



2017-2018

Minnesota K-12 Academic Standards in Mathematics Pathways



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Grade 3

Minnesota Academic Standards Pathway

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<i>Unit</i>	<i>Lesson Order & Name</i>	<i>Standard Code</i>	<i>Standards Description</i>
Number and Operations in Base Ten	1. Visualizing Whole Numbers 2. Visualizing Place Value	n/a	Review the meaning of numbers to 1,000. Improve understanding of the size of numbers by associating pictures of large collections with numeric values. In this introductory lesson, students will: <ul style="list-style-type: none"> • Review valuable content. • Explore TTM features. • Prepare for success on grade-level material.
Operations and Algebraic Thinking	3. Visualizing Addition 4. Visualizing Subtraction	n/a	Understand and represent simple phrases and sentences related to addition. In this introductory lesson, students will: <ul style="list-style-type: none"> • Review valuable content. • Explore TTM features. • Prepare for success on grade-level material.
	5. Structuring Within 5 and Composing 10	n/a	Compose and decompose 5 and 10, using a variety of models. Add and subtract within 5 using objects and patterns. In this lesson, students will: <ul style="list-style-type: none"> • Practice a variety of methods that reflect those of mathematically fluent thinkers. • Prepare for success on grade-level material.
	6. Structuring Within 10	n/a	Create equivalent, but easier or known sums to add and subtract within 10. Strategies for developing known sums include using doubles, combinations to 5, “five-plus” combinations and the Associative Property of Addition. In this lesson, students will: <ul style="list-style-type: none"> • Practice a variety of methods that reflect those of mathematically fluent thinkers. • Prepare for success on grade-level material.
	7. Structuring Within 20	n/a	Practice using various strategies to add and subtract fluently within 20, including working with tens and doubles. In this lesson, students will: <ul style="list-style-type: none"> • Practice a variety of methods that reflect those of mathematically fluent thinkers. • Prepare for success on grade-level material.

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<i>Unit</i>	<i>Lesson Order & Name</i>	<i>Standard Code</i>	<i>Standards Description</i>
Number and Operations in Base Ten	8. Structuring Within 100	n/a	Add and subtract within 100 using strategies based on structuring numbers, place value, and properties of operations. In this lesson, students will: <ul style="list-style-type: none"> • Practice a variety of methods that reflect those of mathematically fluent thinkers. • Prepare for success on grade-level material.
	9. Structuring Within 1,000	n/a	Add and subtract within 1,000 using strategies based on structuring numbers, place value, properties of operations, and/or the relationship between addition and subtraction. In this lesson, students will: <ul style="list-style-type: none"> • Practice a variety of methods that reflect those of mathematically fluent thinkers. • Prepare for success on grade-level material.
	10. Understanding Place Value Relationships	3.1.1	Read, write and represent whole numbers up to 100,000. Representations may include numerals, expressions with operations, words, pictures, number lines, and manipulatives such as bundles of sticks and base 10 blocks.
	11. Using Place Value Concepts to Compare Whole Numbers	3.1.5	Compare and order whole numbers up to 100,000.
	12. Rounding Whole Numbers 13. Using Rounding in Problem Solving	3.1.4	Round numbers to the nearest 10,000, 1000, 100 and 10. Round up and round down to estimate sums and differences.
	14. Adding Whole Numbers 15. Adding and Subtracting with the Standard Algorithm	3.1.2.1	Add and subtract multi-digit numbers, using efficient and generalizable procedures based on knowledge of place value, including standard algorithms.
Operations and Algebraic Thinking	16. Estimating Sums and Differences - Application	3.1.2.2	Use addition and subtraction to solve real-world and mathematical problems involving whole numbers. Use various strategies, including the relationship between addition and subtraction, the use of technology, and the context of the problem to assess the reasonableness of results.

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<i>Unit</i>	<i>Lesson Order & Name</i>	<i>Standard Code</i>	<i>Standards Description</i>
Number and Operations in Base Ten	17. Reasoning About Addition and Subtraction Within 1,000	3.1.2.2	Use addition and subtraction to solve real-world and mathematical problems involving whole numbers. Use various strategies, including the relationship between addition and subtraction, the use of technology, and the context of the problem to assess the reasonableness of results.
Operations and Algebraic Thinking	18. Concept of Multiplication - Grouping	3.1.2.3	Represent multiplication facts by using a variety of approaches, such as repeated addition, equal-sized groups, arrays, area models, equal jumps on a number line and skip counting. Represent division facts by using a variety of approaches, such as repeated subtraction, equal sharing and forming equal groups. Recognize the relationship between multiplication and division.
	19. Concept of Multiplication - Word Problems	3.1.2.3	Represent multiplication facts by using a variety of approaches, such as repeated addition, equal-sized groups, arrays, area models, equal jumps on a number line and skip counting. Represent division facts by using a variety of approaches, such as repeated subtraction, equal sharing and forming equal groups. Recognize the relationship between multiplication and division.
		3.1.2.4	Solve real-world and mathematical problems involving multiplication and division, including both "how many in each group" and "how many groups" division problems.
	20. Concept of Multiplication - Arrays	3.1.2.3	Represent multiplication facts by using a variety of approaches, such as repeated addition, equal-sized groups, arrays, area models, equal jumps on a number line and skip counting. Represent division facts by using a variety of approaches, such as repeated subtraction, equal sharing and forming equal groups. Recognize the relationship between multiplication and division.
	21. Properties of Addition and Multiplication 22. Using Visual Models to Understand the Distributive Property	3.1.2.5	Use strategies and algorithms based on knowledge of place value, equality and properties of addition and multiplication to multiply a two- or three-digit number by a one-digit number. Strategies may include mental strategies, partial products, the standard algorithm, and the commutative, associative, and distributive properties.

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<i>Unit</i>	<i>Lesson Order & Name</i>	<i>Standard Code</i>	<i>Standards Description</i>
Operations and Algebraic Thinking (continued)	23. Concept of Division	3.1.2.3	Represent multiplication facts by using a variety of approaches, such as repeated addition, equal-sized groups, arrays, area models, equal jumps on a number line and skip counting. Represent division facts by using a variety of approaches, such as repeated subtraction, equal sharing and forming equal groups. Recognize the relationship between multiplication and division.
	24. Interpreting Division Problems	3.2.2.1	Understand how to interpret number sentences involving multiplication and division basic facts and unknowns. Create real-world situations to represent number sentences.
	25. Constructing Division Problems	3.1.2.4	Solve real-world and mathematical problems involving multiplication and division, including both "how many in each group" and "how many groups" division problems.
		3.2.2.1	Understand how to interpret number sentences involving multiplication and division basic facts and unknowns. Create real-world situations to represent number sentences.
	26. Relationship Between Multiplication and Division	3.1.2.3	Represent multiplication facts by using a variety of approaches, such as repeated addition, equal-sized groups, arrays, area models, equal jumps on a number line and skip counting. Represent division facts by using a variety of approaches, such as repeated subtraction, equal sharing and forming equal groups. Recognize the relationship between multiplication and division.
	27. Multiplication and Division Fact Families		
	28. Solving Multiplication and Division Equations	3.2.2.2	Use multiplication and division basic facts to represent a given problem situation using a number sentence. Use number sense and multiplication and division basic facts to find values for the unknowns that make the number sentences true.
	29. Division as an Unknown-Factor Problem		
30. Multiplication and Division Word Problems - Visual Models	3.1.2.3	Represent multiplication facts by using a variety of approaches, such as repeated addition, equal-sized groups, arrays, area models, equal jumps on a number line and skip counting. Represent division facts by using a variety of approaches, such as repeated subtraction, equal sharing and forming equal groups. Recognize the relationship between multiplication and division.	

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<i>Unit</i>	<i>Lesson Order & Name</i>	<i>Standard Code</i>	<i>Standards Description</i>
Operations and Algebraic Thinking (continued)	31. Multiplication and Division Word Problems - Equations	3.2.2.2	Use multiplication and division basic facts to represent a given problem situation using a number sentence. Use number sense and multiplication and division basic facts to find values for the unknowns that make the number sentences true.
	32. Multiplication and Division Word Problems - Solutions	3.1.2.4	Solve real-world and mathematical problems involving multiplication and division, including both "how many in each group" and "how many groups" division problems.
		3.2.2.2	Use multiplication and division basic facts to represent a given problem situation using a number sentence. Use number sense and multiplication and division basic facts to find values for the unknowns that make the number sentences true.
Number and Operations - Fractions	33. Understanding Fractions - Equal Areas 34. Understanding Fractions - Notation 35. Unit Fractions on the Number Line 36. Fractions on the Number Line 37. Whole Numbers as Fractions	3.1.3.1	Read and write fractions with words and symbols. Recognize that fractions can be used to represent parts of a whole, parts of a set, points on a number line, or distances on a number line.
	38. Understanding Fractions - Relationship Between Numerator and Denominator 39. Comparing Fractions with the Same Numerator or Denominator 40. Recognizing Valid Fraction Comparisons I	3.1.3.3	Order and compare unit fractions and fractions with like denominators by using models and an understanding of the concept of numerator and denominator.
Measurement and Data	41. Money Sense	2.3.3.2	Identify pennies, nickels, dimes and quarters. Find the value of a group of coins and determine combinations of coins that equal a given amount.

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<i>Unit</i>	<i>Lesson Order & Name</i>	<i>Standard Code</i>	<i>Standards Description</i>
Measurement and Data (continued)	42. Adding and Subtracting Time	3.3.3.1	Tell time to the minute, using digital and analog clocks. Determine elapsed time to the minute.
	43. Perimeter	3.3.2.2	Find the perimeter of a polygon by adding the lengths of the sides.
	44. Introduction to Data Displays	3.4.1.1	Collect, display and interpret data using frequency tables, bar graphs, picture graphs and number line plots having a variety of scales. Use appropriate titles, labels and units.
Operations and Algebraic Thinking	45. Additive and Multiplicative Patterns	3.2.1.1	Create, describe, and apply single-operation input-output rules involving addition, subtraction and multiplication to solve problems in various contexts.

