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PARKROSE SCHOOL DISTRICT

COMMON POWER STANDARDS

GRADES K-12

MATH

Grade K – Math

Number and Operations and Algebra

Represent, compare, and order whole numbers, and join and separate sets in contexts that promote problem solving.

- 1) Write whole numbers less than 10
- 2) Identify whole numbers less than 10
- 3) Connect numerals to the quantities they represent
- 4) Count forward by one beginning with any number less than 30
- 5) Add pairs of numbers using less than 10 objects
- 6) Demonstrate knowledge of more than / less than
- 7) Subtract pairs of numbers using less than 10 objects
- 8) Choose appropriate strategies to solve numeric problems

Geometry

Describe shapes and space in contexts that promote problem solving

- 9) Identify basic shapes (square, circle, triangle, rectangle, and oval)

Measurement

Compare and order objects by attributes in contexts that promote problem solving.

- 10) Measure lengths using standard and nonstandard units
- 11) Copy and extend patterns using objects
- 12) Sort, classify, and order objects by attributes (size, color, shape, or other properties)

Grade 1 – Math

Number and Operations

Develop an understanding of whole number relationships, including grouping in tens and ones in contexts that promote problem solving.

- 1) Compare and order whole numbers to at least 100 on a number line
- 2) Identify the number of ones and tens up to 100
- 3) Determine the value of collections of pennies, nickels, and dimes
- 4) Count and group objects in ones and tens

Number and Operations and Algebra

Develop understandings of addition and subtraction and strategies for basic addition facts and related subtraction facts in contexts that promote problem solving.

- 5) Demonstrate when to add and subtract with models when solving problems
- 6) Demonstrate the properties of addition ($4+2 = 2+4$)
- 7) Show how addition and subtraction are related
- 8) Add and subtract up to 10
- 9) Supply missing or extended number patterns involving addition or subtraction by a single-digit number (2, 4, , 8)
- 10) Show when to add or subtract when solving various types of problems

Geometry

Compose and decompose geometric shapes in contexts that promote problem solving.

- 11) Recognize and create shapes that are congruent or have symmetry.
- 12) Build two-dimensional shapes and three-dimensional solids (e.g., cut a square into two right triangles and put two cubes together to make a rectangular prism)
- 13) Sort and classify objects using one or more attributes (color, shape, size)

Grade 2 – Math

Number and Operations

Develop an understanding of the base-ten numeration system and place-value concepts in contexts that promote problem solving.

- 1) Write, compare, and order whole numbers to at least 1000
- 2) Count by ones, twos, fives, tens, and one hundreds
- 3) Make and take apart whole numbers less than one thousand by place value (e.g., 426 as 4 hundreds + 2 tens + 6 ones)
- 4) Show different ways to represent a number (such as 35 represented by 35 ones, 3 tens and 5 ones, or 2 tens and 15 ones)

Number and Operations and Algebra

Develop fluency with addition facts and related subtraction facts and fluency with multi-digit addition and subtraction in contexts that promote problem solving.

- 5) Apply with fluency sums to 20 and related subtraction facts
- 6) Demonstrate an understanding of place value by solving multi-digit addition and subtraction problems using a variety of models
- 7) Estimate sums and differences to find a reasonable outcome
- 8) Determine the value of mixed collections of coins up to \$1.00

Measurement

Develop an understanding of linear measurement and facility in measuring in contexts that promote problem solving

- 9) Demonstrate an understanding that using different measurement units will result in different numerical measurements for the same object
- 10) Use rulers and other measurement tools to estimate and measure length in standard units (centimeter and inch)
- 11) Know how many minutes there are in an hour, days there are in a week, and months in a year
- 12) Tell time to the nearest 5 minutes using analog and digital clocks

Grade 3 – Math

Number and Operations

Develop an understanding of fractions and fraction equivalence in contexts that promote problem solving.

- 1) Represent fractions as equal parts of a whole
- 2) Use fractions to show numbers that are equal to, less than, or greater than one
- 3) Add common fractions with like denominators
- 4) Order, model, compare, and show commonly used fractions (halves, thirds, fourths, eighths, tenths)

Number and Operations, Algebra, and Data Analysis

Develop an understanding of multiplication and division and strategies for basic multiplication facts and related division facts in contexts that promote problem solving.

- 5) Represent multiplication as repeated addition
- 6) Represent division as repeated subtraction
- 7) Apply models of multiplication and division to solve problems
- 8) Use number properties to solve multiplication and division problems involving basic facts
- 9) Understand the relationship between multiplication and division
- 10) Show and explain data using picture graphs, bar graphs, line plots, and data tables
- 11) Describe and extend patterns (3, 6, 9, 12, ...)

