a linear two-variable equation in slope intercept form for a line that is parallel or perpendicular to a given line and goes through a given point.
MA.912.AR.2.4	Given a table, equation or written description of a linear function, graph that function, and determine and interpret its key features.
	Access Point MA.912.AR.2.AP.4 Given a table, equation or written description of a linear function, select a graph of that function and determine at least two key features (can include domain, range, *y*-intercept or slope).

MA.912.AR.2.5	Solve and graph mathematical and real-world problems that are modeled with linear functions. Interpret key features and determine domain constraints in terms of the context.
	Access Point MA.912.AR.2.AP.5 Given a real-world problem select a graph that is modeled by a linear function and determine domain constraints in terms of the context.
MA.912.AR.2.6	Given a mathematical or real-world context, write and solve one-variable linear inequalities, including compound inequalities. Represent solutions algebraically or graphically.
	Access Point MA.912.AR.2.AP.6 Given a mathematical and/or real-world context, select a one-variable linear inequality that represents the solution algebraically or graphically.
MA.912.AR.2.7	Write two-variable linear inequalities to represent relationships between quantities from a graph or a written description within a mathematical or real-world context.
	Access Point MA.912.AR.2.AP.7 Select a two-variable linear inequality to represent relationships between quantities from a graph.
MA.912.AR.2.8	Given a mathematical or real-world context, graph the solution set to a two-variable linear inequality.
	Access Point MA.912.AR.2.AP.8 Given a two-variable linear inequality, select a graph that represents the solution.
MA.912.AR.3 Write, solve and graph quadratic equations, functions and inequalities in one and two variables.	
MA.912.AR.3.1	Given a mathematical or real-world context, write and solve one-variable quadratic equations over the real number system.
	Access Point MA.912.AR.3.AP.1 Given a one-variable quadratic equation from a mathematical or real-world context, select the solution to the equation over the real number system.

MA.912.AR.3.2	Given a mathematical or real-world context, write and solve one-variable quadratic equations over the real and complex number systems.
	Access Point MA.912.AR.3.AP.2 Solve mathematical one-variable quadratic equations with integer coefficients over the real and complex number systems.
MA.912.AR.3.3	Given a mathematical or real-world context, write and solve one-variable quadratic inequalities over the real number system. Represent solutions algebraically or graphically.
	Access Point MA.912.AR.3.AP.3 Given a mathematical or real-world context, select a one-variable quadratic inequality over the real number system that represents the solution algebraically or graphically.
MA.912.AR.3.4	Write a quadratic function to represent the relationship between two quantities from a graph, a written description or a table of values within a mathematical or real-world context.
	Access Point MA.912.AR.3.AP.4 Select a quadratic function to represent the relationship between two quantities from a graph.
MA.912.AR.3.5	Given the x-intercepts and another point on the graph of a quadratic function, write the equation for the function
	Access Point MA.912.AR.3.AP.5 Given the x-intercepts and another point on the graph of a quadratic function, select the equation for the function.
MA.912.AR.3.6	Given an expression or equation representing a quadratic function, determine the vertex and zeros and interpret them in terms of a real-world context.
	Access Point MA.912.AR.3.AP.6 Given an expression or equation representing a quadratic function in vertex form, determine the vertex and zeros.

MA.912.AR.3.7	Given a table, equation or written description of a quadratic function, graph that function, and determine and interpret its key features.
	Access Point MA.912.AR.3.AP.7 Given a table, equation or written description of a quadratic function, select the graph that represents the function.
MA.912.AR.3.8	Solve and graph mathematical and real-world problems that are modeled with quadratic functions. Interpret key features and determine constraints in terms of the context.
	Access Point MA.912.AR.3.AP.8 Solve mathematical problems that are modeled with quadratic functions, using key features and select the graph that represents this function .
MA.912.AR.3.9	Given a mathematical or real-world context, write two-variable quadratic inequalities to represent relationships between quantities from a graph or a written description.
	Access Point MA.912.AR.3.AP.9 Select two-variable quadratic inequalities to represent relationships between quantities from a graph or a written description.
MA.912.AR.3.10	Given a mathematical or real-world context, graph the solution set to a two-variable quadratic inequality.
	Access Point MA.912.AR.3.AP.10 Select the graph of the solution set to a two-variable quadratic inequality.
MA.912.AR.4 Write, solve and graph absolute value equations, functions and inequalities in one and two variables.	
MA.912.AR.4.1	Given a mathematical or real-world context, write and solve one-variable absolute value equations.
	Access Point MA.912.AR.4.AP.1 Solve a one variable absolute value equation.