Grade 4

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<i>Unit</i>	<i>Lesson Order & Name</i>	<i>Standard Code</i>	<i>Standards Description</i>
Number and Operations in Base Ten	1. Visualizing Place Value Relationships	n/a	<p>Visualize, understand, and use place value phrases, specifically "value represented by a digit" and "10 times the value."</p> <p>In this introductory lesson, students will:</p> <ul style="list-style-type: none"> Review valuable content. Explore TTM features. Prepare for success on grade-level material.
	2. Visualizing Rounding		
Operations and Algebraic Thinking	3. Visualizing Addition and Subtraction	n/a	<p>Visualize, understand, and represent situations involving addition and subtraction.</p> <p>In this introductory lesson, students will:</p> <ul style="list-style-type: none"> Review valuable content. Explore TTM features. Prepare for success on grade-level material.
	4. Visualizing Multiplication and Division		
	5. Developing Fluency Using 2 as a Factor	n/a	<p>Use counting sequences to fluently multiply by 2 and use multiples of 2 to find other products.</p> <p>In this lesson, students will:</p> <ul style="list-style-type: none"> Practice a variety of methods that reflect those of mathematically fluent thinkers. Prepare for success on grade-level material.
	6. Developing Fluency Using 5 or 10 as a Factor	n/a	<p>Use counting sequences to fluently multiply by 5 or 10 and use multiples of 5 or 10 to find other products.</p> <p>In this lesson, students will:</p> <ul style="list-style-type: none"> Practice a variety of methods that reflect those of mathematically fluent thinkers. Prepare for success on grade-level material.
	7. Using Halves and Doubles to Solve Multiplication Problems	n/a	<p>Understand that to multiply, you can break a number into its factors and multiply all the smaller pieces together. Apply this specifically with doubles. Compare this method to breaking apart by place value and applying the distributive property.</p> <p>In this lesson, students will:</p> <ul style="list-style-type: none"> Practice a variety of methods that reflect those of mathematically fluent thinkers. Prepare for success on grade-level material.

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<i>Unit</i>	<i>Lesson Order & Name</i>	<i>Standard Code</i>	<i>Standards Description</i>
Operations and Algebraic Thinking (continued)	8. Solving Two-Step Word Problems	4.1.1.5	Solve multi-step real-world and mathematical problems requiring the use of addition, subtraction and multiplication of multi-digit whole numbers. Use various strategies, including the relationship between operations, the use of technology, and the context of the problem to assess the reasonableness of results.
	9. Modeling and Solving Two-Step Word Problems		
Number and Operations in Base Ten	10. Multiplying by Multiples of Ten	4.1.1.2	Use an understanding of place value to multiply a number by 10, 100 and 1000.
	11. Multiplying Whole Numbers 12. Multiplying 2-Digit Numbers by 2-Digit Numbers	4.1.1.3	Multiply multi-digit numbers, using efficient and generalizable procedures, based on knowledge of place value, including standard algorithms.
Operations and Algebraic Thinking	13. Multiplication as a Comparison - Equations 14. Multiplication as a Comparison - Word Problems	4.2.2	Use number sentences involving multiplication, division and unknowns to represent and solve real-world and mathematical problems; create real-world situations corresponding to number sentences.
		4.2.2.1	Understand how to interpret number sentences involving multiplication, division and unknowns. Use real-world situations involving multiplication or division to represent number sentences.
		4.2.2.2	Use multiplication, division and unknowns to represent a given problem situation using a number sentence. Use number sense, properties of multiplication, and the relationship between multiplication and division to find values for the unknowns that make the number sentences true.
Number and Operations in Base Ten	15. Multiplying Whole Numbers - Standard Algorithm	4.1.1.3	Multiply multi-digit numbers, using efficient and generalizable procedures, based on knowledge of place value, including standard algorithms.
	16. Dividing Whole Numbers - One-Digit Divisors 17. Dividing Whole Numbers - Two-Digit Divisors	4.1.1.6	Use strategies and algorithms based on knowledge of place value, equality and properties of operations to divide multi-digit whole numbers by one- or two-digit numbers. Strategies may include mental strategies, partial quotients, the commutative, associative, and distributive properties and repeated subtraction.

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<i>Unit</i>	<i>Lesson Order & Name</i>	<i>Standard Code</i>	<i>Standards Description</i>	
Number and Operations - Fractions	18. Modeling Equivalent Fractions with Number Lines 19. Visual Models of Equivalent Fractions	4.1.2.1	Represent equivalent fractions using fraction models such as parts of a set, fraction circles, fraction strips, number lines and other manipulatives. Use the models to determine equivalent fractions.	
	20. Whole Numbers as Fractions on the Number Line	4.1.2.2	Locate fractions on a number line. Use models to order and compare whole numbers and fractions, including mixed numbers and improper fractions.	
	21. Modeling Equivalent Fractions 22. Generating Equivalent Fractions 23. Reducing Fractions	4.1.2.1	Represent equivalent fractions using fraction models such as parts of a set, fraction circles, fraction strips, number lines and other manipulatives. Use the models to determine equivalent fractions.	
	24. Comparing Fractions - Visual Models 25. Comparing Fractions with Different Numerators and Different Denominators 26. Recognizing Valid Fraction Comparisons II	4.1.2.2	Locate fractions on a number line. Use models to order and compare whole numbers and fractions, including mixed numbers and improper fractions.	
	27. Adding and Subtracting Fractions with Like Denominators 28. Adding and Subtracting Fractions with Like Denominators in Real-World Situations	4.1.2.3	Use fraction models to add and subtract fractions with like denominators in real-world and mathematical situations. Develop a rule for addition and subtraction of fractions with like denominators.	
	29. Comparing Decimal Fractions	4.1.2.6	Read and write tenths and hundredths in decimal and fraction notations using words and symbols; know the fraction and decimal equivalents for halves and fourths.	
	30. Decimal Notation I 31. Decimal Notation II	4.1.2.4	Read and write decimals with words and symbols; use place value to describe decimals in terms of thousands, hundreds, tens, ones, tenths, hundredths and thousandths.	
	Number and Operations in Base Ten			

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<i>Unit</i>	<i>Lesson Order & Name</i>	<i>Standard Code</i>	<i>Standards Description</i>
Number and Operations - Fractions	32. Decimals to Hundredths	4.1.2.4	Read and write decimals with words and symbols; use place value to describe decimals in terms of thousands, hundreds, tens, ones, tenths, hundredths and thousandths.
Number and Operations in Base Ten	33. Introduction to Comparing Decimals to Hundredths	4.1.2.5	Compare and order decimals and whole numbers using place value, a number line and models such as grids and base 10 blocks.
	34. Comparing Decimals to Hundredths		
Number and Operations - Fractions	35. Recognizing Valid Decimal Comparisons	4.1.2.5	Compare and order decimals and whole numbers using place value, a number line and models such as grids and base 10 blocks.
Number and Operations in Base Ten	36. Decimals to Thousandths	4.1.2.4	Read and write decimals with words and symbols; use place value to describe decimals in terms of thousands, hundreds, tens, ones, tenths, hundredths and thousandths.
	37. Comparing Decimals to Thousandths	4.1.2.5	Compare and order decimals and whole numbers using place value, a number line and models such as grids and base 10 blocks.
Number and Operations - Fractions	38. Understanding Fractions with Denominators of 10 and 100	4.1.2.6	Read and write tenths and hundredths in decimal and fraction notations using words and symbols; know the fraction and decimal equivalents for halves and fourths.
Measurement and Data	39. Unit Squares 40. Concept of Area 41. Area of Rectangles 42. Recognizing Area as Additive	4.3.2.3	Understand that the area of a two-dimensional figure can be found by counting the total number of same size square units that cover a shape without gaps or overlaps. Justify why length and width are multiplied to find the area of a rectangle by breaking the rectangle into one unit by one unit squares and viewing these as grouped into rows and columns.
	43. Area of Basic Composite Figures 44. Area and Perimeter of Rectangles	4.3.2.4	Find the areas of geometric figures and real-world objects that can be divided into rectangular shapes. Use square units to label area measurements.
	45. Identifying and Comparing Angles	4.3.2.2	Compare angles according to size. Classify angles as acute, right and obtuse.

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<i>Unit</i>	<i>Lesson Order & Name</i>	<i>Standard Code</i>	<i>Standards Description</i>
Measurement and Data (continued)	46. Angles 0 to 180 47. Angles	4.3.2.1	Measure angles in geometric figures and real-world objects with a protractor or angle ruler.
		4.3.2.2	Compare angles according to size. Classify angles as acute, right and obtuse.
Geometry	48. Classifying Triangles	4.3.1.1	Describe, classify and sketch triangles, including equilateral, right, obtuse and acute triangles. Recognize triangles in various contexts.
	49. Classifying Quadrilaterals I 50. Classifying Quadrilaterals II	4.3.1.2	Describe, classify and draw quadrilaterals, including squares, rectangles, trapezoids, rhombuses, parallelograms and kites. Recognize quadrilaterals in various contexts.
Operations and Algebraic Thinking	51. Generating and Describing Number Patterns	4.2.1.1	Create and use input-output rules involving addition, subtraction, multiplication and division to solve problems in various contexts. Record the inputs and outputs in a chart or table.
	52. Input-Output Tables	4.2.1	Use input-output rules, tables and charts to represent patterns and relationships and to solve real-world and mathematical problems.
		4.2.1.1	Create and use input-output rules involving addition, subtraction, multiplication and division to solve problems in various contexts. Record the inputs and outputs in a chart or table.