Geometry and Measurement: Describe and analyze properties of two-dimensional shapes, including perimeters in contexts that promote problem solving.

- 12) Identify right angles in two-dimensional shapes and determine if angles are greater than or less than a right angle
- 13) Identify right, acute, obtuse angles in two-dimensional shapes
- 14) Combine, take apart, and change polygons to make other polygons
- 15) Build, draw, and describe two-dimensional shapes
- 16) Identify congruence, symmetry, and perimeter of two-dimensional shapes
- 17) Find area and perimeter of polygons

Grade 4 – Math

Number and Operations: Develop an understanding of decimals (to the hundredths), including the connections between fractions and decimals in contexts that promote problem solving.

- 1) Use decimals to represent numbers between whole numbers.
- 2) Compare, order, and estimate fractions to hundredths
- 3) Compare, order, and estimate decimals to hundredths
- 4) Use models and symbols to show equivalent fractions and decimals
- 5) Represent money amounts to \$10.00 in dollars and cents, and making change

Number and Operations, and Algebra: Develop quick recall of multiplication facts and related division facts and fluency with whole number multiplication in contexts that promote problem solving.

- 6) Multiply and divide facts up to 10
- 7) Model the properties of operations of multi-digit $\times$ (commutative, associative, distributive)
- 8) Develop fluency with efficient procedures for multiplying multi-digit whole numbers
- 9) Calculate mentally or use estimation strategies for multiplying when computing with whole numbers

Measurement: Develop an understanding of area and perimeter and determine the areas of two-dimensional shapes in contexts that promote problem solving

- 10) Solve problems involving area
- 11) Solve problems involving perimeter
- 12) Show the difference between area and perimeter
- 13) Use median to find an average of numbers
- 14) Demonstrate appropriate computation skills (addition, subtraction, multiplication, and division)
- 15) Read, write, and order numbers to the millions
- 16) Interpret and predict probability experiments
- 17) Estimate and find standard measurements for length, weight, liquid, volume, and temperature
- 18) Use quadrilaterals to describe sides and angles, and identify reflections, rotations,

and translations

Grade 5 – Math

Number and Operations and Data Analysis

Develop an understanding of and fluency with addition and subtraction of fractions and decimals (to the thousandths) in contexts that promote problem solving.

- 1) Add and subtract fractions with unlike denominators fluently and efficiently
- 2) Add and subtract decimals fluently and efficiently
- 3) Solve problems involving the addition and subtraction of fractions and decimals
- 4) Round whole numbers and decimals to any specified place value
- 5) Estimate fraction and decimal sums and differences
- 6) Apply understanding of whole numbers, fractions, and decimals to construct and analyze double bar and line graphs
- 7) Use ordered pairs on coordinate grids

Number and Operations, and Algebra

Develop an understanding of and fluency with division of whole numbers in contexts that promote problem solving.

- 8) Model place value and order of operations of division (commutative, associative, and distributive)
- 9) Develop fluency with efficient procedures for dividing multi-digit whole numbers and understand why the procedures work on the basis of place value and number properties
- 10) Calculate mentally or use estimation strategies for division when computing with whole numbers
- 11) Determine the most appropriate form of the quotient for the solution according to the context.
- 12) Find factors and multiples of whole numbers less than 100
- 13) Identify prime or composite to 50

Geometry, Measurement and Algebra: Describe three-dimensional shapes and analyze their properties, including volume and surface area in contexts that promote problem solving.

- 14) Describe and name three-dimensional shapes (edges, faces, and/or vertices)
- 15) Estimate and measure volume
- 16) Find surface areas and volumes of prisms by taking apart 3-D shapes

- 17) Show relationships among the areas of triangles and parallelograms
- 18) Use area and volume formulas to solve problems
- 19) Analyze, interpret, and organize data into a variety of graphic organizers
- 20) Develop fluency with efficient procedures for multiplying multi-digit whole numbers
- 21) Calculate mentally or use estimation strategies for multiplying when computing with whole numbers
- 22) Use median to find an average of numbers
- 23) Demonstrate appropriate computation skills (addition, subtraction, multiplication, and division)
- 24) Read, write, and order numbers to the millions

Grade 6– Math

Operations and Properties

- 1) Identify prime and composite numbers less than 100
- 2) Use strategies to estimate the results of positive rational number computations
- 3) Apply the associative, commutative, and distributive properties to simplify computations with positive rational numbers

Identify, find equivalents for, and represent fractions, decimals, and percents

- 5) Order, model, and compare positive rational numbers (fractions, decimals, and percentages)
- 6) Apply factors and multiples to express fractions in lowest terms and identify fraction equivalents
- 7) Locate positive rational numbers (fractions, decimals, and percentages) on a number line
- 8) Apply equivalent forms of fractions and decimals to solve problems
- 9) Determine equivalent forms of fractions, mixed numbers and improper fractions

