

Ohio Academic Content Standards Mathematics	Boardworks Middle School Math Presentations
<b>Grade 6</b>	
<b>Number, Number Sense and Operations Standard</b>	
<i>Number and Number Systems</i>	
1. Decompose and recompose whole numbers using factors and exponents, and explain why “squared” means “second power” and “cubed” means “third power.”	Powers Multiples and factors Square roots Cubes and cube roots Square and triangular numbers
2. Find and use the prime factorization of composite numbers. For example: a. Use the prime factorization to recognize the greatest common factor (GCF). b. Use the prime factorization to recognize the least common multiple (LCM). c. Apply the prime factorization to solve problems and explain solutions.	GCF and LCM Prime factorization Prime numbers
3. Explain why a number is referred to as being “rational,” and recognize that the expression $a/b$ can mean a parts of size $1/b$ each, $a$ divided by $b$ , or the ratio of $a$ to $b$ .	Rational and irrational numbers
4. Describe what it means to find a specific percent of a number, using real-life examples.	Introducing percentages Percentage change Percentages and inverse operations Calculating percentages mentally Calculating percentages on paper Calculating percentages with a calculator
5. Use models and pictures to relate concepts of ratio, proportion and percent, including percents less than 1 and greater than 100.	Ratio and rate Direct proportion Dividing in a given ratio Comparing proportions Percentage change Percentages and inverse operations Ratio and proportion problems Calculating percentages mentally Calculating percentages on paper Calculating percentages using a calculator Direct variations

<i>Meaning of Operations</i>	
6. Use the order of operations, including the use of exponents, decimals and rational numbers, to simplify numerical expressions.	Order of operations and PEMDAS Adding and subtracting integers Adding and subtracting integers activities Multiplying and dividing integers Mental multiplication Mental division
7. Use simple expressions involving integers to represent and solve problems; e.g., if a running back loses 15 yards on the first carry but gains 8 yards on the second carry, what is the net gain/loss?	Writing expressions Adding and subtracting integers Adding and subtracting integers activities Multiplying and dividing integers Absolute value Using negative numbers in context
8. Represent multiplication and division situations involving fractions and decimals with models and visual representations;	Multiplying fractions Dividing by fractions Fractions and decimals Mental multiplication Mental division One number as a fraction of another
9. Give examples of how ratios are used to represent comparisons; e.g., part-to-part, part-to-whole, whole-to-part.	Finding a fraction of an amount Fractions of shapes Ratio and rate Dividing in a given ratio Ratio and proportion problems
10. Recognize that a quotient may be larger than the dividend when the divisor is a fraction;	Dividing by fractions
<i>Computation and Estimation</i>	
11. Perform fraction and decimal computations and justify their solutions; e.g., using manipulatives, diagrams, mathematical reasoning.	Multiplying fractions Dividing by fractions Fractions and decimals Mental multiplication Mental division Adding and subtracting simple fractions Methods for adding and subtracting fractions Finding a fraction of an amount

12. Develop and analyze algorithms for computing with fractions and decimals, and demonstrate fluency in their use.	Multiplying fractions Dividing by fractions Fractions and decimals Mental multiplication Mental division Written methods for addition and subtraction Written methods for multiplication Written methods for division
13. Estimate reasonable solutions to problem situations involving fractions and decimals;	Estimation and approximation Using a calculator
14. Use proportional reasoning, ratios and percents to represent problem situations and determine the reasonableness of solutions.	Ratio and rate Direct proportion Dividing in a given ratio Comparing proportions Percentage change Percentages and inverse operations Ratio and proportion problems Calculating percentages mentally Calculating percentages on paper Calculating percentages using a calculator
15. Determine the percent of a number and solve related problems; e.g., find the percent markdown if the original price was \$140, and the sale price is \$100.	Calculating percentages mentally Calculating percentages on paper Calculating percentages using a calculator Percentage change Percentages and inverse operations Introducing percentages
<b>Measurement Standard</b>	
<i>Measurement Units</i>	
1. Understand and describe the difference between surface area and volume.	Surface area Volume
<i>Use Measurement Techniques and Tools</i>	
2. Use strategies to develop formulas for finding circumference and area of circles, and to determine the area of sectors;	Circumference of a circle Area of a circle Circles

