

Maine Mathematics Standards	Boardworks Middle School Math Presentations
Grade 6	
A. NUMBER	
1 Students use factors and multiples.	
a. Identify prime numbers and composite numbers and use their properties to solve problems.	Prime numbers Multiples and factors
b. Use the property that every integer greater than one is a prime number or can be written as a unique product of prime numbers.	Prime numbers Prime factorization
c. Interpret and use exponential notation as repeated multiplication.	Powers
d. Find the least common multiple and greatest common factor of two numbers.	GCF and LCM Multiples and factors
2 Students express fractions greater than 0 as decimals and compare positive numbers that are written as fractions and decimals and place them on the number line.	Ordering decimals Ordering fractions Fractions and decimals Equivalent fractions, decimals and percentages
3 Students add, subtract, multiply, and divide numbers expressed as fractions and as decimals including mixed numbers.	Adding and subtracting simple fractions Methods for adding and subtracting fractions Multiplying fractions Dividing by fractions Mental multiplication Mental division

4 Students understand how to express relative quantities as percentages and as decimals and fractions.	
a. Use ratios to describe relationships between quantities.	Ratio and rate Dividing in a given ratio
b. Use decimals, fractions, and percentages to express relative quantities.	Equivalent fractions, decimals and percentages Introducing percentages
c. Interpret relative quantities expressed as decimals, fractions, and percentages.	Equivalent fractions, decimals and percentages Introducing percentages
5 Students multiply and divide decimals with up to three decimal places by tens, hundreds, and thousands.	Place value Mental multiplication Mental division Written methods for multiplication Written methods for division
B. DATA	
1 Students convert within measurement systems.	
a. Solve problems where different units are used within the metric and traditional systems of measurement.	Customary unit conversions Converting metric units
2 Students read and interpret pie charts.	Circle graphs
3 Students find and compare the mean, median, mode, and range for sets of data.	Calculating the mean Finding the median Finding the mode Finding the range

C. GEOMETRY	
1 Students represent solid figures in two dimensions.	
a. Represent cubes, prisms, and square-based or triangular-based pyramids using nets.	Nets Constructing nets
b. Recognize and classify solids presented in picture views.	2-D representations of 3-D shapes Views of 3-D shapes
c. Sketch three- dimensional figures.	2-D representations of 3-D shapes
2 Students find the perimeters and areas of geometric figures.	
a. Triangles	Perimeter Area
b. Quadrilaterals	Area problems Using formulas Perimeter Area
c. Circles	Circumference of a circle Area of a circle
3 Students find the volume and surface areas of right prisms with bases that are triangles and quadrilaterals.	Volume Surface area
4 Students understand and use reflections, rotations, and translations to define and identify congruent plane figures.	

<p>a. Apply the understanding that if a plane figure can be laid on top of another plane figure by rotations, translations, or reflections then the figures are congruent.</p>	<p>Congruence Reflection Rotation Translation Dilation Combing transformations</p>
<p>5 Students understand how to use proportional relationships to make indirect linear measurements and use scale drawings to make linear measurements.</p>	<p>Scale drawings Finding missing lengths Dilation</p>
<p>D. ALGEBRA</p>	
<p>1 Students create and evaluate expressions.</p>	<p></p>
<p>a. Create and evaluate expressions using whole numbers.</p>	<p>Writing expressions Combining like terms Substitution Factoring expressions Introducing formulas</p>
<p>b. Create and evaluate expressions using positive fractions including decimals.</p>	<p>-</p>
<p>2 Students recognize and solve problems involving linear equations and recognize examples and non-examples of linear equations.</p>	<p></p>

a. Solve equations of the form $ax \pm b = c$ where a, b, and c are whole numbers.	The equation of a straight line Graphs of functions Solving simple equations
b. Recognize from a table whether a relationship has a constant rate of change.	The equation of a straight line Reading and plotting graphs Distance-time graphs Conversion graphs Interpreting graphs
3 Students use tables, formulas, diagrams, and graphs to analyze relationships between quantities.	
a. Use tables, formulas and graphs to analyze constant difference (additive) relationships.	Graphs of functions The equation of a straight line Reading and plotting graphs Generating sequences and rules Describing and continuing sequences
b. Use tables, formulas, and graphs to analyze constant ratio (multiplicative) relationships.	Graphs of functions The equation of a straight line Reading and plotting graphs Generating sequences and rules Describing and continuing sequences

Grade 7	
A. NUMBER	
1 Students use negative and positive rational numbers expressed as integers, fractions, and decimals.	
a. Recognize rational numbers as quotients of integers with a non-zero denominator and recognize that rational numbers can be negative or positive.	Rational and irrational numbers
b. Compare signed rational numbers and place them on the number line.	Ordering integers Ordering decimals Ordering fractions Using negative numbers in context
2 Students compute with signed rational numbers.	
a. Use and interpret exponents.	Powers
b. Follow conventions of order of operations including exponents.	Order of operations and PEMDAS
c. Solve problems using signed rational numbers.	Adding and subtracting integers Adding and subtracting integers activities Multiplying and dividing integers Adding and subtracting simple fractions Methods for adding and subtracting fractions Multiplying fractions Dividing by fractions Mental multiplication Mental division Mental math puzzles
3 Students understand that when the ratio of two varying quantities is constant, the two quantities are in direct proportion.	