Understanding and Computing with Fractions

- 10) Select and use appropriate strategies to estimate fraction products and quotients.
- 11) Use and analyze a variety of strategies, including models, for solving problems with multiplication and division of fractions.
- 12) Develop fluency with efficient procedures for multiplying and dividing fractions and justify why the procedures work
- 13) Apply the inverse relationship between multiplication and division to make sense of procedures for multiplying and dividing fractions and justify why they work

Operations with fractions, decimals, and percentages

- 14) Add and subtract fractions with like and unlike denominators
- 15) Multiply and divide fractions
- 12) Solve problems involving common percentages
- 13) Use the inverse operations of addition and subtraction to solve problems involving

adding and subtracting fractions and mixed numbers.

Probability

- 14) Interpret the outcome of a probability experiment using a frequency distribution, including determining experimental probability
- 15) Make predictions for succeeding trials of a probability experiment given the outcome of preceding repeated trials
- 16) Predict the outcome of a probability experiment by computing and using theoretical probability

Patterns

- 17) Analyze and determine rules for finding patterns involving positive rational numbers with tables, graphs, words, and when possible, symbolic rules
- 18) Represent relationships using information from tables and graphs including coordinate graphs (first quadrant)

Measurement

- 22) Select the most appropriate unit to measure area and perimeter
- 23) Carry out unit conversions in the U.S. customary system as a result of calculations involving measurements of length, perimeter, volume, and weight (e.g., $6\frac{1}{2} + 3\frac{3}{4} + 6\frac{1}{2} = 16\frac{3}{4}$ or 1 ft. $4\frac{3}{4}$ ")
- 24) Convert from a measurement expressed in one unit within a system to another using a different unit within the same system to measure perimeter and area
- 25) Determine measurements of length and perimeter to the nearest eighth inch (for length less than one foot) and nearest inch (for lengths greater than one foot)
- 26) Use the relationship between common decimals and fractions to solve problems including problems involving measurement.**

Perimeter and Area

- 26) Use formulas for finding perimeter and area of polygons
- 27) Determine the area of a complex figure representative of a problem situation composed of a combination of two or more geometric figures (e.g., attach a triangle to a parallelogram)
- 28) Analyze how changes in area of a figure affect the dimensions of the figure
- 29) Use referents to make estimates of area

- 30) Use properties of polygons to determine the lengths of sides and perimeters

Perimeter, Area and Volume

- 31) Develop the concept of π as the ratio of the circumference of a circle to its diameter.

Geometry (Angles and Polygons)

- 31) Identify, compare, and classify polygons by their sides and angles
- 32) Identify combinations of angles that are complementary or supplementary and determine their measures
- 33) Use properties of polygons to determine the lengths of sides and perimeters
- 34) Apply the property of the sum of the measures of the interior angles in a polygon as well as the sum of the exterior angles
- 35) Identify the intersection of two or more geometric figures in the plane (e.g., the intersection of a circle and a line)
- 36) Estimate the measures of angles greater than 180 degrees

Understanding and Computing with Decimals

- 37) Select and use appropriate strategies to estimate decimal products and quotients
- 38) Use and analyze a variety of strategies, including models, for solving problems with multiplication and division of decimals
- 39) Develop fluency with efficient procedures for multiplying and dividing decimals and justify why the procedures work

Ratios, Rates and Proportions

- 40) Develop, analyze, and apply the meaning of ratio, rate, and percent to solve problems
- 42) Determine decimal and percent equivalents for common fractions, including approximations
- 43) Understand the meaning of probability and represent probabilities as ratios, decimals, and percents
- 44) Determine simple probabilities, both experimental and theoretical
- 45) Develop the concept of π as the ratio of the circumference of a circle to its diameter

Variables, Expressions and Equation Solving

- 46) Develop the meanings and uses of variables
- 47) Write, evaluate, and use expressions and formulas to solve problems.
- 48) Identify and represent equivalent expressions (e.g., different ways to see a pattern).
- 49) Recognize that the solutions of an equation are the values of the variables that make the equation true.
- 50) Solve one-step equations by using number sense, properties of operations, and the idea of maintaining equality on both sides of an equation.

Graphing on a Coordinate Plane

- 51) Represent, analyze, and determine relationships and patterns using tables, graphs, words and when possible, symbols

Number Properties and Operations

- 52) Apply the properties of operations to simplify calculations.
- 53) Use order of operations to simplify expressions that may include exponents and grouping symbols.