<p>3. Estimate perimeter or circumference and area for circles, triangles and quadrilaterals, and surface area and volume for prisms and cylinders by:</p> <p>a. estimating lengths using string or links, areas using tiles or grid, and volumes using cubes;</p> <p>b. measuring attributes (diameter, side lengths, or heights) and using established formulas for circles, triangles, rectangles, parallelograms and rectangular prisms.</p>	<p>Perimeter  Circumference of a circle  Area of a circle  Circles  Triangles  Quadrilaterals  Area  Area problems  Surface area  Volume  Solid shapes  Cylinders, cones and spheres  Estimation and approximation</p>
<p>4. Determine which measure (perimeter, area, surface area, volume) matches the context for a problem situation; e.g., perimeter is the context for fencing a garden, surface area is the context for painting a room.</p>	<p>Perimeter  Area  Surface area  Volume</p>
<p>5. Understand the difference between perimeter and area, and demonstrate that two shapes may have the same perimeter, but different areas or may have the same area, but different perimeters.</p>	<p>Perimeter  Area  Area problems  Area of irregular shapes</p>
<p>6. Describe what happens to the perimeter and area of a two-dimensional shape when the measurements of the shape are changed; e.g. length of sides are doubled.</p>	<p>-</p>

<b>Geometry and Spatial Sense Standard</b>	
<i>Characteristics and Properties</i>	
<p>1. Classify and describe two-dimensional and three-dimensional geometric figures and objects by using their properties; e.g., interior angle measures, perpendicular/parallel sides, congruent angles/sides.</p>	<p>2-D representations of 3-D shapes  Polygons  Triangles  Quadrilaterals  Circles  Cylinders, cones and spheres  Labeling lines and angles  Parallel and perpendicular lines  Angles made with parallel lines  Angles in a triangle  Angles in polygons  The sum of interior and exterior angles  Congruence</p>
<p>2. Use standard language to define geometric vocabulary: vertex, face, altitude, diagonal, isosceles, equilateral, acute, obtuse and other vocabulary as appropriate.</p>	<p>Polygons  Triangles  Quadrilaterals  Circles  Cylinders, cones and spheres  Labeling lines and angles  Parallel and perpendicular lines  Angles made with parallel lines  Angles in a triangle  Angles in polygons  Calculating angles</p>
<p>3. Use multiple classification criteria to classify triangles; e.g., right scalene triangle.</p>	<p>Identifying right triangles  Triangles  Angles in a triangle</p>
<p>4. Identify and define relationships between planes; i.e., parallel, perpendicular and intersecting.</p>	<p>Parallel and perpendicular lines</p>
<i>Spatial Relationships</i>	
<p>5. Predict and describe sizes, positions and orientations of two-dimensional shapes after transformations such as reflections, rotations, translations and dilations.</p>	<p>Reflection  Rotation  Translations  Dilation  Combining transformations</p>

<i>Transformations and Symmetry</i>	
6. Draw similar figures that model proportional relationships; e.g., model similar figures with a 1 to 2 relationship by sketching two of the same figure, one with corresponding sides twice the length of the other.	Congruence Dilation Using scale factors Finding missing lengths
<i>Visualization and Geometric Models</i>	
7. Build three-dimensional objects with cubes, and sketch the two-dimensional representations of each side; i.e., projection sets.	Solid shapes Views of 3-D shapes 2-D representation of 3-D shapes
<b>Patterns, Functions and Algebra Standard</b>	
<i>Use Patterns, Relations and Functions</i>	
1. Represent and analyze patterns, rules and functions, using physical materials, tables and graphs.	Introducing sequences Sequences from geometrical patterns Describing and continuing sequences Generating sequences from flow charts Generating sequences and rules Finding the nth term Sequences from practical contexts Function machines Mapping functions Inverse functions Graphs of functions
2. Use words and symbols to describe numerical and geometric patterns, rules and functions.	Introducing sequences Sequences from geometrical patterns Describing and continuing sequences Generating sequences from flow charts Generating sequences and rules Finding the nth term Sequences from practical contexts Function machines Mapping functions Inverse functions Graphs of functions

