Pocantico Hills School District
Grade 8 Math Curriculum Draft

Algebra

Content Strands: Performance Indicators

8.N.2 Evaluate expressions with integral exponents
8.N.1 Develop and apply the laws of exponents for multiplication and division
8.A.2 Write verbal expressions that match given mathematical expressions
8.A.1 Translate verbal sentences into algebraic inequalities
8.A.15 Understand that numerical information can be represented in multiple ways: arithmetically, algebraically, and graphically
8.A.5 Use physical models to perform operations with polynomials
8.A.7 Add and subtract polynomials (integer coefficients)
8.A.6 Multiply and divide monomials
8.A.8 Multiply a binomial by a monomial or a binomial (integer coefficients)
8.A.9 Divide a polynomial by a monomial (integer coefficients) ***Note: The degree of the denominator is less than or equal to the degree of the numerator for all variables***
8.A.10 Factor algebraic expressions using the GCF
8.A.11 Factor a trinomial in the form $ax^2 + bx + c$; a=1 and c having no more than three sets of factors
8.A.3 Describe a situation involving relationships that matches a given graph
8.A.4 Create a graph given a description or an expression for a situation involving a linear or nonlinear relationship
8.A.16 Find a set of ordered pairs to satisfy a given linear numerical pattern (expressed algebraically); then plot the ordered pairs and draw the line

Process Strands: Performance Indicators

8.PS.5 Make conjectures from generalizations
8.PS.6 Represent problem situations verbally, numerically, algebraically, and graphically
8.PS.7 Understand that there is no one right way to solve mathematical problems but that different methods have advantages and disadvantages
8.PS.3 Understand and demonstrate how written symbols represent mathematical ideas
8.PS.15 Choose methods for obtaining required information
8.RP.1 Recognize that mathematical ideas can be supported by a variety of strategies
8.RP.2 Use mathematical strategies to reach a conclusion
8.RP.4 Provide supportive arguments for conjectures
8.RP.7 Devise ways to verify results or use counterexamples to refute incorrect statements
8.CM.1 Provide a correct, complete, coherent, and clear rationale for thought process used in problem solving
8.CM.6 Analyze mathematical solutions shared by others
8.CM.7 Compare strategies used and solutions found by others in relation to their own work
8.PS.9 Work backwards from a solution
8.CM.10 Use appropriate language, representations, and terminology when describing objects, relationships, mathematical solutions, and rationale
8.CM.11 Draw conclusions about mathematical ideas through decoding, comprehension and interpretation of mathematical visuals, symbols and technical writing

8.CN.2 Recognize connections between subsets of mathematical ideas
8.CN.3 Connect and apply a variety of strategies to solve problems
8.CN.7 Apply mathematical ideas to problem situations that develop outside of mathematics
8.R.6 Use representations to explore problem situations
8.R.2 Explain, describe, and defend mathematical ideas using representations
8.R.4 Explain how different representations express the same relationship

Vocabulary

algebraic
algebraic expression
algebraically
arithmetically
binomial
combine like terms
degree of a polynomial
domain
factor
graphically
integral exponent
law of exponents for multiplication and division
line
linear equation
monomial
nonlinear equation or inequality
numerically
operations
ordered pair
polynomial
quadratic equation
range of a function
relation
simplify expressions
solution set
trinomial
verbal expression
verbal form
written symbol

Geometry

<u>Content Strands: Performance Indicators:</u>
8.G.1 Identify pairs of vertical angles as congruent
8.G.2 Identify pairs of supplementary and complementary angles
8.G.3 Calculate the missing angle in a supplementary or complementary pair
8.G.6 Calculate the missing angle measurements when given two intersecting lines and an angle
8.G.4 Determine angle pair relationships when given two parallel lines cut by a transversal
8.G.5 Calculate the missing angle measurements when given two parallel lines cut by a transversal
8.A.12 Apply algebra to determine the measure of angles formed by or contained in parallel lines cut by a transversal and by intersecting lines
8.G.7 Describe and identify transformations in the plane, using proper function notation (rotations, reflections, translations, and dilations)
8.G.8 Draw the image of a figure under rotations of 90 and 180 degrees
8.G.9 Draw the image of a figure under a reflection over a given line
8.G.10 Draw the image of a figure under a translation
8.G.11 Draw the image of a figure under a dilation
8.G.12 Identify the properties preserved and not preserved under a reflection, rotation, translation, and dilation

Process Strands: Performance Indicators

8.PS.14 Determine information required to solve the problem
8.PS.16 Justify solution methods through logical argument
8.PS.17 Evaluate the efficiency of different representations of a problem
8.RP.5 Develop, verify and explain an argument using appropriate mathematical ideas and language
8.RP.6 Support an argument by using a systematic approach to test more than one case
8.CM.3 Organize and accurately label work
8.CM.4 Share organized mathematical ideas through the manipulation of objects, numerical tables, drawings, pictures, charts, graphs, tables, diagrams, models and symbols in written and verbal form
8.CM.9 Increase use of mathematical vocabulary and language when communicating with others
8.CN.6 Recognize and provide examples of the presence of mathematics in their daily lives
8.R.1 Use physical objects, drawings, charts, tables, graphs, symbols, equations, and objects created using technology as representations