Grade 5

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<i>Unit</i>	<i>Lesson Order & Name</i>	<i>Standard Code</i>	<i>Standards Description</i>
Operations and Algebraic Thinking	1. Interpreting Remainders	5.1.1.1	Divide multi-digit numbers, using efficient and generalizable procedures, based on knowledge of place value, including standard algorithms. Recognize that quotients can be represented in a variety of ways, including a whole number with a remainder, a fraction or mixed number, or a decimal.
Number and Operations in Base Ten	2. Estimating Solutions to Multistep Word Problems	5.1.1.4	Solve real-world and mathematical problems requiring addition, subtraction, multiplication and division of multi-digit whole numbers. Use various strategies, including the inverse relationships between operations, the use of technology, and the context of the problem to assess the reasonableness of results.
	3. Dividing Whole Numbers - Standard Algorithm	5.1.1.1	Divide multi-digit numbers, using efficient and generalizable procedures, based on knowledge of place value, including standard algorithms. Recognize that quotients can be represented in a variety of ways, including a whole number with a remainder, a fraction or mixed number, or a decimal.
The Number System	4. Operations with Fractions - Mixed Practice	6.1.3.4	Solve real-world and mathematical problems requiring arithmetic with decimals, fractions and mixed numbers.
Number and Operations - Fractions	5. Understanding Fractions as Division	5.1.2.3	Order fractions and decimals, including mixed numbers and improper fractions, and locate on a number line.
		5.1.2.4	Recognize and generate equivalent decimals, fractions, mixed numbers and improper fractions in various contexts.
	6. Decomposing Fractions and Mixed Numbers 7. Writing Fractions as Mixed Numbers and Mixed Numbers as Fractions	5.1.2.4	Recognize and generate equivalent decimals, fractions, mixed numbers and improper fractions in various contexts.
		8. Adding and Subtracting Mixed Numbers with Like Denominators - Conceptual Strategies 9. Adding and Subtracting Mixed Numbers with Like Denominators	5.1.3.4

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<i>Unit</i>	<i>Lesson Order & Name</i>	<i>Standard Code</i>	<i>Standards Description</i>
Number and Operations - Fractions (continued)	10. Word Problems with Fractions and Mixed Numbers - Visual Models	5.1.3.2	Model addition and subtraction of fractions and decimals using a variety of representations.
		5.1.3.4	Solve real-world and mathematical problems requiring addition and subtraction of decimals, fractions and mixed numbers, including those involving measurement, geometry and data.
	11. Word Problems with Fractions and Mixed Numbers - Estimation	5.1.3.3	Estimate sums and differences of decimals and fractions to assess the reasonableness of results.
		5.1.3.4	Solve real-world and mathematical problems requiring addition and subtraction of decimals, fractions and mixed numbers, including those involving measurement, geometry and data.
	12. Adding Fractions with Denominators of 10 or 100	5.1.3.1	Add and subtract decimals and fractions, using efficient and generalizable procedures, including standard algorithms.
	13. Adding Fractions		
	14. Adding Fractions - Estimation Strategies	5.1.3.3	Estimate sums and differences of decimals and fractions to assess the reasonableness of results.
	15. Subtracting Fractions	5.1.3.1	Add and subtract decimals and fractions, using efficient and generalizable procedures, including standard algorithms.
	16. Subtracting Fractions - Estimation Strategies	5.1.3.3	Estimate sums and differences of decimals and fractions to assess the reasonableness of results.
17. Adding and Subtracting Fractions	5.1.3.1	Add and subtract decimals and fractions, using efficient and generalizable procedures, including standard algorithms.	
18. Adding and Subtracting Fractions - Multistep Word Problems	5.1.3.4	Solve real-world and mathematical problems requiring addition and subtraction of decimals, fractions and mixed numbers, including those involving measurement, geometry and data.	
Number and Operations in Base Ten	19. Comparing and Ordering Decimal Fractions	5.1.2.3	Order fractions and decimals, including mixed numbers and improper fractions, and locate on a number line.
	20. Fraction and Decimal Equivalents		
	21. Comparing Fractions and Decimals		

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<i>Unit</i>	<i>Lesson Order & Name</i>	<i>Standard Code</i>	<i>Standards Description</i>
Number and Operations in Base Ten (continued)	22. Rounding Decimals to the Nearest Tenth and Hundredth	5.1.2.5	Round numbers to the nearest 0.1, 0.01 and 0.001.
	23. Reasoning About Rounding Decimals		
	24. Adding and Subtracting Decimals	5.1.3.1	Add and subtract decimals and fractions, using efficient and generalizable procedures, including standard algorithms.
		5.1.3.2	Model addition and subtraction of fractions and decimals using a variety of representations.
	25. Adding and Subtracting Decimals in Real-World Situations	5.1.3.4	Solve real-world and mathematical problems requiring addition and subtraction of decimals, fractions and mixed numbers, including those involving measurement, geometry and data.
Number and Operations-Fractions	26. Using Division to Write Fractions as Decimals	5.1.2	Read, write, represent and compare fractions and decimals; recognize and write equivalent fractions; convert between fractions and decimals; use fractions and decimals in real-world and mathematical situations.
		5.1.2.4	Recognize and generate equivalent decimals, fractions, mixed numbers and improper fractions in various contexts.
Expressions and Equations	27. Evaluating Simple Expressions	5.2.2.1	Apply the commutative, associative and distributive properties and order of operations to generate equivalent numerical expressions and to solve problems involving whole numbers.
Geometry	28. Area of Parallelograms	5.3.2.1	Develop and use formulas to determine the area of triangles, parallelograms and figures that can be decomposed into triangles.
		6.3.1.2	Calculate the area of quadrilaterals. Quadrilaterals include squares, rectangles, rhombuses, parallelograms, trapezoids and kites. When formulas are used, be able to explain why they are valid.
	29. Area of Triangles	5.3.2.1	Develop and use formulas to determine the area of triangles, parallelograms and figures that can be decomposed into triangles.

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<i>Unit</i>	<i>Lesson Order & Name</i>	<i>Standard Code</i>	<i>Standards Description</i>
Geometry (continued)	30. Area of Trapezoids and Composite Figures	5.3.2.1	Develop and use formulas to determine the area of triangles, parallelograms and figures that can be decomposed into triangles.
		6.3.1.2	Calculate the area of quadrilaterals. Quadrilaterals include squares, rectangles, rhombuses, parallelograms, trapezoids and kites. When formulas are used, be able to explain why they are valid.
	31. Classifying 3-Dimensional Figures	5.3.1.1	Describe and classify three-dimensional figures including cubes, prisms and pyramids by the number of edges, faces or vertices as well as the types of faces.
Measurement and Data	32. Volume of Rectangular Prisms I	5.3.2.2	Use various tools and strategies to measure the volume and surface area of objects that are shaped like rectangular prisms.
		5.3.2.3	Understand that the volume of a three-dimensional figure can be found by counting the total number of same-size cubic units that fill a shape without gaps or overlaps. Use cubic units to label volume measurements.
	33. Volume of Rectangular Prisms II	5.3.2.2	Use various tools and strategies to measure the volume and surface area of objects that are shaped like rectangular prisms.
		5.3.2.4	Develop and use the formulas $V = lwh$ and $V = Bh$ to determine the volume of rectangular prisms. Justify why base area B and height h are multiplied to find the volume of a rectangular prism by breaking the prism into layers of unit cubes.
Statistics and Probability	34. Measures of Spread - Range	5.4.1.1	Know and use the definitions of the mean, median and range of a set of data. Know how to use a spreadsheet to find the mean, median and range of a data set. Understand that the mean is a "leveling out" of data.
	35. Measures of Center - Median		
	36. Measures of Center - Mean	7.4.1.1	Design simple experiments and collect data. Determine mean, median and range for quantitative data and from data represented in a display. Use these quantities to draw conclusions about the data, compare different data sets, and make predictions.
		9.4.1.1	Describe a data set using data displays, including box-and-whisker plots; describe and compare data sets using summary statistics, including measures of center, location and spread. Measures of center and location include mean, median, quartile and percentile. Measures of spread include standard deviation, range and inter-quartile range. Know how to use calculators, spreadsheets or other technology to display data and calculate summary statistics.

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Expressions and Equations	37. Concept of Inequalities I	5.2.3.2	Represent real-world situations using equations and inequalities involving variables. Create real-world situations corresponding to equations and inequalities.
		6.2.3.1	Represent real-world or mathematical situations using equations and inequalities involving variables and positive rational numbers.

Grade 6

Minnesota Academic Standards Pathway

Grade 6 Minnesota Standards Pathway



<i>Unit</i>	<i>Lesson Order & Name</i>	<i>Standard Code</i>	<i>Standards Description</i>
Number and Operations in Base Ten	1. Multiplying by Multiples of Ten	4.1.1.2	Use an understanding of place value to multiply a number by 10, 100 and 1000.
	2. Multiplying and Dividing by Powers of Ten	6.1.3.1	Multiply and divide decimals and fractions, using efficient and generalizable procedures, including standard algorithms.
	3. Multiplying Decimals to Hundredths		
	4. Dividing Decimals to Hundredths		
	5. Using Reasoning and Estimation to Calculate with Decimals		
	6. Calculating with Decimals	6.1.3.4	Solve real-world and mathematical problems requiring arithmetic with decimals, fractions and mixed numbers.
Operations and Algebraic Thinking	7. Relating Factors and Multiples I	6.1.1.5	Factor whole numbers; express a whole number as a product of prime factors with exponents.
	8. Factors		
	9. Relating Factors and Multiples II		
The Number System	10. Greatest Common Factor	6.1.1.6	Determine greatest common factors and least common multiples. Use common factors and common multiples to calculate with fractions and find equivalent fractions.
	11. Greatest Common Factor - Applications		
	12. Least Common Multiple		
Number and Operations - Fractions	13. Multiplying Unit Fractions by Whole Numbers	6.1.3.1	Multiply and divide decimals and fractions, using efficient and generalizable procedures, including standard algorithms.
	14. Multiplying Fractions by Whole Numbers	6.1.3.2	Use the meanings of fractions, multiplication, division and the inverse relationship between multiplication and division to make sense of procedures for multiplying and dividing fractions.
	15. Solving Word Problems with Multiplication of Fractions by Whole Numbers	6.1.3.4	Solve real-world and mathematical problems requiring arithmetic with decimals, fractions and mixed numbers.