<i>Use Algebraic Representations</i>	
3. Recognize and generate equivalent forms of algebraic expressions, and explain how the commutative, associative and distributive properties can be used to generate equivalent forms; e.g., perimeter as $2(l + w)$ or $2l + 2w$ .	Properties of numbers Writing expressions Using formulas
4. Solve simple linear equations and inequalities using physical models, paper and pencil, tables and graphs.	Solving simple equations Inequalities Solving linear inequalities Integer solutions for inequalities
5. Produce and interpret graphs that represent the relationship between two variables.	The equation of a straight line Reading and plotting graphs Conversion graphs Distance-time graphs Interpreting graphs Direct variations
6. Evaluate simple expressions by replacing variables with given values, and use formulas in problem-solving situations.	Substitution Introducing formulas Using formulas Transforming formulas
<i>Analyze Change</i>	
7. Identify and describe situations with constant or varying rates of change, and compare them.	The equation of a straight line Reading and plotting graphs Conversion graphs Distance-time graphs Interpreting graphs
8. Use technology to analyze change; e.g., use computer applications or graphing calculators to display and interpret rate of change.	The equation of a straight line Reading and plotting graphs Conversion graphs Distance-time graphs Interpreting graphs
<b>Data Analysis and Probability Standard</b>	
<i>Data Collection</i>	
1. Read, construct and interpret line graphs, circle graphs and histograms.	Line graphs Circle graphs Histograms

2. Select, create and use graphical representations that are appropriate for the type of data collected.	Appropriate graphs Line graphs Bar graphs Circle graphs Histograms
3. Compare representations of the same data in different types of graphs, such as a bar graph and circle graph.	Appropriate graphs Line graphs Bar graphs Circle graphs Hisograms
<i>Statistical Methods</i>	
4. Understand the different information provided by measures of center (mean, mode and median) and measures of spread (range).	Calculating the mean Finding the mode Finding the median Finding the range Comparing data
5. Describe the frequency distribution of a set of data, as shown in a histogram or frequency table, by general appearance or shape; e.g., number of modes, middle of data, level of symmetry, outliers.	Histograms Comparing data
6. Make logical inferences from statistical data.	Writing a statistical report Calculating statistics
<i>Probability</i>	
7. Design an experiment to test a theoretical probability and explain how the results may vary.	Experimental probability
<b>Grade 7</b>	
<b>Number, Number Sense and Operations Standard</b>	
<i>Number and Number Systems</i>	
1. Demonstrate an understanding of place value using powers of 10 and write large numbers in scientific notation.	Place value Scientific notation
2. Explain the meaning of exponents that are negative or 0.	Powers
3. Describe differences between rational and irrational numbers; e.g., use technology to show that some numbers (rational) can be expressed as terminating or repeating decimals and others (irrational) as non-terminating and non-repeating decimals.	Rational and irrational numbers

<i>Meaning of Operations</i>	
4. Use order of operations and properties to simplify numerical expressions involving integers, fractions and decimals.	Order of operations and PEMDAS Adding and subtracting integers Adding and subtracting integers activities Multiplying and dividing integers Mental multiplication Mental division Multiplying fractions Dividing by fractions Adding and subtracting simple fractions Methods for adding and subtracting fractions Finding a fraction of an amount
5. Explain the meaning and effect of adding, subtracting, multiplying and dividing integers; e.g., how adding two integers can result in a lesser value.	Adding and subtracting integers Adding and subtracting integers activities Multiplying and dividing integers Using negative numbers in context
<i>Computation and Estimation</i>	
6. Simplify numerical expressions involving integers and use integers to solve real-life problems.	Adding and subtracting integers Adding and subtracting integers activities Multiplying and dividing integers Using negative numbers in context
7. Solve problems using the appropriate form of a rational number (fraction, decimal or percent).	Equivalent fractions, decimals and percentages Fractions and decimals Mental multiplication Mental division Multiplying fractions Dividing by fractions Adding and subtracting simple fractions Methods for adding and subtracting fractions Introducing percentages Calculating percentages mentally Calculating percentages on paper Calculating percentages with a calculator