MA.912.AR.4.2	Given a mathematical or real-world context, write and solve one-variable absolute value inequalities. Represent solutions algebraically or graphically.
	Access Point MA.912.AR.4.AP.2 Solve a one-variable absolute value inequality. Represent solutions algebraically or graphically.
MA.912.AR.4.3	Given a table, equation or written description of an absolute value function, graph that function and determine its key features.
	Access Point MA.912.AR.4.AP.3 Given a table, equation or written description of an absolute value function, select the graph that represents the function.
MA.912.AR.4.4	Solve and graph mathematical and real-world problems that are modeled with absolute value functions. Interpret key features and determine domain constraints in terms of the context
	Access Point MA.912.AR.4.AP.4 Solve mathematical problems that are modeled with absolute value functions, using key features and select the graph that represents this function.
MA.912.AR.5 Write, solve and graph exponential and logarithmic equations and functions in one and two variables.	
MA.912.AR.5.2	Solve one-variable equations involving logarithms or exponential expressions. Interpret solutions as viable in terms of the context and identify any extraneous solutions.
	Access Point MA.912.AR.5.AP.2 Solve one-variable equations involving logarithms or exponential expressions. Identify any extraneous solutions.
MA.912.AR.5.3	Given a mathematical or real-world context, classify an exponential function as representing growth or decay.
	Access Point MA.912.AR.5.AP.3 Given a real-world context, identify an exponential function as representing growth or decay.

MA.912.AR.5.4	Write an exponential function to represent a relationship between two quantities from a graph, a written description or a table of values within a mathematical or real-world context.
	Access Point MA.912.AR.5.AP.4 Select an exponential function to represent two quantities from a graph or a table of values.
MA.912.AR.5.5	Given an expression or equation representing an exponential function, reveal the constant percent rate of change per unit interval using the properties of exponents. Interpret the constant percent rate of change in terms of a real-world context.
	Access Point MA.912.AR.5.AP.5 Given an expression or equation representing an exponential function, reveal the constant percent rate of change per unit interval using the properties of exponents.
MA.912.AR.5.6	Given a table, equation or written description of an exponential function, graph that function and determine its key features.
	Access Point MA.912.AR.5.AP.6 Given a table, equation or written description of an exponential function, select the graph that represents the function.
MA.912.AR.5.7	Solve and graph mathematical and real-world problems that are modeled with exponential functions. Interpret key features and determine domain constraints in terms of the context.
	Access Point MA.912.AR.5.AP.7 Solve and select the graph of mathematical exponential functions.
MA.912.AR.5.8	Given a table, equation or written description of a logarithmic function, graph that function and determine its key features.
	Access Point MA.912.AR.5.AP.8 Given an equation of a logarithmic function, select the graph of that function.