Measurement

- 54) Use the relationship between common decimals and fractions to solve problems including problems involving measurement

Grade 7– Math

Algebraic Relationships

Represent and analyze mathematical situations and structures using algebraic symbols

- 1) Represent and **solve** equations of the form $ax+b=c$ or $k(ax+b)=c$
- 2) Recognize and generate equivalent symbolic forms for algebraic expressions with an emphasis on linear relationships
- 3) Analyze and determine rules for finding patterns relating to linear functions and arithmetic sequences with tables, graphs, and symbolic rules
- 4) Analyze the nature of change in quantities in linear relationships represented by graphs, tables, or formulas

Use mathematical models to represent and understand quantitative relationships

- 5) Identify functions as linear or non-linear from tables, graphs, or equations.
- 6) Translate between and interpret linear relationships represented by words, symbols, tables, and graphs
- 7) Model situations, make predictions and inferences, and solve problems using linear equations and inequalities

Geometry

Analyze characteristics and properties of 2 and 3-dimensional geometric shapes

- 8) Use similar triangles to measure distances indirectly (e.g., flagpole and shadow)
- 9) Similar & Congruent figures and proportions
- 10) Read drawings and models made to scale

Coordinate Geometry

- 11) On a coordinate plane, determine the relative placement (e.g., intersecting, parallel, perpendicular) of two lines (introduction).

Transformational Geometry

- 12) Identify properties of quadrilaterals and their component parts on a coordinate graph
- 13) Identify the figure or point that is the result of a given rotation, translation, reflection, or dilation or a combination of two transformations

Calculations & Estimations

Understand numbers, ways of representing numbers, relationships among numbers, and number systems

- 14) Locate rational numbers (focus on integers, fractions, decimals) on a number line
- 15) Apply the associative, commutative, and distributive properties to simplify computations with rational numbers

Compute fluently and make reasonable estimates

- 16) Solve problems involving percentages. (introduction)
- 17) Compute rational numbers
- 18) Use strategies to estimate the result of rational number computations

Understand the meanings of operations and how they relate to one another

- 19) Compare numbers greater than one expressed in scientific notation (introduction)
- 20) Use order of operations rules, including exponents
- 21) Use the inverse operations of squares and square root to solve problems
- 22) Apply the property of multiplicative inverses to determine solutions of linear equations

Statistics & Probability

Select and use appropriate statistical methods to analyze data

- 23) Choose appropriate measures of central tendencies to describe given data
- 24) Estimate or predict the occurrence of future events using data
- 25) Interpret data using frequency distribution tables, box-and-whisker plots, stem-and-leaf plots, and single and multiple line graphs

Understand and apply basic concepts of probability

- 26) Determine probabilities of simple independent and dependent events
- 27) Determine all possible outcomes of a certain event or all possible arrangements of

objects in a given set

- 28) Apply theoretical probability to determine if an event or game is fair or unfair and evaluate modifications to change the fairness
- 29) Estimate or predict the occurrence of future events using data

Measurement

Understand measurable attributes of objects and the units, systems and processes of measurement

- 30) Determine an appropriate scale for representing an object in a scale drawing
- 31) Solve problems involving rates and derived measurements for such attributes as speed, velocity, and density (introduction)
- 32) Determine actual distances from scale drawings, blueprints, and maps and solve problems involving scale factors
- 33) Convert among different units of measurement to solve problems, including rates.**

Apply appropriate techniques, tools, and formulas to determine measurements

- 33) Calculate surface area and volume for right prisms and cylinders

Understanding and Computing with Fractions

- 34) Extend knowledge of integers and positive rational numbers to solve problems involving negative rational numbers.
- 35) Develop and use strategies to estimate the result of rational number computations and justify the reasonableness of results.
- 36) Apply properties of rational numbers and algebra to write and solve linear equations in one variable

Understanding and Computing with Decimals

- 37) Extend knowledge of integers and positive rational numbers to solve problems involving negative rational numbers
- 38) Develop and use strategies to estimate the result of rational number computations and justify the reasonableness of results
- 39) Apply properties of rational numbers and algebra to write and solve linear equations in one variable

Ratios, Rates and Proportions

- 40) Apply ratio and proportionality to solve problems, including percent and simple probability
- 41) Develop and use scale factors and proportional relationships to solve problems, including similarity and congruence
- 42) Convert among different units of measurement to solve problems, including rates
- 43) Apply scale factor to analyze how the change in one measure (e.g., length, area, volume) affects another

Variables, Expressions and Equation Solving

- 44) Apply properties of rational numbers and algebra to write and solve linear equations in one variable

Graphing on a Coordinate Plane

- 45) Represent proportional relationships with coordinate graphs and tables, and identify unit rate as the slope of the related line.
- 46) Use coordinate graphs, tables, and equations to distinguish proportional relationships from other relationships, including inverse proportionality.

Number Properties and Operations

- 47) Develop, analyze, and apply models (including everyday contexts), strategies, and procedures to compute with integers, with an emphasis on negative integers.

