PERFORMANCE STANDARDS FOR MATH: GRADE 7

A. Mathematical Processes

Content Standard: Students in Wisconsin will draw on a broad body of mathematical knowledge and apply a variety of mathematical skills and strategies, including reasoning, oral and written communication and the use of appropriate technology, when solving mathematical, real-world* and non-routine* problems.

Rationale: In order to participate fully as a citizen and a worker in our contemporary world, a person should be mathematically powerful. Mathematical power is the ability to explore, to conjecture, to reason logically and to apply a wide repertoire of methods to solve problems. Because no one lives and works in isolation, it is also important to have the ability to communicate mathematical ideas clearly and effectively.

Performance Standard

A.8.1 Use reasoning abilities to:

- evaluate information
- perceive patterns
- identify relationships
- formulate questions for further exploration
- evaluate strategies
- justify statements
- test reasonableness of results
- defend work

7th Grade

1. Use reasoning abilities to:
   - perceive patterns (congruent, similar, divisibility, L.C.M., G.C.F., prime factorization, comparing and ordering, sequence, Pascal's Triangle, Fibonacci Sequence, probability) _____
   - identify relationships (ratio, proportion, congruent, arithmetic, geometric) _____
   - evaluate information (too much, not enough, what do you need to use) _____
2. Use reasoning abilities to:
   - design questions that will help with further research _____
   - justify a statement using logical reasoning by explaining processes used to arrive at the answer _____
   - test reasonableness of results through estimation, sampling and substitution _____
   - to defend work by using the four-step process (explore, plan, solve, examine)_____
3. Apply the following problem-solving strategies:

_____ choose an operation	_____ draw a diagram
_____ use manipulatives	_____ guess and check
_____ make a chart/table/list	_____ use estimation
_____ work backwards	_____ note important information
_____ use a calculator	_____ identify needed/extra information
_____ find a pattern	_____ use a graph

_____ use an equation
_____ solve a simpler problem
_____ classify
_____ Venn diagrams
_____ use a formula
_____ make a model
_____ eliminate possibilities

4. Justify strategies and solutions through oral and written explanations. _____

Performance Standard

A.8.2 Communicate logical arguments clearly to show why a result makes sense.

7th Grade

1. Communicate logical arguments clearly to show why a result makes sense using words, numbers, pictures, symbols, charts, graphs, tables, diagrams, models. _____
2. Know when to use the appropriate resource/strategy. _____
3. Justify logical arguments through oral and written explanation. _____

Performance Standard

A.8.3 Analyze non-routine* problems by modeling*, illustrating, guessing, simplifying, generalizing, shifting to another point of view, etc.

7th Grade

1. Analyze non-routine problems by illustrating, guessing, simplifying, relating to everyday life, modeling, acting it out, generalizing, shifting to another point of view. _____
2. Use mathematics as a way to understand other areas of the curriculum (e.g. measurement in science, geography skills in social studies, and Venn diagrams in language arts). _____
3. See relationships between various kinds of problems and actual events. _____

Performance Standard

A.8.4 Develop effective oral and written presentations that include:

- appropriate use of technology
- the conventions of mathematical discourse (e.g., symbols, definitions, labeled drawings)
- mathematical language
- clear organization of ideas and procedures
- understanding of purpose and audience

7th Grade

1. Calculators – a learner will apply the following: scientific calculators. _____

2. Computers – a learner will apply the following: spreadsheet tool; graphing tool; geometry tool; internet access. _____
3. The learner will determine when technology is appropriate and when other approaches are more appropriate or efficient. _____
4. Present results of a project, written and oral, to an audience. _____

Performance Standard

A.8.5 Explain mathematical concepts, procedures, and ideas to others who may not be familiar with them.

7th Grade

1. Communications – The learner will explain and demonstrate mathematical concepts, procedures and ideas to others by reading, talking about it, sharing and assisting others.

   * think/pair/share _____
   * study buddies _____
   * peer tutoring _____
   * cooperative groups _____

Performance Standard

A.8.6 Read and understand mathematical texts and other instructional materials and recognize mathematical ideas as they appear in other contexts.

7th Grade

1. Curriculum connections: social studies/history/geography; health/physical education; science; music; language arts; art; and electives. _____
2. Real-world connections: the learner will use real-world connections as they apply in daily life, careers, as consumers and in multicultural situations. _____

Vocabulary

7th Grade

_____ congruent
_____ point of view
_____ generalize
_____ Pascal
_____ substitution

B. Number Operations and Relationships

Content Standard: Students in Wisconsin will use numbers effectively for various purposes, such as counting, measuring, estimating and problem solving.

Rationale: People use numbers to quantify, describe and label things in the world around them. It is important to know the many uses of numbers and various ways of representing them. Number sense is a matter of necessity, not only in one's occupation but also in the conduct of daily life, such as shopping, cooking, planning a budget or analyzing information reported in the media. When computing, an educated person needs to know which operations (e.g., addition, multiplication), which procedures (e.g., mental techniques, algorithms*), or which technological aids (e.g., calculator, spreadsheet) are appropriate.

Performance Standard:

B.8.1 Read, represent and interpret various rational numbers* (whole numbers*, decimals, fractions and percents) with verbal descriptions, geometric models* and mathematical notation (e.g., expanded*, scientific*, exponential*).

7th Grade

1. Read, write and demonstrate integers, decimals, fractions, and percents. _____
2. Express numbers in scientific notation and exponential expanded form (standard form). _____
3. Use powers and exponents in expressions. _____
4. Read, write, demonstrate and graph on a number line integers, decimals, fractions and percent. _____

Performance Standard:

B.8.2 Perform and explain operations on rational* numbers (add, subtract, multiply, divide, raise to a power, extract a root, take opposites and reciprocals, determine absolute value).