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<i>Unit</i>	<i>Lesson Order & Name</i>	<i>Standard Code</i>	<i>Standards Description</i>
Number and Operations - Fractions (continued)	16. Understanding Products with Fractions	6.1.3.1	Multiply and divide decimals and fractions, using efficient and generalizable procedures, including standard algorithms.
	17. Multiplying Fractions by Fractions	6.1.3.2	Use the meanings of fractions, multiplication, division and the inverse relationship between multiplication and division to make sense of procedures for multiplying and dividing fractions.
	18. Multiplying Fractions by Whole Numbers to Solve Multistep Problems		
	19. Multiplying with Fractions and Mixed Numbers	6.1.3.4	Solve real-world and mathematical problems requiring arithmetic with decimals, fractions and mixed numbers.
	20. Dividing Unit Fractions by Whole Numbers	6.1.3.1	Multiply and divide decimals and fractions, using efficient and generalizable procedures, including standard algorithms.
	21. Dividing Whole Numbers by Unit Fractions	6.1.3.2	Use the meanings of fractions, multiplication, division and the inverse relationship between multiplication and division to make sense of procedures for multiplying and dividing fractions.
The Number System	22. Using the Relationship Between Multiplication and Division to Divide Fractions	6.1.3.2	Use the meanings of fractions, multiplication, division and the inverse relationship between multiplication and division to make sense of procedures for multiplying and dividing fractions.
	23. Dividing Fractions by Fractions	6.1.3.1	Multiply and divide decimals and fractions, using efficient and generalizable procedures, including standard algorithms.
		6.1.3.2	Use the meanings of fractions, multiplication, division and the inverse relationship between multiplication and division to make sense of procedures for multiplying and dividing fractions.
	24. Using Division of Fractions to Represent and Solve Problems	6.1.3.4	Solve real-world and mathematical problems requiring arithmetic with decimals, fractions and mixed numbers.
25. Operations with Fractions - Mixed Practice			
Ratios and Proportional Relationships	26. Identifying Ratios 27. Ratios	6.1.2.1	Identify and use ratios to compare quantities; understand that comparing quantities using ratios is not the same as comparing quantities using subtraction.

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<i>Unit</i>	<i>Lesson Order & Name</i>	<i>Standard Code</i>	<i>Standards Description</i>
Ratios and Proportional Relationships (continued)	28. Concept of Ratios and Rates	6.1.2.1	Identify and use ratios to compare quantities; understand that comparing quantities using ratios is not the same as comparing quantities using subtraction.
		6.1.2.3	Determine the rate for ratios of quantities with different units.
	29. Using Ratios to Solve Problems 30. Identifying Unit Rates 31. Solving Problems with Unit Rates	6.1.2.4	Use reasoning about multiplication and division to solve ratio and rate problems.
		32. Converting Units of Measure I	6.3.3.1
	33. Percent Concepts 34. Reasoning with Percents	6.1.1.3	Understand that percent represents parts out of 100 and ratios to 100.
Expressions and Equations	35. Fraction, Decimal, and Percent Equivalents	6.1.1.4	Determine equivalences among fractions, decimals and percents; select among these representations to solve problems.
Ratios and Proportional Relationships	36. Calculations with Percent	6.1.3.3	Calculate the percent of a number and determine what percent one number is of another number to solve problems in various contexts.
Expressions and Equations	37. Reasoning About One-Step Equations	6.2.3.2	Solve equations involving positive rational numbers using number sense, properties of arithmetic and the idea of maintaining equality on both sides of the equation. Interpret a solution in the original context and assess the reasonableness of results.
		38. Writing and Solving One-Step Equations	6.2.3.1
	6.2.3.2		Solve equations involving positive rational numbers using number sense, properties of arithmetic and the idea of maintaining equality on both sides of the equation. Interpret a solution in the original context and assess the reasonableness of results.

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<i>Unit</i>	<i>Lesson Order & Name</i>	<i>Standard Code</i>	<i>Standards Description</i>
Expressions and Equations (continued)	39. Evaluating Expressions with Two Operations	6.2.2.1	Apply the associative, commutative and distributive properties and order of operations to generate equivalent expressions and to solve problems involving positive rational numbers.
	40. Identifying and Generating Equivalent Expressions		
	41. Evaluating Expressions with the Distributive Property		
	42. Using the Distributive Property to Represent Real-World Situations	6.2.3.1	
	43. Independent and Dependent Quantities	6.2.1.1	Understand that a variable can be used to represent a quantity that can change, often in relationship to another changing quantity. Use variables in various contexts.
Geometry	44. Introduction to the Coordinate Plane	6.1.1.1	Locate positive rational numbers on a number line and plot pairs of positive rational numbers on a coordinate grid.
	45. Representing Real-World Quantities in the First Quadrant		
	46. Introduction to Scatter Plots		
	47. Area of Parallelograms	5.3.2.1	
	48. Area of Trapezoids and Composite Figures	6.3.1.2	
	49. Surface Area and Volume of Rectangular Prisms	6.3.1.1	Calculate the surface area and volume of prisms and use appropriate units, such as cm^2 and cm^3 . Justify the formulas used. Justification may involve decomposition, nets or other models.

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<i>Unit</i>	<i>Lesson Order & Name</i>	<i>Standard Code</i>	<i>Standards Description</i>
Geometry (continued)	50. Angle Pairs	6.3.2.1	Solve problems using the relationships between the angles formed by intersecting lines.
		9.3.3.1	Know and apply properties of parallel and perpendicular lines, including properties of angles formed by a transversal, to solve problems and logically justify results.
		9.3.3.2	Know and apply properties of angles, including corresponding, exterior, interior, vertical, complementary and supplementary angles, to solve problems and logically justify results.
	51. Angles in a Polygon	6.3.2.3	Develop and use formulas for the sums of the interior angles of polygons by decomposing them into triangles.
Statistics and Probability	52. Probability and Sample Spaces	6.4.1.1	Determine the sample space (set of possible outcomes) for a given experiment and determine which members of the sample space are related to certain events. Sample space may be determined by the use of tree diagrams, tables or pictorial representations.
		6.4.1.2	Determine the probability of an event using the ratio between the size of the event and the size of the sample space; represent probabilities as percents, fractions and decimals between 0 and 1 inclusive. Understand that probabilities measure likelihood.
	53. Simple Probability	6.4.1.2	Determine the probability of an event using the ratio between the size of the event and the size of the sample space; represent probabilities as percents, fractions and decimals between 0 and 1 inclusive. Understand that probabilities measure likelihood.
		7.4.3.2	Calculate probability as a fraction of sample space or as a fraction of area. Express probabilities as percents, decimals and fractions.
		9.4.3.2	Calculate experimental probabilities by performing simulations or experiments involving a probability model and using relative frequencies of outcomes.

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<i>Unit</i>	<i>Lesson Order & Name</i>	<i>Standard Code</i>	<i>Standards Description</i>
Statistics and Probability (continued)	54. Compound Probability	6.4.1.2	Determine the probability of an event using the ratio between the size of the event and the size of the sample space; represent probabilities as percents, fractions and decimals between 0 and 1 inclusive. Understand that probabilities measure likelihood.
		7.4.3.2	Calculate probability as a fraction of sample space or as a fraction of area. Express probabilities as percents, decimals and fractions.
		9.4.3.1	Select and apply counting procedures, such as the multiplication and addition principles and tree diagrams, to determine the size of a sample space (the number of possible outcomes) and to calculate probabilities.
		9.4.3.2	Calculate experimental probabilities by performing simulations or experiments involving a probability model and using relative frequencies of outcomes.
Measurement and Data	55. Units of Measure - Customary	6.3.3.1	Solve problems in various contexts involving conversion of weights, capacities, geometric measurements and times within measurement systems using appropriate units.
	56. Units of Measure - Metric		
Expressions and Equations	57. Introduction to the Language of Algebra	6.2.1.1	Understand that a variable can be used to represent a quantity that can change, often in relationship to another changing quantity. Use variables in various contexts.
		6.2.3.1	Represent real-world or mathematical situations using equations and inequalities involving variables and positive rational numbers.
	58. Introduction to Solving Word Problems with Algebra	6.2.3.1	Represent real-world or mathematical situations using equations and inequalities involving variables and positive rational numbers.
	59. Concept of Inequalities I	5.2.3.2	Represent real-world situations using equations and inequalities involving variables. Create real-world situations corresponding to equations and inequalities.
		6.2.3.1	Represent real-world or mathematical situations using equations and inequalities involving variables and positive rational numbers.

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<i>Unit</i>	<i>Lesson Order & Name</i>	<i>Standard Code</i>	<i>Standards Description</i>
Expressions and Equations	1. Solving and Modeling Two-Step Problems	7.2.2.4	Represent real-world or mathematical situations using equations and inequalities involving variables and positive and negative rational numbers.
		7.2.4.1	Represent relationships in various contexts with equations involving variables and positive and negative rational numbers. Use the properties of equality to solve for the value of a variable. Interpret the solution in the original context.
	2. Solving Equations with the Distributive Property	7.2.3.1	Use properties of algebra to generate equivalent numerical and algebraic expressions containing rational numbers, grouping symbols and whole number exponents. Properties of algebra include associative, commutative and distributive laws.
		7.2.4.1	Represent relationships in various contexts with equations involving variables and positive and negative rational numbers. Use the properties of equality to solve for the value of a variable. Interpret the solution in the original context.
	3. Solving Equations with the Distributive Property in Context	7.2.4.1	Represent relationships in various contexts with equations involving variables and positive and negative rational numbers. Use the properties of equality to solve for the value of a variable. Interpret the solution in the original context.
	4. Understanding Exponents	7.1.2.1	Add, subtract, multiply and divide positive and negative rational numbers that are integers, fractions and terminating decimals; use efficient and generalizable procedures, including standard algorithms; raise positive rational numbers to whole-number exponents.
		7.2.3.1	Use properties of algebra to generate equivalent numerical and algebraic expressions containing rational numbers, grouping symbols and whole number exponents. Properties of algebra include associative, commutative and distributive laws.