Perimeter, Area and Volume

- 48) Use models to explain the reasonableness of formulas for the circumference and area of circles.
- 49) Know common estimates of π and use these values to estimate and calculate the circumference and area of a circle.
- 50) Solve problems involving areas and circumferences of circles.
- 51) Use models to explain the reasonableness of formulas for the surface area of pyramids and cylinders, and volume of pyramids, cylinders, and cones.
- 52) Find and justify relationships among the formulas for the areas of different polygons and determining surface area.

53) Solve problems involving surface areas of pyramids and cylinders and volumes of pyramids, cylinders, and cones.

54) Estimate and compute the area and volume of complex or irregular shapes by dividing them into basic shapes.

Measurement

55) Convert among different units of measurement to solve problems, including rates.

Grade 8– Math

Algebraic Relationships

Represent and analyze mathematical situations and structures using algebraic symbols

- 1) Determine the slope of a line given two points on the line
- 2) Interpret the meaning of the rate of change and the y - intercept of a linear relationship in a problem setting
- 3) Identify functions as linear or non-linear from tables, graphs, or equations
- 4) Determine the slope and x - and y - intercept given the graph of a linear equation
- 5) AR 11 Recognize direct variation using tables, graphs, and equations
 - Determine when data represented in a table or graph represented in a table or graph represents a linear or non-linear relationship
- 6) Analyze and determine rules for finding patterns relating to linear functions, non-linear functions, and arithmetic sequences with tables, graphs, and symbolic rules
- 7) Analyze the nature of change in quantities in linear relationships represented by graphs, tables, or formulas

Use mathematical models to represent and understand quantitative relationships

- 8) Recognize and graph the solutions of a linear inequalities on a coordinate plane
- 9) Identify the effects of changing the slope or y -intercept on the graph of a linear relationship of the form $y=kx$ or $y=kx+b$
- 10) Model situations, make predictions and inferences, and solve problems using linear equations and inequalities
- 11) Use systems of linear equations in two variables to represent, analyze, and solve a variety of problems. Relate systems of two linear equations in two variables to pairs of lines that are intersecting, parallel, or the same line

Geometry

Analyze characteristics and properties of 2 and 3-dimensional geometric shapes

- 12) Determine the measures of corresponding sides and angles or congruent and similar triangles and their component parts
- 13) Use properties of parallel lines, transversals and angles to solve problems including determining similarity or congruence of triangles

- 14) Use models to show that the sum of the angles of any triangle is 180 degrees and apply this fact to find unknown angles.
- 15) Use similar triangles to measure distances indirectly (e.g., flagpole and shadow)
- 16) Use the Pythagorean theorem to determine if triangles are right triangles and determine the lengths of missing sides in right triangles

Coordinate Geometry

- 17) On a coordinate plane, determine the relative placement (e.g., intersecting, parallel, perpendicular) of two lines (using information from equations)
- 18) GE 6 Determine the distance between two points on a coordinate graph using right triangles and the Pythagorean theorem

Transformational Geometry

- 19) Determine the effects of a transformation on linear and area measurement of the original figure

Calculations & Estimations

Understand numbers, ways of representing numbers, relationships among numbers, and number systems

- 20) Apply proportions to solve problems
- 21) Locate rational numbers on a number line
- 22) Apply the associative, commutative, and distributive properties to simplify computations with rational numbers

Compute fluently and make reasonable estimates

- 23) Solve problems involving percentages
- 24) Compute rational numbers
- 25) Use strategies to estimate the result of rational number computations

Understand the meanings of operations and how they relate to one another

- 26) Compare numbers greater than one expressed in scientific notation.
- 27) Use the inverse operations of squares and square root to solve problems

- 28) Apply the property of multiplicative inverses to determine solutions of linear equations and inequalities

Statistics & Probability

Select and use appropriate statistical methods to analyze data.

- 29) Estimate a line of best fit on a scatter plot and use the line to make predictions
- 30) Identify relationships in the scatter plot

Understand and apply basic concepts of probability.

- 31) Apply theoretical probability to determine if an event or game is fair or unfair and evaluate modifications to change the fairness.

Measurement

Understand measurable attributes of objects and the units, systems and processes of measurement

- 32) Determine an appropriate scale for representing an object in a scale drawing
- 33) Carry out unit conversions in one measuring system or between the metric and U.S. customary systems of measurement given conversion ratios (e.g., 1 in. = 2.54 cm).
- 34) Solve problems involving rates and derived measurements for such attributes as speed, velocity, and density.
- 35) Determine actual distances from scale drawings, blueprints, and maps and solve problems involving scale factors.