	Adding and subtracting integers Adding and subtracting integers activities Multiplying and dividing integers Using negative numbers in context Written methods for addition and subtraction Written methods for multiplication Written methods for division Calculating percentages mentally Calculating percentages on paper Calculating percentages with a calculator
8. Develop and analyze algorithms for computing with percents and integers, and demonstrate fluency in their use.	Calculating percentages with a calculator
9. Represent and solve problem situations that can be modeled by and solved using concepts of absolute value, exponents and square roots (for perfect squares).	Absolute value Powers Square roots
<b>Measurement Standard</b>	
<i>Measurement Units</i>	
1. Select appropriate units for measuring derived measurements; e.g., miles per hour, revolutions per minute.	-
2. Convert units of area and volume within the same measurement system using proportional reasoning and a reference table when appropriate; e.g., square feet to square yards, cubic meters to cubic centimeters.	Converting metric units Customary unit conversions Conversion graphs Direct variations Area Volume
<i>Use Measurement Techniques and Tools</i>	
3. Estimate a measurement to a greater degree of precision than the tool provides.	Estimating measurements Measuring angles
4. Solve problems involving proportional relationships and scale factors; e.g., scale models that require unit conversions within the same measurement system.	Using scale factors Scale drawings Converting metric units Customary unit conversions Direct proportion Ratio and proportion problems

<p>5. Analyze problem situations involving measurement concepts, select appropriate strategies, and use an organized approach to solve narrative and increasingly complex problems.</p>	<p>Estimating measurements  Using scale factors  Converting metric units  Customary unit conversions  Area  Area problems  Area of irregular shapes  Area of a circle  Triangles  Quadrilaterals  Polygons  Circles  Cylinders, cones and spheres  Volume  Surface area  Solid shapes</p>
<p>6. Use strategies to develop formulas for finding area of trapezoids and volume of cylinders and prisms.</p>	<p>Area  Area problems  Cylinders, cones and spheres  Volume  Formulas for shapes</p>
<p>7. Develop strategies to find the area of composite shapes using the areas of triangles, parallelograms, circles and sectors.</p>	<p>Area  Area problems  Area of irregular shapes  Area of a circle  Triangles  Quadrilaterals  Polygons  Circles</p>
<p>8. Understand the difference between surface area and volume and demonstrate that two objects may have the same surface area, but different volumes or may have the same volume, but different surface areas.</p>	<p>Surface area  Volume</p>
<p>9. Describe what happens to the surface area and volume of a three-dimensional object when the measurements of the object are changed; e.g., length of sides are doubled.</p>	<p>-</p>

<b>Geometry and Spatial Sense Standard</b>	
<i>Characteristics and Properties</i>	
1. Use proportional reasoning to describe and express relationships between parts and attributes of similar and congruent figures.	Congruence Dilation Finding missing lengths Scale drawings
2. Determine sufficient (not necessarily minimal) properties that define a specific two-dimensional figure or three-dimensional object. For example: a. Determine when one set of figures is a subset of another; e.g., all squares are rectangles. b. Develop a set of properties that eliminates all but the desired figure; e.g., only squares are quadrilaterals with all sides congruent and all angles congruent.	Quadrilaterals Triangles Polygons Circles Solid shapes Cylinders, cones and spheres
3. Use and demonstrate understanding of the properties of triangles. For example: a. Use Pythagorean Theorem to solve problems involving right triangles. b. Use triangle angle sum relationships to solve problems.	Pythagorean Theorem Identifying right triangles Pythagorean triples Calculation sides of right triangles Triangles Angles in a triangle
4. Determine necessary conditions for congruence of triangles.	Congruence Triangles
5. Apply properties of congruent or similar triangles to solve problems involving missing lengths and angle measures.	Congruence Finding missing lengths Triangles Dilation
<i>Spatial Relationships</i>	
6. Determine and use scale factors for similar figures to solve problems using proportional reasoning.	Congruence Finding missing lengths Dilation Direct proportion Using scale factors Scale drawings
<i>Transformations and Symmetry</i>	
7. Identify the line and rotation symmetries of two-dimensional figures to solve problems.	Reflection symmetry Rotational symmetry