MA.912.AR.5.9	Solve and graph mathematical and real-world problems that are modeled with logarithmic functions. Interpret key features and determine constraints in terms of the context.
	Access Point MA.912.AR.5.AP.9 Solve and select the graph of mathematical logarithmic functions.
MA.912.AR.6 Solve and graph polynomial equations and functions in one and two variables.	
MA.912.AR.6.1	Given a mathematical or real-world context, when suitable factorization is possible, solve one-variable polynomial equations of degree 3 or higher over the real and complex number systems.
	Access Point MA.912.AR.6.AP.1 Solve one-variable polynomial equations of degree 3 or higher in factored form, over the real number system.
MA.912.AR.6.5	Sketch a rough graph of a polynomial function of degree 3 or higher using zeros, multiplicity and knowledge of end behavior.
	Access Point MA.912.AR.6.AP.5 Create a rough graph of a polynomial function of degree 3 or higher (in factored form) using zeros, multiplicity and knowledge of end behavior.
MA.912.AR.7 Solve and graph radical equations and functions in one and two variables.	
MA.912.AR.7.1	Solve one-variable radical equations. Interpret solutions as viable in terms of context and identify any extraneous solutions.
	Access Point MA.912.AR.7.AP.1 Solve one-variable radical equations and identify any extraneous solutions.

MA.912.AR.7.2	Given a table, equation or written description of a square root or cube root function, graph that function and determine its key features.
	Access Point MA.912.AR.7.AP.2 Given a table, equation or written description of a square root or cube root function, select the graph that represents the function.
MA.912.AR.7.3	Solve and graph mathematical and real-world problems that are modeled with square root or cube root functions. Interpret key features in context.
	Access Point MA.912.AR.7.AP.3 Given a mathematical or real-world problem that is modeled with square root or cube root functions, using key features (in terms of the context), select the graph that represents this model.
MA.912.AR.8 Solve and graph rational equations and functions in one and two variables.	
MA.912.AR.8.1	Write and solve one-variable rational equations. Interpret solutions as viable in terms of the context and identify any extraneous solutions.
	Access Point MA.912.AR.8.AP.1 Solve one-variable rational equations and identify any extraneous solutions.
MA.912.AR.8.2	Given a table, equation or written description of a rational function, graph that function and determine its key features.
	Access Point MA.912.AR.8.AP.2 Given a table, equation or written description of a rational function, select the graph that represents the function.
MA.912.AR.8.3	Solve and graph mathematical and real-world problems that are modeled with rational functions. Interpret key features in terms of the context.
	Access Point MA.912.AR.8.AP.3 Given a mathematical and/or real-world problem that is modeled with rational functions, using key features (in terms of the context), select the graph that represents this model.

MA.912.AR.9 Write and solve a system of two- and three-variable equations and inequalities that describe quantities or relationships.	
MA.912.AR.9.1	Given a mathematical or real-world context, write and solve a system of two-variable linear equations algebraically or graphically.
	Access Point MA.912.AR.9.AP.1 Given an algebraic or graphical system of two-variable linear equations, select the solution to the system of equations.
MA.912.AR.9.2	Given a mathematical or real-world context, solve a system consisting of a two-variable linear equation and a non-linear equation algebraically or graphically.
	Access Point MA.912.AR.9.AP.2 Solve a system consisting of a two-variable linear equation and a quadratic equation algebraically or graphically.
MA.912.AR.9.3	Given a mathematical or real-world context, solve a system consisting of two-variable linear or non-linear equations algebraically or graphically.
	Access Point MA.912.AR.9.AP.3 Solve a system consisting of two-variable linear or quadratic equations algebraically or graphically.
MA.912.AR.9.4	Graph the solution set of a system of two-variable linear inequalities.
	Access Point MA.912.AR.9.AP.4 Select the graph of the solution set of a system of two-variable linear inequalities.
MA.912.AR.9.5	Graph the solution set of a system of two-variable inequalities.
	Access Point MA.912.AR.9.AP.5 Select the graph of the solution set of a system of two-variable inequalities.

MA.912.AR.9.6	Given a real-world context, represent constraints as systems of linear equations or inequalities. Interpret solutions to problems as viable or non-viable options.
	Access Point MA.912.AR.9.AP.6 Given a real-world context, as systems of linear equations or inequalities with identified constraints, select a solution as a viable or non-viable option.
MA.912.AR.9.7	Given a real-world context, represent constraints as systems of linear and non-linear equations or inequalities. Interpret solutions to problems as viable or non-viable options.
	Access Point MA.912.AR.9.AP.7 Given a real-world context, as systems of linear and non-linear equations or inequalities with identified constraints, select a solution as a viable or non-viable option.