Apply appropriate techniques, tools, and formulas to determine measurements

- 36) Calculate surface area and volume for right prisms and cylinders
- 37) Calculate and analyze changes in surface area and volume in relation to changes in linear measures of figures.
- 38) Analyze how changes in surface area and volume affect the dimensions of the solid

Understanding and Computing with Fractions

- 39) Determine the slope of a line and understand that it is a constant rate of change

Ratios, Rates and Proportions

40) Use sample data to make predictions regarding a population

Variables, Expressions and Equation Solving

41) Use linear functions and equations to represent, analyze and solve problems, and to make predictions and inferences

Graphing on a Coordinate Plane

42) Translate among contextual, verbal, tabular, graphical, and algebraic representations of linear functions.

43) Determine the slope of a line and understand that it is a constant rate of change.

44) Identify and interpret the properties (i.e., slope, intercepts, continuity, and discreteness) of linear relationships as they are shown in the different representations and recognize proportional relationships ($y/x = k$ or $y = kx$) as a special case.

45) Relate systems of two linear equations in two variables and their solutions to pairs of lines that are intersecting, parallel, or the same line.

46) Use informal strategies (e.g., graphs or tables) to solve problems involving systems of linear equations in two variables.

47) Apply the Pythagorean Theorem to find distances in a variety of 2- and 3-dimensional contexts, including distances on coordinate graphs.

Number Properties and Operations

48) Use models and referents to explore and estimate square roots.

Data Analysis

49) Organize and display data (e.g. histograms, box-and-whisker plots, scatter plots) to pose and answer questions; and justify the reasonableness of the choice of display.

50) Use measures of center and spread to summarize and compare data sets.

51) Interpret and analyze displays of data and descriptive statistics

52) Compare descriptive statistics and evaluate how changes in data affect those statistics.

Everyday Algebra

Statistics

- 1) Calculate the three central tendencies from a graph or set of data
- 2) Use histograms, scatter plots, stem-and-leaf plots, and box-and-whisker plots to interpret data
- 3) Make inferences and predictions from data in histograms, scatter plots, and parallel box plots
- 4) Other essential outcomes:
 - Create data displays: stem and leaf, histograms, box and whisker, dot plot, scatter plots
 - Graph points and identify quadrants

Basic Skills

- 5) Compare real numbers
- 6) Locate real numbers on a number line
- 7) Other essential outcomes:
 - Integers
 - Order of Operations (including exponents)
 - Fractions (Operations with basic fractions, Simplifying, Technology)
 - Decimals – Fractions – Percents
 - Real Numbers (locate and compare)
 - One-step Equations

Proportions with Probability

- 8) Solve problems using unit conversions
- 9) Compute the probability of a compound event
- 10) Determine the probability of dependent and independent events (with and without replacement)
- 11) Use conditional probability to solve problems
- 12) Other essential outcomes:
 - Working with ratios and proportions
 - Dimensional analysis

Rate of Change

- 13) Approximate and interpret rates of change in graphical and numeric data
- 14) Other essential outcomes:
 - Order of Operations and Distributive Property
 - Using graphing calculator to calculate complex expressions
 - Identify and use recursive patterns
 - Given data, find start value and rate of change
 - Write equations in intercept form when given start value and rate of change
 - Solve multi-step linear equation (by undoing and balancing)

Linear Equations

- 15) Generalize sequences resulting from **linear** relationships using formulas, tables of values, and graphs
- 16) Evaluate algebraic expressions and formulas by substituting real numbers
- 17) Model situations and make predictions using **linear** functions
- 18) Make predictions about populations based on reported sample statistics
- 19) Other essential outcomes:
 - Given data, calculate slope
 - Given linear data, write a point slope or slope-intercept equation that represents the data
 - Given any linear equation, convert to intercept form and graph
 - Determine line of best fit from scatter plots visually and using Q-Points

Systems of Equations

- 20) AR 8 Graph linear inequalities in two variables
- 21) AR 14 Represent and solve system of linear equations with two variables using simultaneous equations and by graphing
- 22) Determine the relative placement (e.g., intersecting, parallel, perpendicular) of two lines on a coordinate plane given the algebraic equations representing them
- 23) Other essential outcomes:
 - Solve systems of equations using graphing, substitution, and elimination

Exponential Functions

- 24) Generalize sequences resulting from **exponential** relationships using formulas, tables of values, and graphs
- 25) Algebraically represent situations and solve problems involving **exponential** equations
- 26) Model situations and make predictions using **exponential** functions
- 27) Order and compare numbers expressed in scientific notation
- 28) Compute with real numbers, including absolute value and scientific notation
- 29) CE 5 Compute with integer exponents and whole number roots