8. Perform translations, reflections, rotations and dilations of two-dimensional figures using a variety of methods (paper folding, tracing, graph paper).	Translations Reflection Rotation Dilation Combining transformations
<i>Visualization and Geometric Models</i>	
9. Draw representations of three-dimensional geometric objects from different views.	Views of 3-D shapes 2-D representations of 3-D shapes
<b>Patterns, Functions and Algebra Standard</b>	
<i>Use Patterns, Relations and Functions</i>	
1. Represent and analyze patterns, rules and functions with words, tables, graphs and simple variable expressions.	Introducing sequences Sequences from geometrical patterns Describing and continuing sequences Generating sequences from flow charts Generating sequences and rules Finding the nth term Sequences from practical contexts Function machines Mapping functions Inverse functions Graphs of functions Function notation and relations Writing expressions Graphs of functions Graphs of nonlinear functions
2. Generalize patterns by describing in words how to find the next term.	Finding the nth term
3. Recognize and explain when numerical patterns are linear or nonlinear progressions; e.g., 1,3,5,7... is linear and 1,3,4,8,16... is nonlinear.	Describing and continuing sequences
<i>Use Algebraic Representations</i>	
4. Create visual representations of equation-solving processes that model the use of inverse operations.	Solving simple equations Transforming formulas Equations involving parentheses and division

5. Represent linear equations by plotting points in the coordinate plane.	Introducing coordinates Reading and plotting graphs The equation of a straight line Conversion graphs Distance-time graphs Graphs of functions
6. Represent inequalities on a number line or a coordinate plane.	Inequalities Inequalities on a number line Inequalities and regions Combined linear inequalities
7. Justify that two forms of an algebraic expression are equivalent, and recognize when an expression is simplified; e.g., $4m = m + m + m + m$ or $a \cdot 5 + 4 = 5a + 4$ .	Writing expressions Combining like terms
8. Use formulas in problem-solving situations.	Introducing formulas Using formulas Transforming formulas Deriving formulas
9. Recognize a variety of uses for variables; e.g., placeholder for an unknown quantity in an equation, generalization for a pattern, formula.	Writing expressions Introducing formulas
<i>Analyze Change</i>	
10. Analyze linear and simple nonlinear relationships to explain how a change in one variable results in the change of another.	Solving simple equations Direct variations Nonlinear equations Nonlinear equations and spreadsheets
11. Use graphing calculators or computers to analyze change; e.g., distance-time relationships.	-
<b>Data Analysis and Probability Standard</b>	
<i>Data Collection</i>	
1. Read, create and interpret box-and-whisker plots, stem-and-leaf plots, and other types of graphs, when appropriate.	Appropriate graphs Bar graphs Circle graphs Line graphs Histograms Quartiles and box plots