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<i>Unit</i>	<i>Lesson Order & Name</i>	<i>Standard Code</i>	<i>Standards Description</i>
Expressions and Equations (continued)	5. Evaluating Expressions and Equations with Exponents	7.1.2	Calculate with positive and negative rational numbers, and rational numbers with whole number exponents, to solve real-world and mathematical problems.
		7.1.2.1	Add, subtract, multiply and divide positive and negative rational numbers that are integers, fractions and terminating decimals; use efficient and generalizable procedures, including standard algorithms; raise positive rational numbers to whole-number exponents.
		7.2.3.2	Evaluate algebraic expressions containing rational numbers and whole number exponents at specified values of their variables.
	6. Combining Like Terms	7.2.3.1	Use properties of algebra to generate equivalent numerical and algebraic expressions containing rational numbers, grouping symbols and whole number exponents. Properties of algebra include associative, commutative and distributive laws.
Ratios and Proportional Relationships	7. Interpreting Unit Rates on Graphs	7.2.1.2	Understand that the graph of a proportional relationship is a line through the origin whose slope is the unit rate (constant of proportionality). Know how to use graphing technology to examine what happens to a line when the unit rate is changed.
		7.2.2.1	Represent proportional relationships with tables, verbal descriptions, symbols, equations and graphs; translate from one representation to another. Determine the unit rate (constant of proportionality or slope) given any of these representations.
	8. Proportion Concepts	7.2.1.1	Understand that a relationship between two variables, x and y , is proportional if it can be expressed in the form $y/x = k$ or $y = kx$. Distinguish proportional relationships from other relationships, including inversely proportional relationships ($xy=k$ or $y= k/x$).
		7.2.2.1	Represent proportional relationships with tables, verbal descriptions, symbols, equations and graphs; translate from one representation to another. Determine the unit rate (constant of proportionality or slope) given any of these representations.
	9. Proportional Relationships in Tables and Equations	7.2.2.1	Represent proportional relationships with tables, verbal descriptions, symbols, equations and graphs; translate from one representation to another. Determine the unit rate (constant of proportionality or slope) given any of these representations.

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<i>Unit</i>	<i>Lesson Order & Name</i>	<i>Standard Code</i>	<i>Standards Description</i>
Ratios and Proportional Relationships (continued)	10. Interpreting Points on Graphs of Proportional Relationships	7.2.1.2	Understand that the graph of a proportional relationship is a line through the origin whose slope is the unit rate (constant of proportionality). Know how to use graphing technology to examine what happens to a line when the unit rate is changed.
		7.2.2.1	Represent proportional relationships with tables, verbal descriptions, symbols, equations and graphs; translate from one representation to another. Determine the unit rate (constant of proportionality or slope) given any of these representations.
Expressions and Equations	11. Interpreting Slope	7.2.1.2	Understand that the graph of a proportional relationship is a line through the origin whose slope is the unit rate (constant of proportionality). Know how to use graphing technology to examine what happens to a line when the unit rate is changed.
		7.2.2.1	Represent proportional relationships with tables, verbal descriptions, symbols, equations and graphs; translate from one representation to another. Determine the unit rate (constant of proportionality or slope) given any of these representations.
Ratios and Proportional Relationships	12. Using Proportions to Solve Problems	7.2.2.2	Solve multi-step problems involving proportional relationships in numerous contexts.
		7.2.2.3	Use knowledge of proportions to assess the reasonableness of solutions.
		7.2.4.2	Solve equations resulting from proportional relationships in various contexts.
		7.3.2.3	Use proportions and ratios to solve problems involving scale drawings and conversions of measurement units.
	13. Converting Units of Measure II	7.3.2.3	Use proportions and ratios to solve problems involving scale drawings and conversions of measurement units.
	14. Distance, Rate, and Time	7.2.2.2	Solve multi-step problems involving proportional relationships in numerous contexts.
	15. Proportions in Scale Drawings	7.2.2.2	Solve multi-step problems involving proportional relationships in numerous contexts.
7.3.2.3		Use proportions and ratios to solve problems involving scale drawings and conversions of measurement units.	

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<i>Unit</i>	<i>Lesson Order & Name</i>	<i>Standard Code</i>	<i>Standards Description</i>
Ratios and Proportional Relationships (continued)	16. Introduction to Similar Figures	7.2.2.2	Solve multi-step problems involving proportional relationships in numerous contexts.
		7.3.2.1	Describe the properties of similarity, compare geometric figures for similarity, and determine scale factors.
		7.3.2.2	Apply scale factors, length ratios and area ratios to determine side lengths and areas of similar geometric figures.
		7.3.2.3	Use proportions and ratios to solve problems involving scale drawings and conversions of measurement units.
	17. Using Similar Figures to Solve Problems	7.2.2.2	Solve multi-step problems involving proportional relationships in numerous contexts.
		7.3.2.2	Apply scale factors, length ratios and area ratios to determine side lengths and areas of similar geometric figures.
	18. Similarity	7.3.2.1	Describe the properties of similarity, compare geometric figures for similarity, and determine scale factors.
	19. Percent and Percent Change	7.2.2.2	Solve multi-step problems involving proportional relationships in numerous contexts.
	20. Percent and Percent Error	7.2.2.2	Solve multi-step problems involving proportional relationships in numerous contexts.
	21. Simple Interest	7.1.2.4	Solve problems in various contexts involving calculations with positive and negative rational numbers and positive integer exponents, including computing simple and compound interest.
The Number System	22. Integer Concepts	7.1.1.3	Locate positive and negative rational numbers on the number line, understand the concept of opposites, and plot pairs of positive and negative rational numbers on a coordinate grid.
	23. Integer Concepts with a Number Line		
	24. Absolute Value I	7.1.2.6	Demonstrate an understanding of the relationship between the absolute value of a rational number and distance on a number line. Use the symbol for absolute value.
	25. Absolute Value II		
	26. Comparing Rational Numbers I	7.1.1.4	Compare positive and negative rational numbers expressed in various forms using the symbols $<$, $>$, $=$, "less than or equal to", "greater than or equal to".
27. Comparing Rational Numbers II			

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<i>Unit</i>	<i>Lesson Order & Name</i>	<i>Standard Code</i>	<i>Standards Description</i>
The Number System (continued)	28. Classifying and Ordering Real Numbers	7.1.1.3	Locate positive and negative rational numbers on the number line, understand the concept of opposites, and plot pairs of positive and negative rational numbers on a coordinate grid.
		7.1.1.4	Compare positive and negative rational numbers expressed in various forms using the symbols $<$, $>$, $=$, "less than or equal to", "greater than or equal to".
	29. Adding and Subtracting Rational Numbers I 30. Adding and Subtracting Rational Numbers II 31. Multiplying and Dividing Rational Numbers	7.1.2.1	Add, subtract, multiply and divide positive and negative rational numbers that are integers, fractions and terminating decimals; use efficient and generalizable procedures, including standard algorithms; raise positive rational numbers to whole-number exponents.
Number and Operations-Fractions	32. Understanding and Multiplying with Negative Mixed Numbers	7.1.2	Calculate with positive and negative rational numbers, and rational numbers with whole number exponents, to solve real-world and mathematical problems.
		7.1.2.1	Add, subtract, multiply and divide positive and negative rational numbers that are integers, fractions and terminating decimals; use efficient and generalizable procedures, including standard algorithms; raise positive rational numbers to whole-number exponents.
The Number System	33. Writing and Interpreting Expressions with Rational Numbers	7.1.2.1	Add, subtract, multiply and divide positive and negative rational numbers that are integers, fractions and terminating decimals; use efficient and generalizable procedures, including standard algorithms; raise positive rational numbers to whole-number exponents.
	34. Operations with Rational Numbers I		
	35. Operations with Rational Numbers II		
Geometry	36. Circumference 37. Area of Circles	7.3.1.1	Demonstrate an understanding of the proportional relationship between the diameter and circumference of a circle and that the unit rate (constant of proportionality) is pi. Calculate the circumference and area of circles and sectors of circles to solve problems in various contexts.
	38. Surface Area of Cylinders	7.3.1.2	Calculate the volume and surface area of cylinders and justify the formulas used.

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<i>Unit</i>	<i>Lesson Order & Name</i>	<i>Standard Code</i>	<i>Standards Description</i>
Geometry (continued)	39. Volume of Cylinders	7.3.1.2	Calculate the volume and surface area of cylinders and justify the formulas used.
		9.3.1.1	Determine the surface area and volume of pyramids, cones and spheres. Use measuring devices or formulas as appropriate.
The Number System	40. Integers in the Coordinate Plane I	7.1.1.3	Locate positive and negative rational numbers on the number line, understand the concept of opposites, and plot pairs of positive and negative rational numbers on a coordinate grid.
	41. Integers in the Coordinate Plane II		
	42. Rational Numbers in the Coordinate Plane I		
	43. Rational Numbers in the Coordinate Plane II		
Geometry	44. Translations	7.3.2.4	Graph and describe translations and reflections of figures on a coordinate grid and determine the coordinates of the vertices of the figure after the transformation.
	45. Reflections		
Statistics and Probability	46. Measures of Spread - Range	5.4.1.1	Know and use the definitions of the mean, median and range of a set of data. Know how to use a spreadsheet to find the mean, median and range of a data set. Understand that the mean is a "leveling out" of data.
	47. Measures of Center - Median	7.4.1.1	Design simple experiments and collect data. Determine mean, median and range for quantitative data and from data represented in a display. Use these quantities to draw conclusions about the data, compare different data sets, and make predictions.
	48. Measures of Center - Mean		
			9.4.1.1
	49. Understanding the Effects of Outliers on Mean and Median	7.4.1.2	Describe the impact that inserting or deleting a data point has on the mean and the median of a data set. Know how to create data displays using a spreadsheet to examine this impact.

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<i>Unit</i>	<i>Lesson Order & Name</i>	<i>Standard Code</i>	<i>Standards Description</i>	
Statistics and Probability (continued)	50. Summarizing Data 51. Data Analysis	7.4.1.1	Design simple experiments and collect data. Determine mean, median and range for quantitative data and from data represented in a display. Use these quantities to draw conclusions about the data, compare different data sets, and make predictions.	
	52. Bar Graphs and Histograms 53. Circle Graphs	7.4.2.1	Use reasoning with proportions to display and interpret data in circle graphs (pie charts) and histograms. Choose the appropriate data display and know how to create the display using a spreadsheet or other graphing technology.	
	54. Stem-and-Leaf Plots 55. Comparing Data	7.4.1.1	Design simple experiments and collect data. Determine mean, median and range for quantitative data and from data represented in a display. Use these quantities to draw conclusions about the data, compare different data sets, and make predictions.	
	56. Simple Probability		6.4.1.2	Determine the probability of an event using the ratio between the size of the event and the size of the sample space; represent probabilities as percents, fractions and decimals between 0 and 1 inclusive. Understand that probabilities measure likelihood.
			7.4.3.2	Calculate probability as a fraction of sample space or as a fraction of area. Express probabilities as percents, decimals and fractions.
			9.4.3.2	Calculate experimental probabilities by performing simulations or experiments involving a probability model and using relative frequencies of outcomes.
	57. Compound Probability		6.4.1.2	Determine the probability of an event using the ratio between the size of the event and the size of the sample space; represent probabilities as percents, fractions and decimals between 0 and 1 inclusive. Understand that probabilities measure likelihood.
			7.4.3.2	Calculate probability as a fraction of sample space or as a fraction of area. Express probabilities as percents, decimals and fractions.
			9.4.3.1	Select and apply counting procedures, such as the multiplication and addition principles and tree diagrams, to determine the size of a sample space (the number of possible outcomes) and to calculate probabilities.
			9.4.3.2	Calculate experimental probabilities by performing simulations or experiments involving a probability model and using relative frequencies of outcomes.