Functions

- 30) Evaluate and make a table for a two-variable formula or match a graph or table of values to its formula
- 31) Identify independent and dependent variables and determine the domain and range of a function in a problem situation
- 32) Analyze the nature of change of each variable in a non-linear relationship as suggested by a table of values, a graph, or a formula
- 33) Compute with real numbers, including absolute value and scientific notation
- 34) Other essential outcomes:
 - Understand and use function notation
 - Understand and use absolute value

Transformations

- 35) Analyze how changing a parameter in a quadratic or exponential function affects the graph i.e. $y = k^x + b$ or $y = kx^2 + b$ or $y = k(x + b)^2$

Quadratics

- 36) Algebraically represent situations and solve problems involving quadratic equations
- 37) Use graphs to solve non-linear equations, including quadratics
- 38) Determine and interpret maxima and minima and zeros of quadratic functions
- 39) Model situations and make predictions using quadratic functions
- 40) Determine whether the data in a table or graph represents linear, quadratic, or exponential relationship
- 41) Recognize equivalent forms for algebraic expressions, including combining like terms and expanding binomials

Algebra

The Language of Math

- 42) Compare, order, and locate real numbers on a number line.
- 43) Compute with absolute value, integer exponents, square roots, π , and/or scientific notation.
- 44) Express square roots in their decimal approximations when appropriate.

Expressions and Equations (Algebra Readiness)

- 45) Evaluate, compute with, and determine equivalent numeric and algebraic expressions with real numbers and variables that may also include absolute value, integer exponents, square roots, π , and/or scientific notation.
- 46) Develop, identify, and/or justify equivalent algebraic expressions, equations, and inequalities using the properties of exponents, equality and inequality, as well as the commutative, associative, inverse, identity, and distributive properties.
- 47) Write, use, and solve linear equations and inequalities using graphical and symbolic methods. Represent solutions number line.
- 48) Factor expressions limited to factoring common monomial terms

Linear Equations and Inequalities

- 49) Identify, construct, extend, and analyze linear patterns and functional relationships that are expressed contextually, numerically, algebraically, graphically, in tables, or using geometric figures.
- 50) Given a rule, a context, two points, a table of values, a graph, or a linear equation in either slope intercept or standard form, identify the slope, determine the x and/or y intercept(s), and interpret the meaning of each.

- 51) Determine the equation of a line given any of the following information: two points on the line, its slope and one point on the line, or its graph
- 52) Fluently convert among representations of linear relationships given in the form of a graph of a line, a table of values, or an equation of a line in slope-intercept and standard form.
- 53) Given a linear function, interpret and analyze the relationship between the independent and dependent variables. Solve for x given $f(x)$ or solve for $f(x)$ given x .
- 54) Analyze how changing the parameters transforms the graph of $f(x) = mx + b$.
- 55) Write, use, and solve linear equations and inequalities using graphical and symbolic methods with one or two variables. Represent solutions on a coordinate graph or number line.

Exponential Functions

- 56) Given an exponential function, identify or determine a corresponding table or graph.
- 57) Given a table or graph that represents an exponential function, extend the pattern to make predictions.
- 58) Compare the characteristics of and distinguish among exponential functions that are expressed in a table of values, a sequence, a context, algebraically, and/or graphically, and interpret the domain and range of each as it applies to a given context.
- 59) Given an exponential function, interpret and analyze the relationship between the independent and dependent variables, and evaluate the function for specific values of the domain.

Quadratics

- 60) Factor quadratic expressions limited to factoring common monomial terms, perfect-square trinomials, differences of squares, and quadratics of the form $x^2 + bx + c$ that factor over the integers.
- 61) Given a quadratic function, identify or determine a corresponding table or graph.
- 62) Given a table or graph that represents a quadratic function, extend the pattern to make predictions.
- 63) Compare the characteristics of and distinguish among quadratic functions that are expressed in a table of values, a sequence, a context, algebraically, and/or graphically, and interpret the domain and range of each as it applies to a given context.
- 64) Given a quadratic function, interpret and analyze the relationship between the independent and dependent variables, and evaluate the function for specific values of the domain.
- 65) Given a quadratic function of the form $f(x) = x^2 + bx + c$ (or equation of the form

$y = x^2 + bx + c$) with integer roots, determine and interpret the roots, the vertex of the parabola, and the equation for the axis of symmetry of the parabola graphically and algebraically.

Systems of Equations and Inequalities

66) Determine an equation of a new line parallel or perpendicular to a given line, through a given point.

67) Solve systems of two linear equations graphically and algebraically, and solve systems of two linear inequalities graphically.

Statistics

68) Given a context, determine appropriate survey methods, analyze the strengths and limitations of a particular survey, observational study, experiment, or simulation, and the display of its data.

69) Evaluate data-based reports by considering the source of the data, the design of the study, and the way the data was analyzed and displayed.