<p>2. Analyze how decisions about graphing affect the graphical representation; e.g., scale, size of classes in a histogram, number of categories in a circle graph.</p>	<p>Appropriate graphs  Bar graphs  Circle graphs  Line graphs  Circle graphs  Histograms  Quartiles and box plots  Misleading graphs</p>
<p><i>Statistical Methods</i></p>	
<p>3. Analyze a set of data by using and comparing combinations of measures of center (mean, mode, median) and measures of spread (range, quartile, interquartile range), and describe how the inclusion or exclusion of outliers affects those measures.</p>	<p>Calculating the mean  Finding the median  Finding the mode  Finding the range  Interquartile range  Quartiles and box plots  Calculating statistics</p>
<p>4. Construct opposing arguments based on analysis of the same data, using different graphical representations.</p>	<p>Appropriate graphs  Bar graphs  Circle graphs  Line graphs  Histograms  Quartiles and box plots  Misleading graphs  Comparing data  Organizing data</p>
<p>5. Compare data from two or more samples to determine how sample selection can influence results.</p>	<p>Population and sampling</p>
<p>6. Identify misuses of statistical data in articles, advertisements, and other media.</p>	<p>Misleading graphs</p>
<p><i>Probability</i></p>	
<p>7. Compute probabilities of compound events; e.g., multiple coin tosses or multiple rolls of number cubes, using such methods as organized lists, tree diagrams and area models.</p>	<p>Probability diagrams</p>
<p>8. Make predictions based on theoretical probabilities, design and conduct an experiment to test the predictions, compare actual results to predicted results, and explain differences.</p>	<p>Experimental probability  Calculating probability part 1  The language of probability</p>

<b>Grade 8</b>	
<b>Number, Number Sense and Operations Standard</b>	
<i>Number and Number Systems</i>	
1. Use scientific notation to express large numbers and small numbers between 0 and 1.	Scientific notation
2. Recognize that natural numbers, whole numbers, integers, rational numbers and irrational numbers are subsets of the real number system.	-
<i>Meaning of Operations</i>	
3. Apply order of operations to simplify expressions and perform computations involving integer exponents and radicals.	Order of operations and PEMDAS
4. Explain and use the inverse and identity properties and use inverse relationships (addition/subtraction, multiplication/division, squaring/square roots) in problem solving situations.	Properties of numbers Solving simple equations
<i>Computation and Estimation</i>	
5. Determine when an estimate is sufficient and when an exact answer is needed in problem situations, and evaluate estimates in relation to actual answers; e.g., very close, less than, greater than.	Estimation and approximation Rounding

	Ratio and rate Direct proportion Dividing in a given ratio Comparing proportions Percentage change Percentages and inverse operations Ratio and proportion problems Calculating percentages mentally Calculating percentages on paper Calculating percentages using a calculator Multiplying fractions Dividing by fractions Fractions and decimals Mental multiplication Mental division Adding and subtracting simple fractions Methods for adding and subtracting fractions Finding a fraction of an amount Adding and subtracting integers Adding and subtracting integers activities Multiplying and dividing integers Checking results One number as a fraction of another
6. Estimate, compute and solve problems involving rational numbers, including ratio, proportion and percent, and judge the reasonableness of solutions.	
7. Find the square root of perfect squares, and approximate the square root of non-perfect squares as consecutive integers between which the root lies;	Square roots Estimation and approximation
8. Add, subtract, multiply, divide and compare numbers written in scientific notation.	Scientific notation
<b>Measurement Standard</b>	
<i>Measurement Units</i>	
1. Compare and order the relative size of common U.S. customary units and metric units; e.g., mile and kilometer, gallon and liter, pound and kilogram.	Customary unit conversion Converting metric units
2. Use proportional relationships and formulas to convert units from one measurement system to another; e.g., degrees Fahrenheit to degrees Celsius.	Customary unit conversion Converting metric units Conversion graphs Direct variations Using negative numbers in context