a. Use ratios to compare quantities and use comparison to solve problems.	Ratio and rate Direct proportion Ratio and proportion problems
b. Identify proportional relationships.	Ratio and rate Direct proportion Direct variations
c. Use proportions to solve problems.	Ratio and rate Direct proportion Dividing in a given ratio Ratio and proportion problems Direct variations
4 Students interpret and use percents to solve problems.	
a. Use percents when comparing fractional parts of sets of unequal size.	Comparing proportions
b. Solve practical problems involving percents.	Calculating percentages mentally Calculating percentages on paper Calculating percentages with a calculator Percentage change Percentages and inverse operations
B. DATA	
1 Students use graphs and charts to represent, organize, interpret, and draw inferences from data.	

<p>a. Create tables, pictograms, bar graphs, line graphs, pie charts, stem and leaf plots, box and whiskers plots, and histograms using pencil and paper and electronic technologies.</p>	<p>Appropriate graphs Line graphs Bar graphs Circle graphs Scatter plots Histograms Quartiles and box plots</p>
<p>b. Draw conclusions based on graphs and charts including tables, pictograms, bar graphs, line graphs, pie charts, stem and leaf plots, box and whiskers plots, and histograms.</p>	<p>Reading and plotting graphs Interpreting graphs Appropriate graphs Line graphs Bar graphs Circle graphs Scatter plots Histograms Quartiles and box plots</p>
<p>2 Students understand and apply concepts of probability to simple events.</p>	
<p>a. Describe events as likely or unlikely and discuss the concept of likelihood using such words phrases as “certain”, “equally likely”, and “impossible”.</p>	<p>The language of probability The probability scale</p>
<p>b. Predict the probability of outcomes of simple experiments and verify predictions using the understanding that the probability of an occurrence is the ratio of the number of actual occurrences to the number of possible occurrences.</p>	<p>Experimental probability The language of probability</p>
<p>c. Interpret probabilities between and including zero and one and explain why zero and one are the upper and lower limits for probability values.</p>	<p>The probability scale</p>

C. GEOMETRY	
1 Students understand angle properties of lines in the plane.	
a. Identify and name straight angles, angles at a point, and vertical angles and use these measures to find the measures of unknown angles.	Calculating angles
b. Recognize that the measures that form straight angles add to 180 degrees and the measures of angles at a point add to 360 degree and apply this property to solve problems.	Calculating angles
c. Recognize that vertical angles are congruent and apply this property to solve problems.	Calculating angles
2 Students solve problems involving perimeter and area.	
a. Solve problems involving the area and perimeter of regions in the plane bounded by line segments and circular arcs.	Area of a circle Circumference of a circle
b. Solve problems involving the area of combined figures.	Area of irregular shapes
3 Students understand and use the concept of scale drawings to enlarge or reduce two-dimensional plane figures.	
a. Use the concept of scale factors when enlarging or reducing and recognize the invariance of shape.	Dilation Finding missing lengths Scale drawings Using scale factors
b. Apply the understanding that enlargement or reduction by a scale factor leaves angle measures unchanged.	Dilation Finding missing lengths Scale drawings Congruence
c. Identify similar figures and name corresponding parts.	Dilation Finding missing lengths Congruence

D. ALGEBRA	
1 Students create and evaluate expressions.	
a. Create and evaluate expressions using integers.	Writing expressions Combining like terms Factoring expressions Substitution
b. Create and evaluate expressions using rational numbers.	Writing expressions Combining like terms Factoring expressions Substitution
2 Students understand and solve problems involving linear equations and know that a linear equation can be written in the form $0 = ax + b$.	
a. Solve equations of the form $ax + b = c$ where a, b, and c are positive rational numbers or positive or negative integers.	The equation of a straight line Solving simple equations
b. Convert equations to $0 = ax + b$ form.	Nonlinear equations
3 Students understand and use directly proportional relationships, $y = kx$.	
a. Recognize directly proportional relationships by information in a table, graph, or formula.	Direct variations Distance-time graphs Conversion graphs Direct proportion
b. Translate common directly proportional relationships into symbolic statements and graphs.	Distance-time graphs Conversion graphs
c. Interpret the slope and y-intercept of the graph of $y = kx$ in terms of a given context.	Direct variations