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<i>Unit</i>	<i>Lesson Order & Name</i>	<i>Standard Code</i>	<i>Standards Description</i>
Statistics and Probability (continued)	58. Making Predictions	7.4.3.3	Use proportional reasoning to draw conclusions about and predict relative frequencies of outcomes based on probabilities.
Expressions and Equations	59. Solving Word Problems with Algebra	7.2.2.4	Represent real-world or mathematical situations using equations and inequalities involving variables and positive and negative rational numbers.
		7.2.4.1	Represent relationships in various contexts with equations involving variables and positive and negative rational numbers. Use the properties of equality to solve for the value of a variable. Interpret the solution in the original context.
	60. Concept of Inequalities II	7.2.2.4	Represent real-world or mathematical situations using equations and inequalities involving variables and positive and negative rational numbers.

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<i>Unit</i>	<i>Lesson Order & Name</i>	<i>Standard Code</i>	<i>Standards Description</i>
Expressions and Equations	1. Solving Two-Step Equations	8.2.4.2	Solve multi-step equations in one variable. Solve for one variable in a multi-variable equation in terms of the other variables. Justify the steps by identifying the properties of equalities used.
	2. Understanding Properties of Integer Exponents	8.1.1.4	Know and apply the properties of positive and negative integer exponents to generate equivalent numerical expressions.
	3. Applying Properties of Integer Exponents		
Functions	4. Interpreting Graphs of Real-World Situations	8.2.1	Understand the concept of function in real-world and mathematical situations, and distinguish between linear and non-linear functions.
		8.2.2	Recognize linear functions in real-world and mathematical situations; represent linear functions and other functions with tables, verbal descriptions, symbols and graphs; solve problems involving these functions and explain results in the original context.
	5. Introduction to Sketching Graphs of Real-World Situations	8.2.2	Recognize linear functions in real-world and mathematical situations; represent linear functions and other functions with tables, verbal descriptions, symbols and graphs; solve problems involving these functions and explain results in the original context.
Expressions and Equations	6. Slope	8.2.2.2	Identify graphical properties of linear functions including slopes and intercepts. Know that the slope equals the rate of change, and that the y-intercept is zero when the function represents a proportional relationship.
Functions	7. Slope-Intercept Form 8. Point-Slope Form	8.2.2.2	Identify graphical properties of linear functions including slopes and intercepts. Know that the slope equals the rate of change, and that the y-intercept is zero when the function represents a proportional relationship.
		8.2.4.3	Express linear equations in slope-intercept, point-slope and standard forms, and convert between these forms. Given sufficient information, find an equation of a line.
Expressions and Equations	9. Solving a System of Linear Equations Graphically	8.2.4.7	Represent relationships in various contexts using systems of linear equations. Solve systems of linear equations in two variables symbolically, graphically and numerically.

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<i>Unit</i>	<i>Lesson Order & Name</i>	<i>Standard Code</i>	<i>Standards Description</i>
Expressions and Equations (continued)	10. Solving a System of Linear Equations Algebraically	8.2.4.7	Represent relationships in various contexts using systems of linear equations. Solve systems of linear equations in two variables symbolically, graphically and numerically.
	11. Solving a System of Linear Equations - Applications	8.2.4.8	Understand that a system of linear equations may have no solution, one solution, or an infinite number of solutions. Relate the number of solutions to pairs of lines that are intersecting, parallel or identical. Check whether a pair of numbers satisfies a system of two linear equations in two unknowns by substituting the numbers into both equations.
Building Functions	12. Direct Variation	8.2.1.2	Use linear functions to represent relationships in which changing the input variable by some amount leads to a change in the output variable that is a constant times that amount.
		8.2.2.2	Identify graphical properties of linear functions including slopes and intercepts. Know that the slope equals the rate of change, and that the y-intercept is zero when the function represents a proportional relationship.
Statistics and Probability	13. Comparing Linear and Nonlinear Data	8.2.1	Understand the concept of function in real-world and mathematical situations, and distinguish between linear and non-linear functions.
Expressions and Equations	14. Solving Equations with the Variable on Both Sides	8.2.4.2	Solve multi-step equations in one variable. Solve for one variable in a multi-variable equation in terms of the other variables. Justify the steps by identifying the properties of equalities used.
	15. Understanding Square and Cube Roots	8.1.1.2	Compare real numbers; locate real numbers on a number line. Identify the square root of a positive integer as an integer, or if it is not an integer, locate it as a real number between two consecutive positive integers.
The Number System	16. Approximating Values of Irrational Numbers	8.1.1.2	Compare real numbers; locate real numbers on a number line. Identify the square root of a positive integer as an integer, or if it is not an integer, locate it as a real number between two consecutive positive integers.
Expressions and Equations	17. Interpreting Numbers Written in Scientific Notation	8.1.1.5	Express approximations of very large and very small numbers using scientific notation; understand how calculators display numbers in scientific notation. Multiply and divide numbers expressed in scientific notation, express the answer in scientific notation, using the correct number of significant digits when physical measurements are involved.
	18. Operations with Numbers in Scientific Notation		

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<i>Unit</i>	<i>Lesson Order & Name</i>	<i>Standard Code</i>	<i>Standards Description</i>
Geometry	19. Distance on the Coordinate Plane I	8.3.1.2	Determine the distance between two points on a horizontal or vertical line in a coordinate system. Use the Pythagorean Theorem to find the distance between any two points in a coordinate system.
The Number System	20. Distance on the Coordinate Plane II	8.3.1.2	Determine the distance between two points on a horizontal or vertical line in a coordinate system. Use the Pythagorean Theorem to find the distance between any two points in a coordinate system.
Geometry	21. Understanding the Pythagorean Theorem	8.3.1.3	Informally justify the Pythagorean Theorem by using measurements, diagrams and computer software.
	22. Pythagorean Theorem - Hypotenuse	8.3.1.1	Use the Pythagorean Theorem to solve problems involving right triangles.
	23. Pythagorean Theorem - Legs	9.3.3.4	Apply the Pythagorean Theorem and its converse to solve problems and logically justify results.
	24. Pythagorean Theorem - Mixed Problems		
	25. Pythagorean Theorem - Distance Formula	8.3.1.2	Determine the distance between two points on a horizontal or vertical line in a coordinate system. Use the Pythagorean Theorem to find the distance between any two points in a coordinate system.
Creating Equations	26. Equations of Parallel and Perpendicular Lines	8.3.2.3	Given a line on a coordinate system and the coordinates of a point not on the line, find lines through that point that are parallel and perpendicular to the given line, symbolically and graphically.
Building Functions	27. Writing Geometric Sequences Using an Explicit Formula	8.2.1.5	Understand that a geometric sequence is a non-linear function that can be expressed in the form $f(x)=ab$ to the x power, where $x = 0, 1, 2, 3, \dots$
	28. Writing Geometric Sequences Recursively	8.2.2.5	Represent geometric sequences using equations, tables, graphs and verbal descriptions, and use them to solve problems.
		9.2.2.4	Express the terms in a geometric sequence recursively and by giving an explicit (closed form) formula, and express the partial sums of a geometric series recursively.
	29. Writing Arithmetic Sequences Explicitly and Recursively	8.2.1.4	Understand that an arithmetic sequence is a linear function that can be expressed in the form $f(x)=mx+b$, where $x = 0, 1, 2, 3, \dots$

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<i>Unit</i>	<i>Lesson Order & Name</i>	<i>Standard Code</i>	<i>Standards Description</i>
Creating Equations	1. Writing and Solving Linear Equations in One Variable	9.2.2.1	Represent and solve problems in various contexts using linear and quadratic functions.
	2. Writing and Graphing Linear Equations in Two or More Variables		
	3. Modeling Exponential Relationships with Equations, Inequalities, and Graphs	9.2.2.2	Represent and solve problems in various contexts using exponential functions, such as investment growth, depreciation and population growth.
		9.2.2.3	Sketch graphs of linear, quadratic and exponential functions, and translate between graphs, tables and symbolic representations. Know how to use graphing technology to graph these functions.
	9.2.4.2	Represent relationships in various contexts using equations involving exponential functions; solve these equations graphically or numerically. Know how to use calculators, graphing utilities or other technology to solve these equations.	
Reasoning with Equations and Inequalities	4. Solving Linear Equations Graphically	9.2.2.1	Represent and solve problems in various contexts using linear and quadratic functions.
	5. Solving Exponential Equations Graphically	9.2.2.2	Represent and solve problems in various contexts using exponential functions, such as investment growth, depreciation and population growth.
		9.2.4.2	Represent relationships in various contexts using equations involving exponential functions; solve these equations graphically or numerically. Know how to use calculators, graphing utilities or other technology to solve these equations.
	6. Graphing Linear Inequalities and Systems of Linear Inequalities in Real-World Situations	9.2.4.4	Represent relationships in various contexts using systems of linear inequalities; solve them graphically. Indicate which parts of the boundary are included in and excluded from the solution set using solid and dotted lines.
Interpreting Functions	7. Function Notation I	9.2.1.1	Understand the definition of a function. Use functional notation and evaluate a function at a given point in its domain.