<i>Use Measurement Techniques and Tools</i>	
3. Use appropriate levels of precision when calculating with measurements.	Estimating measurements
4. Derive formulas for surface area and volume and justify them using geometric models and common materials. For example, find: a. the surface area of a cylinder as a function of its height and radius; b. that the volume of a pyramid (or cone) is one-third of the volume of a prism (or cylinder) with the same base area and height.	Surface area Volume Cylinders, cones and spheres
5. Determine surface area for pyramids by analyzing their parts.	Surface area
6. Solve and determine the reasonableness of the results for problems involving rates and derived measurements, such as velocity and density, using formulas, models and graphs.	Checking results Reading and plotting graphs Conversion graphs Distance-time graphs Interpreting graphs Using formulas Transforming formulas
7. Apply proportional reasoning to solve problems involving indirect measurements or rates.	Direct proportion Ratio and proportion problems Finding missing lengths
8. Find the sum of the interior and exterior angles of regular convex polygons with and without measuring the angles with a protractor.	The sum of the interior and exterior angles Measuring angles
9. Demonstrate understanding of the concepts of perimeter, circumference and area by using established formulas for triangles, quadrilaterals, and circles to determine the surface area and volume of prisms, pyramids, cylinders, spheres and cones. (Note: Only volume should be calculated for spheres and cones.)	Perimeter Circumference of a circle Area Area of a circle Area problems Area of irregular shapes Triangles Quadrilaterals Circles Surface area Volume Cylinders, cones and spheres Polygons Solid shapes Formulas for shapes

10. Use conventional formulas to find the surface area and volume of prisms, pyramids and cylinders and the volume of spheres and cones to a specified level of precision.	Surface area Cylinders, cones and spheres Volume Formulas for shapes
<b>Geometry and Spatial Sense Standard</b>	
<i>Characteristics and Properties</i>	
1. Make and test conjectures about characteristics and properties (e.g., sides, angles, symmetry) of two-dimensional figures and three-dimensional objects.	Labeling lines and angles Parallel and perpendicular lines Calculating angles Angles made with parallel lines Angles in a triangle Angles in polygons The sum of interior and exterior angles Triangles Quadrilaterals Polygons Congruence Circles Solid shapes Reflection symmetry Rotational symmetry Perimeter Area Area problems Area of irregular shapes Area of a circle Circumference of a circle Surface area Volume Cylinders, cones and spheres Pythagorean Theorem Pythagorean triples Calculating sides of right triangles
2. Recognize the angles formed and the relationship between the angles when two lines intersect and when parallel lines are cut by a transversal.	Angles made with parallel lines Calculating angles

3. Use proportions in several forms to solve problems involving similar figures (part-to-part, part-to-whole, corresponding sides between figures).	Congruence Finding missing lengths Dilation Scale drawings
<i>Spatial Relationships</i>	
4. Represent and analyze shapes using coordinate geometry; e.g., given three vertices and the type of quadrilateral, find the coordinates of the fourth vertex.	Quadrilaterals on a coordinate grid
<i>Transformations and Symmetry</i>	
5. Draw the results of translations, reflections, rotations and dilations of objects in the coordinate plane, and determine properties that remain fixed; e.g., lengths of sides remain the same under translations.	Reflection Rotation Translations Dilation Combining transformations
<i>Visualization and Geometric Models</i>	
6. Draw nets for a variety of prisms, pyramids, cylinders and cones.	Nets Constructing nets Cylinders, cones and spheres
<b>Patterns, Functions and Algebra Standard</b>	
<i>Use Patterns, Relations and Functions</i>	
1. Relate the various representations of a relationship; i.e., relate a table to graph, description and symbolic form.	Function machines Inverse functions Mapping functions Graphs of functions The equations of a straight line Function notation and relations
2. Generalize patterns and sequences by describing how to find the nth term.	Finding the nth term
3. Identify functions as linear or nonlinear based on information given in a table, graph or equation.	Graphs of functions Graphs of nonlinear functions Exploring nonlinear graphs
<i>Use Algebraic Representations</i>	
4. Extend the uses of variables to include covariants where y depends on x.	The equation of a straight line Mapping functions Function machines Graphs of functions