Vocabulary:

alternate exterior angles	***alternate interior angles***
angle pairs	***bisector***
complementary angles	***congruent***
corresponding angles	***dilation***
equation	***equidistant***
exterior angle of a polygon	***fixed distance***
formally	***image***
informally	***interior angle***
line	***line of symmetry***
parallel lines	***perpendicular bisector***
pre-image	***preserved***
reflection	***rotation***
rotational symmetry	***spatial reasoning***
supplementary angles	***symmetry***
system of equations	***transformation***
translation	***transversal***
vertical	***vertical angles***
vertical line test	***visual***

Proportional Reasoning

Content Strands: Performance Indicators

8.N.3 Read, write, and identify percents less than 1% and greater than 100%
8.N.4 Apply percents to: tax, percent increase/decrease, simple interest, sale price, commission, interest rates, and gratuities
8.M.1 Solve equations/proportions to convert to equivalent measurements within metric and customary measurement systems Note: Also allow Fahrenheit to Celsius and vice versa
8.N.5 Estimate a percent of quantity, given an application
8.N.6 Justify the reasonableness of answers using estimation

Process Strands: Performance Indicators

8.PS.8 Understand how to break a complex problem into simpler parts or use a similar problem type to solve a problem
8.PS.10 Use proportionality to model problems
8.PS.11 Work in collaboration with others to solve problems
8.PS.12 Interpret solutions within the given constraints of a problem
8.PS.13 Set expectations and limits for possible solutions
8.RP.2 Use mathematical strategies to reach a conclusion
8.RP.3 Evaluate conjectures by distinguishing relevant from irrelevant information to reach a conclusion or make appropriate estimates
8.CM.2 Provide an organized argument which explains rationale for strategy selection
8.CM.5 Answer clarifying questions from others
8.CN.9 Recognize and apply mathematics to other disciplines, areas of interest, and societal issues
8.CN.8 Investigate the presence of mathematics in careers and areas of interest
8.R.5 Use standard and non-standard representations with accuracy and detail
8.CN.5 Understand how concepts, procedures and mathematical results in one area of mathematics can be used to solve problems in other areas of mathematics
8.R.8 Use representation as a tool for exploring and understanding mathematical ideas
8.R.9 Use mathematics to show and understand physical phenomena (i.e., make and interpret scale drawings of figures or scale models of objects)
8.R.10 Use mathematics to show and understand social phenomena (i.e., determine profit from sale of yearbooks)

Vocabulary:

Celsius	***commission***
convert	***evaluate***
Fahrenheit	***gratuity***
greatest common factor	***income***
interest	***interest rate***
percent	***percent decrease***
percent increase	***profit***
proportion	***sales price***
simple interest	***tax***

Algebra & Geometry

Content Strands: Performance Indicators

8G.19 Graph the solution set of an inequality on a number line
8.A.13 Solve multi-step inequalities and graph the solution set on a number line
8.A.14 Solve linear inequalities by combining like terms, using the distributive property, or moving variables to one side of the inequality (include multiplication or division of inequalities by a negative number
8.A.17 Define and use correct terminology when referring to function (domain and range)
8.A.18 Determine if a relation is a function
8.G.15 Graph a line using a table of values
8.A.19 Interpret multiple representations using equation, table of values, and graph

8.G.13 Determine the slope of a line from a graph and explain the meaning of slope as a constant rate of change
8.G.14 Determine the y-intercept of a line from a graph and be able to explain the y- intercept
8.G.16 Determine the equation of a line given the slope and the y-intercept
8.G.17 Graph a line from an equation in slope-intercept form($y = mx + b$)
8.G.18 Solve systems of equations graphically (only linear, integral solutions, $y=mx + b$ format, (no vertical/horizontal lines)
8.G.20 Distinguish between linear and nonlinear equations $ax^2+ bx + c$; a=1 (only graphically)
8.G.21 Recognize the characteristics of quadratics in tables, graphs, equations, and situations
8.G.0 Construct the following using a straight edge and compass: segment congruent to a segment, angle congruent to an angle, perpendicular bisector, angle bisector

<u>Process Strands: Performance Indicators</u>
8.PS.1 Use a variety of strategies to understand new mathematical content and to develop more efficient methods
8.PS.2 Construct appropriate extensions to problem situations
8.PS.4 Observe patterns and formulate generalizations
8.RP.8 Apply inductive reasoning in making and supporting mathematical conjectures
8.CM.8 Formulate mathematical questions that elicit, extend, or challenge strategies, solutions, and/or conjectures of others
8.CN.1 Understand and make connections among multiple representations of the same mathematical idea
8.CN.4 Model situations mathematically using representations to draw conclusion and formulate new situations
8.R.3 Recognize, compare, and use an array of representational forms
8.R.7 Investigate relationships between different representations and their impact on a given problem
8.R.11 Use mathematics to show and understand mathematical phenomena (i.e. use tables, graphs, and equations to show a pattern underlying a function)

Vocabulary:
angle bisector
compass
construction
function
function notation
rate of change
slope
slope-intercept form
straightedge
system of inequalities
y-intercept