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Interpreting Functions (continued)	8. Function Notation II	9.2.1.1	Understand the definition of a function. Use functional notation and evaluate a function at a given point in its domain.
		9.2.1.2	Distinguish between functions and other relations defined symbolically, graphically or in tabular form.
		9.2.1.3	Find the domain of a function defined symbolically, graphically or in a real-world context.
	9. Interpreting Graphs of Linear and Exponential Functions in Context	9.2.1.4	Obtain information and draw conclusions from graphs of functions and other relations.
	10. Sketching Graphs of Linear and Exponential Functions from a Context	9.2.2.1	Represent and solve problems in various contexts using linear and quadratic functions.
		9.2.2.2	Represent and solve problems in various contexts using exponential functions, such as investment growth, depreciation and population growth.
		9.2.2.3	Sketch graphs of linear, quadratic and exponential functions, and translate between graphs, tables and symbolic representations. Know how to use graphing technology to graph these functions.
	11. Understanding the Domain of a Function	9.2.1.3	Find the domain of a function defined symbolically, graphically or in a real-world context.
	12. Rate of Change for Linear and Exponential Functions	9.2.1.8	Make qualitative statements about the rate of change of a function, based on its graph or table of values.
	13. Sketching Graphs of Linear Functions from Symbolic Representations	9.2.2.1	Represent and solve problems in various contexts using linear and quadratic functions.
9.2.2.3		Sketch graphs of linear, quadratic and exponential functions, and translate between graphs, tables and symbolic representations. Know how to use graphing technology to graph these functions.	

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Unit	Lesson Order & Name	Standard Code	Standards Description
Interpreting Functions (continued)	14. Sketching Graphs of Exponential Functions from Symbolic Representations	9.2.1.7	Understand the concept of an asymptote and identify asymptotes for exponential functions and reciprocals of linear functions, using symbolic and graphical methods.
		9.2.2.2	Represent and solve problems in various contexts using exponential functions, such as investment growth, depreciation and population growth.
		9.2.2.3	Sketch graphs of linear, quadratic and exponential functions, and translate between graphs, tables and symbolic representations. Know how to use graphing technology to graph these functions.
Building Functions	15. Transformations of Graphs of Linear and Exponential Functions	9.2.1.9	Determine how translations affect the symbolic and graphical forms of a function. Know how to use graphing technology to examine translations.
	16. Writing Geometric Sequences Using an Explicit Formula	8.2.1.5	Understand that a geometric sequence is a non-linear function that can be expressed in the form $f(x)=ab$ to the x power, where $x = 0, 1, 2, 3, \dots$
	17. Writing Geometric Sequences Recursively	8.2.2.5	Represent geometric sequences using equations, tables, graphs and verbal descriptions, and use them to solve problems.
		9.2.2.4	Express the terms in a geometric sequence recursively and by giving an explicit (closed form) formula, and express the partial sums of a geometric series recursively.
Interpreting Categorical and Quantitative Data	18. Data Displays on the Real Number Line	9.4.1.1	Describe a data set using data displays, including box-and-whisker plots; describe and compare data sets using summary statistics, including measures of center, location and spread. Measures of center and location include mean, median, quartile and percentile. Measures of spread include standard deviation, range and inter-quartile range. Know how to use calculators, spreadsheets or other technology to display data and calculate summary statistics.
	19. Comparing the Shape, Center, and Spread of Data Sets		
	20. Summarizing and Interpreting Categorical Data		
	21. Fitting Functions to Data	9.4.1.3	Use scatterplots to analyze patterns and describe relationships between two variables. Using technology, determine regression lines (line of best fit) and correlation coefficients; use regression lines to make predictions and correlation coefficients to assess the reliability of those predictions.

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<i>Unit</i>	<i>Lesson Order & Name</i>	<i>Standard Code</i>	<i>Standards Description</i>
Arithmetic with Polynomials and Rational Expressions	22. Adding and Subtracting Polynomials	9.2.3.1	Evaluate polynomial and rational expressions and expressions containing radicals and absolute values at specified points in their domains.
	23. Multiplying Polynomials	9.2.3.2	Add, subtract and multiply polynomials; divide a polynomial by a polynomial of equal or lower degree.
	24. Multiplying and Dividing Monomials	9.2.3.2	Add, subtract and multiply polynomials; divide a polynomial by a polynomial of equal or lower degree.
The Real Number System	25. Using Rational Exponents to Rewrite Expressions	9.2.3.1	Evaluate polynomial and rational expressions and expressions containing radicals and absolute values at specified points in their domains.
		9.2.3.6	Apply the properties of positive and negative rational exponents to generate equivalent algebraic expressions, including those involving n th roots.
		9.2.3.7	Justify steps in generating equivalent expressions by identifying the properties used. Use substitution to check the equality of expressions for some particular values of the variables; recognize that checking with substitution does not guarantee equality of expressions for all values of the variables.
Arithmetic with Polynomials and Rational Expressions	26. Simplifying Monomials	9.2.3.6	Apply the properties of positive and negative rational exponents to generate equivalent algebraic expressions, including those involving n th roots.
Seeing Structure in Expressions	27. Factoring Polynomials	9.2.3.3	Factor common monomial factors from polynomials, factor quadratic polynomials, and factor the difference of two squares.

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<i>Unit</i>	<i>Lesson Order & Name</i>	<i>Standard Code</i>	<i>Standards Description</i>
Creating Equations	28. Modeling Quadratic Relationships with Equations, Inequalities, and Graphs	9.2.2.1	Represent and solve problems in various contexts using linear and quadratic functions.
		9.2.2.3	Sketch graphs of linear, quadratic and exponential functions, and translate between graphs, tables and symbolic representations. Know how to use graphing technology to graph these functions.
		9.2.4.1	Represent relationships in various contexts using quadratic equations and inequalities. Solve quadratic equations and inequalities by appropriate methods including factoring, completing the square, graphing and the quadratic formula. Find non-real complex roots when they exist. Recognize that a particular solution may not be applicable in the original context. Know how to use calculators, graphing utilities or other technology to solve quadratic equations and inequalities.
Building Functions	29. Writing Quadratic Functions from a Context	9.2.2.1	Represent and solve problems in various contexts using linear and quadratic functions.
Seeing Structure in Expressions	30. Factoring Quadratic Expressions	9.2.3.3	Factor common monomial factors from polynomials, factor quadratic polynomials, and factor the difference of two squares.
		9.2.4.1	Represent relationships in various contexts using quadratic equations and inequalities. Solve quadratic equations and inequalities by appropriate methods including factoring, completing the square, graphing and the quadratic formula. Find non-real complex roots when they exist. Recognize that a particular solution may not be applicable in the original context. Know how to use calculators, graphing utilities or other technology to solve quadratic equations and inequalities.

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Unit	Lesson Order & Name	Standard Code	Standards Description
Interpreting Functions	31. Sketching Graphs of Quadratic Functions in Context	9.2.1.5	Identify the vertex, line of symmetry and intercepts of the parabola corresponding to a quadratic function, using symbolic and graphical methods, when the function is expressed in the form $f(x) = ax^2 + bx + c$, in the form $f(x) = a(x - h)^2 + k$, or in factored form.
		9.2.1.6	Identify intercepts, zeros, maxima, minima and intervals of increase and decrease from the graph of a function.
		9.2.2.1	Represent and solve problems in various contexts using linear and quadratic functions.
		9.2.2.3	Sketch graphs of linear, quadratic and exponential functions, and translate between graphs, tables and symbolic representations. Know how to use graphing technology to graph these functions.
		9.2.4.1	Represent relationships in various contexts using quadratic equations and inequalities. Solve quadratic equations and inequalities by appropriate methods including factoring, completing the square, graphing and the quadratic formula. Find non-real complex roots when they exist. Recognize that a particular solution may not be applicable in the original context. Know how to use calculators, graphing utilities or other technology to solve quadratic equations and inequalities.
Reasoning with Equations and Inequalities	32. Solving Quadratics - Completing the Square	9.2.4.1	Represent relationships in various contexts using quadratic equations and inequalities. Solve quadratic equations and inequalities by appropriate methods including factoring, completing the square, graphing and the quadratic formula. Find non-real complex roots when they exist. Recognize that a particular solution may not be applicable in the original context. Know how to use calculators, graphing utilities or other technology to solve quadratic equations and inequalities.
	33. Solving Quadratic Equations Graphically	9.2.2.1	Represent and solve problems in various contexts using linear and quadratic functions.
Interpreting Functions	34. Rewriting Quadratics to Reveal Their Structure	9.2.3.3	Factor common monomial factors from polynomials, factor quadratic polynomials, and factor the difference of two squares.

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Unit	Lesson Order & Name	Standard Code	Standards Description
Reasoning with Equations and Inequalities	35. Problem Solving with Quadratic Functions	9.2.2.1	Represent and solve problems in various contexts using linear and quadratic functions.
		9.2.3.5	Check whether a given complex number is a solution of a quadratic equation by substituting it for the variable and evaluating the expression, using arithmetic with complex numbers.
		9.2.4.1	Represent relationships in various contexts using quadratic equations and inequalities. Solve quadratic equations and inequalities by appropriate methods including factoring, completing the square, graphing and the quadratic formula. Find non-real complex roots when they exist. Recognize that a particular solution may not be applicable in the original context. Know how to use calculators, graphing utilities or other technology to solve quadratic equations and inequalities.
		9.2.4.3	Recognize that to solve certain equations, number systems need to be extended from whole numbers to integers, from integers to rational numbers, from rational numbers to real numbers, and from real numbers to complex numbers. In particular, non-real complex numbers are needed to solve some quadratic equations with real coefficients.
	9.2.4.7	Solve equations that contain radical expressions. Recognize that extraneous solutions may arise when using symbolic methods.	
	36. Using the Quadratic Formula	9.2.4.1	Represent relationships in various contexts using quadratic equations and inequalities. Solve quadratic equations and inequalities by appropriate methods including factoring, completing the square, graphing and the quadratic formula. Find non-real complex roots when they exist. Recognize that a particular solution may not be applicable in the original context. Know how to use calculators, graphing utilities or other technology to solve quadratic equations and inequalities.
9.2.4.7		Solve equations that contain radical expressions. Recognize that extraneous solutions may arise when using symbolic methods.	
Interpreting Functions	37. Piecewise, Step, and Absolute Value Functions	9.2.2.6	Sketch the graphs of common non-linear functions such as $f(x) = \sqrt{x}$, $f(x) = x $, $f(x) = 1/x$, $f(x) = x^3$, and translations of these functions, such as $f(x) = \sqrt{x-2} + 4$. Know how to use graphing technology to graph these functions.