5. Use physical models to add and subtract monomials and polynomials, and to multiply a polynomial by a monomial.	Multiplying algebraic terms Dividing algebraic terms Equations with variables on both sides Nonlinear equations Factoring expressions
6. Describe the relationship between the graph of a line and its equation, including being able to explain the meaning of slope as a constant rate of change and y-intercept in real-world problems.	The equation of a straight line Graphs of nonlinear functions
7. Use symbolic algebra (equations and inequalities), graphs and tables to represent situations and solve problems.	Direct proportion Introducing formulas Using formulas Transforming formulas Reading and plotting graphs Conversion graphs Distance-time graphs Interpreting graphs Solving linear inequalities Deriving formulas
8. Write, simplify and evaluate algebraic expressions (including formulas) to generalize situations and solve problems.	Deriving formulas Writing expressions Using formulas Transforming formulas Introducing formulas Factoring expressions Substitution Solving simple equations Sequences from practical contexts
9. Solve linear equations and inequalities graphically, symbolically and using technology.	Solving simple equations Inequalities and regions Inequalities on a number line Solving linear inequalities Combined linear inequalities
10. Solve 2 by 2 systems of linear equations graphically and by simple substitution.	Systems of linear equations
11. Interpret the meaning of the solution of a 2 by 2 system of equations; i.e., point, line, no solution.	Systems of linear equations
12. Solve simple quadratic equations graphically;	Graphs of nonlinear functions Exploring nonlinear graphs

13. Compute and interpret slope, midpoint and distance given a set of ordered pairs.	Graphs of nonlinear functions Exploring nonlinear graphs Finding the midpoint of a line segment The equation of a straight line
<i>Analyze Change</i>	
14. Differentiate and explain types of changes in mathematical relationships, such as linear vs. nonlinear, continuous vs. noncontinuous, direct variation vs. inverse variation.	Direct variations Exploring nonlinear graphs Nonlinear equations Graphs of functions Graphs of nonlinear functions
15. Describe and compare how changes in an equation affects the related graphs; e.g., for a linear equation changing the coefficient of x affects the slope and changing the constant affects the intercepts.	Direct variations Graphs of functions Graphs of nonlinear functions Exploring nonlinear graphs The equation of a straight line
16. Use graphing calculators or computers to analyze change; e.g., interest compounded over time as a nonlinear growth pattern.	-
<b>Data Analysis and Probability Standard</b>	
<i>Data Collection</i>	
1. Use, create and interpret scatterplots and other types of graphs as appropriate.	Appropriate graphs Scatter plots Bar graphs Histograms Line graphs Circle graphs Quartiles and box plots Misleading graphs
2. Evaluate different graphical representations of the same data to determine which is the most appropriate representation for an identified purpose; e.g., line graph for change over time, circle graph for part-to-whole comparison, scatterplot for relationship between two variants.	Appropriate graphs Scatter plots Bar graphs Histograms Line graphs Circle graphs Quartiles and box plots
3. Differentiate between discrete and continuous data and appropriate ways to represent each.	Organizing data

<i>Statistical Methods</i>	
4. Compare two sets of data using measures of center (mean, mode, median) and measures of spread (range, quartiles, interquartile range, percentiles).	Comparing data Calculating the mean Finding the mode Finding the median Finding the range Interquartile range Quartiles and box plots
5. Explain the mean's sensitivity to extremes and its use in comparison with the median and mode.	Calculating the mean Finding the median Finding the mode Comparing data Calculating statistics
6. Make conjectures about possible relationship in a scatterplot and approximate line of best fit.	Scatter plots
7. Identify different ways of selecting samples, such as survey response, random sample, representative sample and convenience sample.	Population and sampling
8. Describe how the relative size of a sample compared to the target population affects the validity of predictions.	Population and sampling
9. Construct convincing arguments based on analysis of data and interpretation of graphs.	Writing a statistical report Organizing data Appropriate graphs Interpreting graphs Distance-time graphs
<i>Probability</i>	
10. Calculate the number of possible outcomes for a situation, recognizing and accounting for when items may occur more than once or when order is important.	Probability diagrams Calculating probability part 1
11. Demonstrate an understanding that the probability of either of two disjoint events occurring can be found by adding the probabilities for each and that the probability of one independent event following another can be found by multiplying the probabilities.	Probability diagrams Calculating probability part 2