9-12 Functions Strand

MA.912.F.1 Understand, compare and analyze properties of functions.	
MA.912.F.1.1	Given an equation or graph that defines a function, determine the function type. Given an input-output table, determine a function type that could represent it.
	Access Point MA.912.F.1.AP.1a Given an equation or graph that defines a function, identify the function type as either linear or quadratic.
	MA.912.F.1.AP.1b Given an input-output table with an accompanying graph, determine a function type, either linear or quadratic, that could represent it.
MA.912.F.1.2	Given a function represented in function notation, evaluate the function for an input in its domain. For a real-world context, interpret the output.
	Access Point MA.912.F.1.AP.2 Given an equation in function notation or table of a function, identify the effect of the output of the function as the domain changes.

MA.912.F.1.3	Calculate and interpret the average rate of change of a real-world situation represented graphically, algebraically or in a table over a specified interval.
	Access Point MA.912.F.1.AP.3 Given a real-world situation represented graphically or algebraically, identify the rate of change as positive, negative, zero or undefined.
MA.912.F.1.5	Compare key features of linear and nonlinear functions each represented in the same way, such as algebraically, graphically, in tables or written descriptions.
	Access Point MA.912.F.1.AP.5 Identify key features of linear and quadratic functions each represented in the same way algebraically or graphically (key features are limited to domain; range; intercepts; intervals where the function is increasing, decreasing, positive or negative; end behavior).
MA.912.F.1.6	Compare key features of linear and nonlinear functions each represented algebraically, graphically, in tables or written descriptions.
	Access Point MA.912.F.1.AP.6 Identify key features of linear and quadratic functions each represented in a different way algebraically or graphically (key features are limited to domain; range; intercepts; intervals where the function is increasing, decreasing, positive or negative; end behavior).
MA.912.F.1.7	Compare key features of two functions each represented algebraically, graphically, in tables or written descriptions.
	Access Point MA.912.F.1.AP.7 Compare key features of two functions each represented algebraically or graphically.
MA.912.F.1.8	Determine whether a linear, quadratic or exponential function best models a given real-world situation.
	Access Point MA.912.F.1.AP.8 Select whether a linear or quadratic function best models a given real-world situation.

MA.912.F.1.9	Determine whether a function is even, odd or neither when represented algebraically, graphically or in a table.
	Access Point MA.912.F.1.AP.9 Select whether a function is even, odd or neither when represented algebraically.
MA.912.F.2 Identify and describe the effects of transformations on functions. Create new functions given transformations.	
MA.912.F.2.1	Identify the effect on the graph or table of a given function after replacing $f(x)$ by $f(x) + kk$, $kkff(xx)$, $f(kx)$ and $ff(xx + kk)$ for specific values of kk.
	Access Point MA.912.F.2.AP.1 Select the effect (up, down, left, or right) on the graph of a given function after replacing $f(x)$ by $f(x) + k$ and $f(x + k)$ for specific values of k.
MA.912.F.2.2	Identify the effect on the graph of a given function of two or more transformations defined by adding a real number to the x- or y-values or multiplying the x- or y-values by a real number.
	Access Point MA.012.F.2.AP.2 Identify the effect on the graph of a given function of two or more transformations defined by adding a real number to the x- or y-values.
MA.912.F.2.3	Given the graph or table of $ff(xx)$ and the graph or table of $ff(xx) + kk$, $kkff(xx)$, $ff(kkxx)$ and $ff(xx + kk)$, state the type of transformation and find the value of the real number kk.
	Access Point MA.912.F.2.AP.3 Given the graph of a given function after replacing $f(x)$ by $f(x) + k$ and $f(x + k)$, $kf(x)$, for specific values of k select the type of transformation and find the value of the real number k.