Grade 8	
A. NUMBER	
1 Students express or interpret numbers using scientific notation from real-life contexts.	
a. Use positive and negative integer exponents for powers of ten.	Powers Scientific notation
b. Convert between standard and scientific notation forms and compare the relative size of numbers including the interpretation of numbers as displayed on calculators and computers.	Scientific notation Using a calculator
2 Students understand the set of real numbers as containing the rational numbers and the irrational numbers.	
a. Know that there are real numbers that are not rational numbers.	-
b. Know some common examples of irrational numbers including pi or those arising from square roots.	Rational and irrational numbers
c. Use square roots. Be able to estimate the value of the square roots of whole numbers and place them on the number line.	Square roots Estimation and approximation
B. DATA	
1 Students understand and use derived measures (measurements expressed as rates).	
a. Calculate measures using multiple attributes including speed (distance per time).	Distance-time graphs Reading and plotting graphs
b. Solve for an unknown component of a measure including finding time given average speed and distance.	Using formulas
2 Students convert across measurement systems and within a system for different units in derived measures.	
a. Approximate metric and customary equivalents given a conversion factor.	Converting metric units Customary unit conversions

b. Convert derived measures, including feet per second to miles per hour.	Converting metric units Customary unit conversions
3 Students use the mean, median, mode, range, and quartiles to solve problems involving raw data and information from data displays.	Calculating the mean Finding the median Finding the mode Finding the range Interquartile range Quartiles and box plots
4 Students understand and apply concepts of probability.	
a. Use appropriate terminology to describe complementary and mutually exclusive events.	Calculating probability part 2
b. Use an understanding of relative frequency to make and test conjectures about results of experiments and simulations.	Experimental probability
c. Compute probabilities for compound events, using such methods as organized lists, tree diagrams, and area models.	Probability diagrams
C. GEOMETRY	
1 Students know and use properties of polygons.	
a. Apply the triangle inequality.	-
b. Find the sum of the measures of the interior angles of a polygon.	The sum of interior and exterior angles
c. Apply the property that the sum of the measures of the exterior angles of a polygon is 360 degrees.	The sum of interior and exterior angles
2 Students know and use angle properties of parallel lines to solve problems and determine geometric relationships.	
a. Know and use properties of angles created when parallel lines are cut by a transversal.	Angles made with parallel lines
b. Use angle properties to determine whether lines are parallel.	Parallel and perpendicular lines Angles made with parallel lines
c. Know and use properties of angles created by parallel lines and transversals to determine the angle properties of trapezoids and parallelograms, and apply these properties in problem situations.	Angles made with parallel lines

3 Students know and use the Pythagorean Theorem.	Pythagorean Theorem Pythagorean triples Identifying right triangles Calculating sides of right triangles
4 Students find the volume and surface area of prisms, pyramids, cylinders, and other figures composed of these solids.	
a. Apply the understanding that the volume of prisms and cylinders can be found by multiplying the area of a base by the height of the solid.	Volume Cylinders, cones and spheres
b. Apply the understanding that the volume of pyramids can be found by multiplying the area of a base by 1/3 the height of the solid.	Cylinders, cones and spheres
c. Apply the understanding that the surface area of a figure is the sum of the areas of its faces and find the surface areas of cylinders	Surface area Cylinders, cones and spheres
D. ALGEBRA	
1 Students create, evaluate, and manipulate expressions.	
a. Create and evaluate expressions using real numbers.	Writing expressions Combining like terms Factoring expressions Substitution
b. Add and subtract linear expressions.	Equations with variables on both sides
c. Apply the properties of the real number system, including distributive and associative laws, to create equivalent expressions.	Properties of numbers
2 Students understand and solve problems involving linear equations.	
a. Solve any linear equation including linear equations of the form $ax + b = cx + d$.	Systems of linear equations
b. Recognize that, in general, linear equations have just one solution but know also that some linear equations can have no solution and those linear equations that are identities have every value of x as a solution.	Systems of linear equations Mapping functions

c. Use graphs to estimate solutions to equations and systems of equations, check algebraic approaches, provide alternative solution paths, and communicate the solution to a problem.	Systems of linear equations Reading and plotting graphs Graphs of functions Graphs of nonlinear functions Exploring nonlinear graphs Direct variations
3 Students understand and solve linear inequalities in one unknown.	
a. Represent problem situations as inequalities.	Inequalities Inequalities on a number line Solving linear inequalities
b. Solve linear inequalities.	Solving linear inequalities Integer solutions to inequalities
c. Interpret the solutions to linear inequalities.	Inequalities Inequalities on a number line Solving linear inequalities Integer solutions to inequalities Combined linear inequalities
4 Students understand and use the basic properties of linear relationships, $y = kx + b$.	
a. Understand that linear relationships are characterized by a constant rate of change, k .	The equation of a straight line Direct variations
b. Understand that the graph of a linear relationship $y = kx + b$ is a line where the slope is k and b is the y -coordinate of the point where the graph crosses the y -axis (i.e., value of y when $x = 0$).	The equation of a straight line
c. Translate common linear phenomena into symbolic statements and graphs, and interpret the slope and y -intercept of the graph of $y = kx + b$ in terms of the original situation.	The equation of a straight line Reading and plotting graphs Conversion graphs