70) Compare and draw conclusions about two or more data sets using graphical displays or central tendencies and range.

71) Use or construct a scatter plot for a given data set, determine whether there is a(n) linear, quadratic, exponential, or no trend. If linear, determine if there is a positive or negative correlation among the data; and, if appropriate, sketch a line of best fit, and use it to make predictions.

72) Construct, analyze, and interpret tables, scatter plots, frequency distributions, and histograms of data sets.

Geometry

Intro to Geometry (include vocab, notation, midpoint)

Apply theorems, properties, and definitions to determine, identify, and justify congruency or similarity of triangles and to classify quadrilaterals

Apply theorems of corresponding parts of congruent and similar figures to determine missing sides and angles of polygons.

Identify, classify, model, sketch, and label representations of three-dimensional objects from nets and from different perspectives.

Apply slope, distance, and midpoint formulas to solve problems in a coordinate plane.

Reasoning, Angle Relationships and Linear Sequences

Identify, apply, and analyze angle relationships among two or more lines and a transversal to determine if lines are parallel, perpendicular, or neither.

Apply slope, distance, and midpoint formulas to solve problems in a coordinate plane.

Triangle Properties

Apply theorems, properties, and definitions to determine, identify, and justify congruency or similarity of triangles and to classify quadrilaterals

Apply theorems of corresponding parts of congruent and similar figures to determine missing sides and angles of polygons.

Determine if three given lengths form a triangle. If the given lengths form a triangle, classify it as acute, right, or obtuse.

Use trigonometric ratios (sine, cosine and tangent) and the Pythagorean Theorem to solve for unknown lengths in right triangles.

Polygon Properties

Apply theorems, properties, and definitions to determine, identify, and justify congruency or similarity of triangles and to classify quadrilaterals

Determine the missing dimensions, angles, or area of regular polygons, quadrilaterals, triangles, circles, composite shapes, and shaded regions.

Circle Properties

Determine the missing dimensions, angles, or area of regular polygons, quadrilaterals, triangles, circles, composite shapes, and shaded regions.

In problems involving circles, apply theorems and properties of chords, tangents, and angles; and theorems and formulas of arcs and sectors.

Transformations

Recognize and identify line and rotational symmetry of two-dimensional figures.

Identify and perform single and composite transformations of geometric figures in a plane, including translations, origin-centered dilations, reflections across either axis or $y = \pm x$, and rotations about the origin in multiples of 90° .

Two-Dimensional Area

Determine the missing dimensions, angles, or area of regular polygons, quadrilaterals, triangles, circles, composite shapes, and shaded regions.

In problems involving circles, apply theorems and properties of chords, tangents, and angles; and theorems and formulas of arcs and sectors.

Identify and apply formulas for surface area and volume of spheres; right solids, including rectangular prisms and pyramids; cones; and cylinders; and compositions thereof. Solve related context-based problems.

Identify and apply formulas to solve for the missing dimensions of spheres and right solids, including rectangular prisms and pyramids, cones, and cylinders, both numerically and symbolically.

Sample Space and Geometric Probability

Identify, analyze, and use experimental and theoretical probability to estimate and calculate the probability of simple events.

Compute and interpret probabilities for independent, dependent, complementary, and compound events using various methods (e.g., diagrams, tables, area models, and counting techniques)

Pythagorean Thm (distance, square roots)

Use trigonometric ratios (sine, cosine and tangent) and the Pythagorean Theorem to solve for unknown lengths in right triangles.

Determine if three given lengths form a triangle. If the given lengths form a triangle, classify it as acute, right, or obtuse.

Apply slope, distance, and midpoint formulas to solve problems in a coordinate plane.

Evaluate and compute with square roots.

Express square roots in equivalent radical form and their decimal approximations when appropriate.

Surface Area and Volume

Identify and apply formulas for surface area and volume of spheres; right solids, including rectangular prisms and pyramids; cones; and cylinders; and compositions thereof. Solve related context-based problems.

Identify and apply formulas to solve for the missing dimensions of spheres and right solids, including rectangular prisms and pyramids, cones, and cylinders, both numerically and symbolically.

Similarity

Apply theorems, properties, and definitions to determine, identify, and justify congruency or similarity of triangles and to classify quadrilaterals.

Apply theorems of corresponding parts of congruent and similar figures to determine missing sides and angles of polygons.

Apply a scale factor to determine similar two- and three-dimensional figures, are similar. Compare and compute their respective areas and volumes of similar figures.

Trigonometry

Use trigonometric ratios (sine, cosine and tangent) and the Pythagorean Theorem to solve for unknown lengths in right triangles.

Determine the missing dimensions, angles, or area of regular polygons, quadrilaterals, triangles, circles, composite shapes, and shaded regions.