MA.912.F.2.5	Given a table, equation or graph that represents a function, create a corresponding table, equation or graph of the transformed function defined by adding a real number to the ?- or ?-values or multiplying the ?- or ?-values by a real number.
	Access Point MA.912.F.2.AP.5 Given a table, equation or graph that represents a function, select a corresponding table, equation or graph of the transformed function defined by adding a real number to the *x*- or *y*-values.
MA.912.F.3 Create new functions from existing functions.	
MA.912.F.3.2	Given a mathematical or real-world context, combine two or more functions, limited to linear, quadratic, exponential and polynomial, using arithmetic operations. When appropriate, include domain restrictions for the new function.
	Access Point MA.912.F.3.AP.2 Given a mathematical and/or real-world context, combine two or more functions, limited to linear, quadratic, and polynomial, using arithmetic operations of addition, subtraction, or multiplication.
MA.912.F.3.4	Represent the composition of two functions algebraically or in a table. Determine the domain and range of the composite function.
	Access Point MA.912.F.3.AP.4 Given a composite function within a mathematical or real-world context, identify the domain and range of the composite function.
MA.912.F.3.6	Determine whether an inverse function exists by analyzing tables, graphs and equations.
	Access Point MA.912.F.3.AP.6 Determine whether an inverse function exists by analyzing graphs and equations.

MA.912.F.3.7	Represent the inverse of a function algebraically, graphically or in a table. Use composition of functions to verify that one function is the inverse of the other.
	Access Point MA.912.F.3.AP.7 Represent the inverse of a function algebraically. Use composition of functions to verify that one function is the inverse of the other.

9-12 Financial Literacy Strand

MA.912.FL.1 Determine simple and compound interest and demonstrate its relationship to functions. Calculate and use net present and net future values.	
MA.912.FL.3.1	Compare simple, compound and continuously compounded interest over time.
	Access Point MA.912.FL.3.AP.1 Compare simple and compound interest over time.
MA.912.FL.3.2	Solve real-world problems involving simple, compound and continuously compounded interest.
	Access Point MA.912.FL.3.AP.2 Solve real-world problems involving simple and compound interest.
MA.912.FL.3.4	Explain the relationship between simple interest and linear growth. Explain the relationship between compound interest and exponential growth and the relationship between continuously compounded interest and exponential growth.
	Access Point MA.912.FL.3.AP.4 Identify the relationship between simple interest and linear growth. Identify the relationship between compound interest and exponential growth.

9-12 Geometric Reasoning Strand

MA.912.GR.1 Prove and apply geometric theorems to solve problems.	
MA.912.GR.1.1	Prove relationships and theorems about lines and angles. Solve mathematical and real-world problems involving postulates, relationships and theorems of lines and angles.
	Access Point MA.912.GR.1.AP.1 Use the relationships and theorems about lines and angles to solve mathematical or real-world problems involving postulates, relationships and theorems of lines and angles.
MA.912.GR.1.2	Prove triangle congruence or similarity using Side-Side-Side, Side-Angle-Side, Angle-Side-Angle, Angle-Angle-Side, Angle-Angle and Hypotenuse-Leg.
	Access Point MA.912.GR.1.AP.2 Identify the triangle congruence or similarity criteria; Side-Side-Side, Side-Angle-Side, Angle-Side-Angle, Angle-Angle-Side, Angle-Angle and Hypotenuse-Leg.
MA.912.GR.1.3	Prove relationships and theorems about triangles. Solve mathematical and real-world problems involving postulates, relationships and theorems of triangles.
	Access Point MA.912.GR.1.AP.3 Use the relationships and theorems about triangles. Solve mathematical and/or real-world problems involving postulates, relationships and theorems of triangles.
MA.912.GR.1.4	Prove relationships and theorems about parallelograms. Solve mathematical and real-world problems involving postulates, relationships and theorems of parallelograms.
	Access Point MA.912.GR.1.AP.4 Use the relationships and theorems about parallelograms. Solve mathematical and/or real-world problems involving postulates, relationships and theorems of parallelograms.