Geometry

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<i>Unit</i>	<i>Lesson Order & Name</i>	<i>Standard Code</i>	<i>Standards Description</i>
Ratios and Proportional Relationships	1. Converting Units of Measure I	6.3.3.1	Solve problems in various contexts involving conversion of weights, capacities, geometric measurements and times within measurement systems using appropriate units.
	2. Converting Units of Measure II	7.3.2.3	Use proportions and ratios to solve problems involving scale drawings and conversions of measurement units.
	3. Using Similar Figures to Solve Problems	7.2.2.2	Solve multi-step problems involving proportional relationships in numerous contexts.
		7.3.2.2	Apply scale factors, length ratios and area ratios to determine side lengths and areas of similar geometric figures.
Geometry	4. Rotations 5. Composition of Transformations 6. Dilations	9.3.4.6	Use numeric, graphic and symbolic representations of transformations in two dimensions, such as reflections, translations, scale changes and rotations about the origin by multiples of 90° , to solve problems involving figures on a coordinate grid.
Congruence	7. Defining Transformations 8. Representing Transformations with Algebra	9.3.4.6	Use numeric, graphic and symbolic representations of transformations in two dimensions, such as reflections, translations, scale changes and rotations about the origin by multiples of 90° , to solve problems involving figures on a coordinate grid.
Geometry	9. Congruence	9.3.3.6	Know and apply properties of congruent and similar figures to solve problems and logically justify results.
Congruence	10. Rigid Motion and Congruence	9.3.3.6	Know and apply properties of congruent and similar figures to solve problems and logically justify results.
		9.3.4.6	Use numeric, graphic and symbolic representations of transformations in two dimensions, such as reflections, translations, scale changes and rotations about the origin by multiples of 90° , to solve problems involving figures on a coordinate grid.

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<i>Unit</i>	<i>Lesson Order & Name</i>	<i>Standard Code</i>	<i>Standards Description</i>
Congruence (continued)	11. What Is Proof?	9.3.2.4	Construct logical arguments and write proofs of theorems and other results in geometry, including proofs by contradiction. Express proofs in a form that clearly justifies the reasoning, such as two-column proofs, paragraph proofs, flow charts or illustrations.
		9.3.3.1	Know and apply properties of parallel and perpendicular lines, including properties of angles formed by a transversal, to solve problems and logically justify results.
		9.3.3.2	Know and apply properties of angles, including corresponding, exterior, interior, vertical, complementary and supplementary angles, to solve problems and logically justify results.
Geometry	12. Angle Pairs	6.3.2.1	Solve problems using the relationships between the angles formed by intersecting lines.
		9.3.3.1	Know and apply properties of parallel and perpendicular lines, including properties of angles formed by a transversal, to solve problems and logically justify results.
		9.3.3.2	Know and apply properties of angles, including corresponding, exterior, interior, vertical, complementary and supplementary angles, to solve problems and logically justify results.
	13. Parallel Lines and Transversals	9.3.3.1	Know and apply properties of parallel and perpendicular lines, including properties of angles formed by a transversal, to solve problems and logically justify results.
		9.3.3.2	Know and apply properties of angles, including corresponding, exterior, interior, vertical, complementary and supplementary angles, to solve problems and logically justify results.
	Congruence	14. Proving Theorems About Lines and Angles	9.3.3.1
9.3.3.2			Know and apply properties of angles, including corresponding, exterior, interior, vertical, complementary and supplementary angles, to solve problems and logically justify results.
15. Proving Theorems About Congruent Triangles		9.3.3.6	Know and apply properties of congruent and similar figures to solve problems and logically justify results.

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<i>Unit</i>	<i>Lesson Order & Name</i>	<i>Standard Code</i>	<i>Standards Description</i>
Similarity, Right Triangles, and Trigonometry	16. Problem Solving with Congruent Triangles	9.3.3.6	Know and apply properties of congruent and similar figures to solve problems and logically justify results.
Congruence	17. Proving Theorems About Relationships in Triangles	9.3.3.3	Know and apply properties of equilateral, isosceles and scalene triangles to solve problems and logically justify results.
	18. Constructing Angles and Special Line Segments	9.3.3.1	Know and apply properties of parallel and perpendicular lines, including properties of angles formed by a transversal, to solve problems and logically justify results.
	19. Constructing Inscribed Figures	9.3.3.8	Know and apply properties of a circle to solve problems and logically justify results.
Similarity, Right Triangles, and Trigonometry	20. Properties of Dilations I 21. Properties of Dilations II	9.3.4.6	Use numeric, graphic and symbolic representations of transformations in two dimensions, such as reflections, translations, scale changes and rotations about the origin by multiples of 90° , to solve problems involving figures on a coordinate grid.
	22. Transformations and Similarity 23. Problem Solving with Transformations and Similarity	9.3.3.6	Know and apply properties of congruent and similar figures to solve problems and logically justify results.
	24. Pythagorean Theorem - Hypotenuse 25. Pythagorean Theorem - Legs 26. Pythagorean Theorem - Mixed Problems	8.3.1.1 9.3.3.4	Use the Pythagorean Theorem to solve problems involving right triangles. Apply the Pythagorean Theorem and its converse to solve problems and logically justify results.
Similarity, Right Triangles, and Trigonometry	27. Proving Theorems About Similar Triangles	9.3.3.6	Know and apply properties of congruent and similar figures to solve problems and logically justify results.

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<i>Unit</i>	<i>Lesson Order & Name</i>	<i>Standard Code</i>	<i>Standards Description</i>
Similarity, Right Triangles, and Trigonometry (continued)	28. Similarity and Trigonometric Ratios	9.3.4.1	Understand how the properties of similar right triangles allow the trigonometric ratios to be defined, and determine the sine, cosine and tangent of an acute angle in a right triangle.
	29. Problem Solving with Similarity and Trigonometric Ratios	9.3.4.1	Understand how the properties of similar right triangles allow the trigonometric ratios to be defined, and determine the sine, cosine and tangent of an acute angle in a right triangle.
		9.3.4.2	Apply the trigonometric ratios sine, cosine and tangent to solve problems, such as determining lengths and areas in right triangles and in figures that can be decomposed into right triangles. Know how to use calculators, tables or other technology to evaluate trigonometric ratios.
Geometry	30. Area of Complex Composite Figures	9.3.1.2	Compose and decompose two- and three-dimensional figures; use decomposition to determine the perimeter, area, surface area and volume of various figures.
	31. Surface Area of Pyramids 32. Surface Area of Cones 33. Surface Area of Spheres	9.3.1.1	Determine the surface area and volume of pyramids, cones and spheres. Use measuring devices or formulas as appropriate.
	34. Surface Area of Composite Solids	9.3.1.2	Compose and decompose two- and three-dimensional figures; use decomposition to determine the perimeter, area, surface area and volume of various figures.
	35. Volume of Cylinders	7.3.1.2	Calculate the volume and surface area of cylinders and justify the formulas used.
		9.3.1.1	Determine the surface area and volume of pyramids, cones and spheres. Use measuring devices or formulas as appropriate.
	36. Volume of Pyramids and Cones 37. Volume of Spheres	9.3.1.1	Determine the surface area and volume of pyramids, cones and spheres. Use measuring devices or formulas as appropriate.
	38. Volume of Composite Solids	9.3.1.2	Compose and decompose two- and three-dimensional figures; use decomposition to determine the perimeter, area, surface area and volume of various figures.

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Modeling with Geometry	39. Rates with Area and Volume	9.3.1.4	Understand and apply the fact that the effect of a scale factor k on length, area and volume is to multiply each by k , k^2 and k^3 , respectively.
Geometric Measurement and Dimension	40. Understanding Formulas for Curved Figures	9.3.1.1	Determine the surface area and volume of pyramids, cones and spheres. Use measuring devices or formulas as appropriate.
Expressing Geometric Properties with Equations	41. Coordinates of Parallel and Perpendicular Lines 42. Problem Solving with Coordinates of Parallel and Perpendicular Lines	9.3.3.1	Know and apply properties of parallel and perpendicular lines, including properties of angles formed by a transversal, to solve problems and logically justify results.
	43. Using Coordinates to Find Perimeters and Areas	9.3.4.4	Use coordinate geometry to represent and analyze line segments and polygons, including determining lengths, midpoints and slopes of line segments.
Circles	44. Tangents, Chords, Radii, and Angles in Circles 45. Radians and Area of Sectors	9.3.3.8	Know and apply properties of a circle to solve problems and logically justify results.
Expressing Geometric Properties with Equations	46. Equation of a Circle 47. Problem Solving with the Equation of a Circle	9.3.4.5	Know the equation for the graph of a circle with radius r and center (h,k) , $(x - h)^2 + (y - k)^2 = r^2$, and justify this equation using the Pythagorean Theorem and properties of translations.
Circles	48. Quadrilaterals Inscribed in Circles	9.3.3.8	Know and apply properties of a circle to solve problems and logically justify results.

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Similarity, Right Triangles, and Trigonometry	49. Law of Sines and Law of Cosines	9.3.4.2	Apply the trigonometric ratios sine, cosine and tangent to solve problems, such as determining lengths and areas in right triangles and in figures that can be decomposed into right triangles. Know how to use calculators, tables or other technology to evaluate trigonometric ratios.
		9.3.4.3	Use calculators, tables or other technologies in connection with the trigonometric ratios to find angle measures in right triangles in various contexts.
Conditional Probability and the Rules of Probability	50. Organizing Possible Outcomes of Events	9.4.3.1	Select and apply counting procedures, such as the multiplication and addition principles and tree diagrams, to determine the size of a sample space (the number of possible outcomes) and to calculate probabilities.
		9.4.3.5	Apply probability concepts such as intersections, unions and complements of events, and conditional probability and independence, to calculate probabilities and solve problems.
	51. Modeling Probability Situations Using Two-Way Frequency Tables	9.4.3.9	Use the relationship between conditional probabilities and relative frequencies in contingency tables.
	52. Relating Probabilities of Unions and Intersections of Events	9.4.3.7	Understand and use simple probability formulas involving intersections, unions and complements of events.