MA.912.GR.1.5	Prove relationships and theorems about trapezoids. Solve mathematical and real-world problems involving postulates, relationships and theorems of trapezoids.
	Access Point MA.912. GR.1. AP.5 Use the relationships and theorems about trapezoids. Solve mathematical and/or real-world problems involving postulates, relationships and theorems of trapezoids.
MA.912.GR.1.6	Solve mathematical and real-world problems involving congruence or similarity in two-dimensional figures.
	Access Point MA.912.GR.1.AP.6 Use the definitions of congruent or similar figures to solve mathematical and/or real-world problems involving two-dimensional figures.
MA.912.GR.2 Apply properties of transformations to describe congruence or similarity.	
MA.912.GR.2.1	Given a preimage and image, describe the transformation and represent the transformation algebraically using coordinates.
	Access Point MA.912.GR.2.AP.1a Given a preimage and image, identify the transformation.
	MA.912.GR.2.AP.1b Select the algebraic coordinates that represent the transformation.
MA.912.GR.2.2	Identify transformations that do or do not preserve distance.
	Access Point MA.912.GR.2.AP.2 Select a transformation that preserves distance.
MA.912.GR.2.3	Identify a sequence of transformations that will map a given figure onto itself or onto another congruent or similar figure.
	Access Point MA.912.GR.2.AP.3 Identify a given sequence of transformations, that includes translations or reflections, that will map a given figure onto itself or onto another congruent figure.

MA.912.GR.2.5	Given a geometric figure and a sequence of transformations, draw the transformed figure on a coordinate plane.
	Access Point MA.912.GR.2.AP.5 Given a geometric figure and a sequence of transformations, select the transformed figure on a coordinate plane.
MA.912.GR.2.6	Apply rigid transformations to map one figure onto another to justify that the two figures are congruent.
	Access Point MA.912.GR.2.AP.6 Use rigid transformations that includes translations or reflections to map one figure onto another to show that the two figures are congruent.
MA.912.GR.2.8	Apply an appropriate transformation to map one figure onto another to justify that the two figures are similar.
	Access Point MA.912.GR.2.AP.8 Identify an appropriate transformation to map one figure onto another to show that the two figures are similar.
MA.912.GR.3 Use coordinate geometry to solve problems or prove relationships.	
MA.912.GR.3.1	Determine the weighted average of two or more points on a line.
	Access Point MA.912.GR.3.AP.1 Select the weighted average of two or more points on a line.
MA.912.GR.3.2	Given a mathematical context, use coordinate geometry to classify or justify definitions, properties and theorems involving circles, triangles or quadrilaterals
	Access Point MA.912.GR.3.AP.2 Use coordinate geometry to classify definitions, properties and theorems involving circles, triangles, or quadrilaterals.

MA.912.GR.3.3	Use coordinate geometry to solve mathematical and real-world geometric problems involving lines, circles, triangles and quadrilaterals.
	Access Point MA.912.GR.3.AP.3 Use coordinate geometry to solve mathematical geometric problems involving lines, triangles and quadrilaterals.
MA.912.GR.3.4	Use coordinate geometry to solve mathematical and real-world problems on the coordinate plane involving perimeter or area of polygons.
	Access Point MA.912.GR.3.AP.4 Solve mathematical and/or real-world problems on the coordinate plane involving perimeter or area of a three- or four-sided polygon.
MA.912.GR.4 Use geometric measurement and dimensions to solve problems.	
MA.912.GR.4.1	Identify the shapes of two-dimensional cross sections of three-dimensional figures.
	Access Point MA.912.GR.4.AP.1 Identify the shape of a two-dimensional cross section of a three-dimensional figure.
MA.912.GR.4.2	Identify three-dimensional objects generated by rotations of two-dimensional figures.
	Access Point MA.912.GR.4.AP.2 Identify a three-dimensional object generated by the rotation of a two-dimensional figure.
MA.912.GR.4.3	Extend previous understanding of scale drawings and scale factors to determine how dilations affect the area of two-dimensional figures and the surface area or volume of three-dimensional figures.
	Access Point MA.912.GR.4.AP.3 Select the effect of a dilation on the area of two-dimensional figures and/or surface area or volume of three-dimensional figures.

MA.912.GR.4.4	Solve mathematical and real-world problems involving the area of two-dimensional figures.
	Access Point MA.912.GR.4.AP.4 Solve mathematical and/or real-world problems involving the area of triangles, squares, circles or rectangles.
MA.912.GR.4.5	Solve mathematical and real-world problems involving the volume of three-dimensional figures limited to cylinders, pyramids, prisms, cones and spheres.
	Access Point MA.912.GR.4.AP.5 Solve mathematical or real-world problems involving the volume of three-dimensional figures limited to cylinders, pyramids, prisms, or cones.
MA.912.GR.4.6	Solve mathematical and real-world problems involving the surface area of three-dimensional figures limited to cylinders, pyramids, prisms, cones and spheres.
	Access Point MA.912.GR.4.AP.6 Solve mathematical or real-world problems involving the surface area of three-dimensional figures limited to cylinders, pyramids, prisms, and cones.
MA.912.GR.5 Make formal geometric constructions with a variety of tools and methods.	
MA.912.GR.5.1	Construct a copy of a segment or an angle.
	Access Point MA.912.GR.5.AP.1 Construct a copy of a segment.
MA.912.GR.5.2	Construct the bisector of a segment or an angle, including the perpendicular bisector of a line segment.
	Access Point MA.912.GR.5.AP.2 Construct the bisector of a segment, including the perpendicular bisector of a line segment.
MA.912.GR.5.3	Construct the inscribed and circumscribed circles of a triangle.
	Access Point MA.912.GR.5.AP.3 Select the inscribed and circumscribed circles of a triangle.

MA.912.GR.6 Use properties and theorems related to circles.	
MA.912.GR.6.1	Solve mathematical and real-world problems involving the length of a secant, tangent, segment or chord in a given circle.
	Access Point MA.912.GR.6.AP.1 Identify and describe the relationship involving the length of a secant, tangent, segment or chord in a given circle.
MA.912.GR.6.2	Solve mathematical and real-world problems involving the measures of arcs and related angles.
	Access Point MA.912.GR.6.AP.2 Identify the relationship involving the measures of arcs and related angles, limited to central, inscribed and intersections of a chord, secants or tangents.
MA.912.GR.6.3	Solve mathematical problems involving triangles and quadrilaterals inscribed in a circle.
	Access Point MA.912.GR.6.AP.3 Identify and describe the relationship involving triangles and quadrilaterals inscribed in a circle.
MA.912.GR.6.4	Solve mathematical and real-world problems involving the arc length and area of a sector in a given circle.
	Access Point MA.912.GR.6.AP.4 Identify and describe the relationship involving the arc length and area of a sector in a given circle.
MA.912.GR.7 Apply geometric and algebraic representations of conic sections.	
MA.912.GR.7.2	Given a mathematical or real-world context, derive and create the equation of a circle using key features.
	Access Point MA.912.GR.7.AP.2 Create the equation of a circle when given the center and radius.
MA.912.GR.7.3	Graph and solve mathematical and real-world problems that are modeled with an equation of a circle. Determine and interpret key features in terms of the context.

	Access Point MA.912.GR.7.AP.3 Given an equation of a circle, identify center and radius, and graph the circle.

9-12 Data Analysis and Probability Strand

MA.912.DP.1 Summarize, represent and interpret categorical and numerical data with one and two variables.	
MA.912.DP.1.1	Given a set of data, select an appropriate method to represent the data, depending on whether it is numerical or categorical data and on whether it is univariate or bivariate.
	Access Point MA.912.DP.1.AP.1a Given a set of data, select an appropriate table or graph to represent categorical data and whether it is univariate or bivariate.
	MA.912.DP.1.AP.1b Given a set of data, select an appropriate table or graph to represent numerical data and whether it is univariate or bivariate.
MA.912.DP.1.2	Interpret data distributions represented in various ways. State whether the data is numerical or categorical, whether it is univariate or bivariate and interpret the different components and quantities in the display.
	Access Point MA.912.DP.1.AP.2 Given a univariate or bivariate data distribution (numerical or categorical), identify the different components and quantities in the display.
MA.912.DP.1.3	Explain the difference between correlation and causation in the contexts of both numerical and categorical data.
	Access Point MA.912.DP.1.AP.3 Identify whether the data is explained by correlation or causation in the contexts of both numerical and categorical data.
MA.912.DP.1.4	Estimate a population total, mean or percentage using data from a sample survey; develop a margin of error through the use of simulation.
	Access Point MA.912.DP.1.AP.4 Given the mean or percentage and the margin of error from a sample survey, identify a population total.

MA.912.DP.2 Solve problems involving univariate and bivariate numerical data.	
MA.912.DP.2.4	Given a scatter plot that represents bivariate numerical data, assess the fit of a given linear function by plotting and analyzing residuals.
	Access Point MA.912.DP.2.AP.4 Fit a linear function to a scatter plot that suggests a linear association. Identify the slope and *y*-intercept of the model.
MA.912.DP.2.6	Compute the correlation coefficient of a linear model using technology. Interpret the strength and direction of the correlation coefficient.
	Access Point MA.912.DP.2.AP.6 Given a scatter plot with a line of fit, residuals, and correlation identify the strength and direction of the linear fit.
MA.912.DP.2.8	Fit a quadratic function to bivariate numerical data that suggests a quadratic association and interpret any intercepts or the vertex of the model. Use the model to solve real-world problems in terms of the context of the data.
	Access Point MA.912.DP.2.AP.8 Given a scatter plot, select a quadratic function that fits the data the best.
MA.912.DP.2.9	Fit an exponential function to bivariate numerical data that suggests an exponential association. Use the model to solve real-world problems in terms of the context of the data.
	Access Point MA.912.DP.2.AP.9 Given a scatter plot, select an exponential function that fits the data the best.
MA.912.DP.3 Solve problems involving categorical data.	
MA.912.DP.3.1	Construct a two-way frequency table summarizing bivariate categorical data. Interpret joint and marginal frequencies and determine possible associations in terms of a real-world context.

	Access Point MA.912.DP.3.AP.1 When given a two-way frequency table summarizing bivariate categorical data, identify joint and marginal frequencies.

9-12 Trigonometry

MA.912.T.1 Define and use trigonometric ratios, identities or functions to solve problems.	
MA.912.T.1.1	Define trigonometric ratios for acute angles in right triangles.
	Access Point MA.912.T.1.AP.1 Select a trigonometric ratio for acute angles in right triangles limited to sine or cosine.
MA.912.T.1.2	Solve mathematical and real-world problems involving right triangles using trigonometric ratios and the Pythagorean Theorem.
	Access Point MA.912.T.1.AP.2 Given a mathematical and/or real-world problem involving right triangles, select a corresponding trigonometric ratio.

9-12 Logic and Theory Strand

MA.912.LT.4 Develop an understanding of the fundamentals of propositional logic, arguments and methods of proof.	
MA.912.LT.4.3	Identify and accurately interpret “if…then,” “if and only if,” “all” and “not” statements. Find the converse, inverse and contrapositive of a statement.
	Access Point MA.912.LT.4.AP.3 Identify and accurately interpret “if…then,” “if and only if,” “all” or “not” statements.
MA.912.LT.4.10	Judge the validity of arguments and give counterexamples to disprove statements.
	Access Point MA.912.LT.4.AP.10 Select the validity of an argument or give counterexamples to disprove statements.