7th Grade

1. Add, subtract, multiply and divide decimals, fractions, mixed numbers, and integers. _____
2. Solve for, as well as write, powers and positive and negative exponents in expressions. _____
3. Understand and find the square root of perfect squares. _____
4. Evaluate numerical and algebraic expressions using order of operations. _____
5. Reinforce solving algebraic two-step equations. _____
6. Recall of multiplication and division facts 0-12. _____

Performance Standard

B.8.3 Generate and explain equivalences among fractions, decimals and percents.

B. Number Operations and Relationships

7th Grade

1. Express terminating decimals as fractions and express fractions as decimals. _____
2. Express fractions as percents and vice versa. _____
3. Express decimals as percents and vice versa. _____
4. Formulate algebraic expressions and equations from verbal phrases and sentences. _____
5. Express equivalent fractions in lowest terms. _____

Performance Standard:

B.8.4 Express order relationships among rational numbers using appropriate symbols (>, <, <, >, =).

7th Grade

1. Compare and order decimals and fractions and integers using <, >, =. _____
2. Determine whether a pair of ratios forms a proportion by using cross products (= or =/). _____
3. Solve proportions by using cross products. _____

Performance Standard:

B.8.5 Apply proportional thinking in a variety of problem situations that include, but are not limited to:

- ratios and proportions (e.g., rates, scale drawings*, similarity*)
- percents including those greater than 100 and less than one (e.g., discounts, rate of increase or decrease, sales tax)

7th Grade

1. Express ratios as fractions and determine whether two ratios are equivalent. _____
2. Determine unit rates (3 apples for $.30; how much for 1 apple?). _____
3. Solve proportions. _____
4. Solve problems involving scale drawings. _____
5. Illustrate the meaning of percent using models or symbols. _____
6. Express percents greater than 100 and percents less than 1 as fractions and as decimals and vice versa. _____
7. Find the percent of a number. _____
8. Solve problems using the percent proportion. _____
9. Solve problems involving sales tax and discount. _____
10. Express similarity statements. _____

Performance Standard:

B.8.6 Model* and solve problems involving number-theory concepts such as:

- prime* and composite numbers
- divisibility and remainders
- greatest common factors
- least common multiples

B. Number Operations and Relationships

7th Grade

1. Find the prime factorization of a composite number. _____
2. Use divisibility rules of 2, 3, 4, 5, 6, 8, 9, and 10. _____
3. Find the greatest common factor of two or more numbers. _____
4. Find the least common multiple of two or more numbers. _____
5. Reinforce dividing whole numbers and repeating and terminating rational decimals. _____

Performance Standard:

B.8.7 In problem-solving situations, select and use appropriate computational procedures with rational numbers such as:

- calculating mentally
- estimating
- using technology (e.g., scientific calculators, spreadsheets)

7th Grade

1. Compute sums and differences using compensation. _____
2. Multiply decimals mentally by powers of 10. _____
3. Estimate sums and differences using front-end estimation. _____
4. Estimate quotients using compatible numbers. _____
5. Problem solving strategies:
   Classify information, guess and check, use a graph, make a table, determine reasonable answers, use a formula, solve a simpler problem, choose the method of computation, make a list, eliminate possibilities, find a pattern, use logical reasoning, draw a diagram, make a model, work backward, use an equation and not enough information is present. _____
6. Estimate with decimals. _____
7. Estimate the area of irregular figures. _____
8. Estimate sums and differences, products and quotients of fractions and mixed numbers. _____
9. Estimate by using fractions, decimals and percents interchangeably. _____
10. Estimate by rounding. _____
11. Estimate square roots. _____
12. Use scientific calculators in problem-solving situations to help explain algorithms. _____
13. Compute mentally a percent of a number. _____

B. Number Operations and Relationships

Vocabulary

7th Grade

_____ absolute value
_____ additive inverse
_____ clustering
_____ common denominator
_____ denominator
_____ fraction
_____ divisible
_____ equivalent
_____ unit rate
_____ irregular figures
_____ lowest terms
_____ numerator
_____ percent
_____ proportion
_____ percentage
_____ perfect square
_____ population density
_____ radical sign
_____ rate
_____ scale factor
_____ scientific notation
_____ similar figures
_____ square
_____ square root
_____ standard form
_____ unit price
_____ corresponding sides and angles

C. Geometry

Content Standard: Students in Wisconsin will be able to use geometric concepts, relationships and procedures to interpret, represent and solve problems.

Rationale: Geometry and its study of shapes and relationships is an effort to understand the nature and beauty of the world. While the need to understand our environment is still with us, the rapid advance of technology has created another need: to understand ideas communicated visually through electronic media. For these reasons, educated people in the 21st century need a well-developed sense of spatial order to visualize and model real world* problem situations.

Performance Standard

C.8.1 Describe special and complex two- and three-dimensional figures (e.g., rhombus, polyhedron, cylinder) and their component parts (e.g., base, altitude and slant height) by:

- naming, defining and giving examples
- comparing, sorting and classifying them
- identifying and contrasting their properties (e.g., symmetrical, isosceles, regular)
- drawing and constructing physical models to specifications
- explaining how these figures are related to objects in the environment

7th Grade

1. Identify and draw points, line segments, line rays, transversal lines, perpendicular lines, parallel lines, and intersecting lines. _____
2. Draw and construct physical models to specifications by using a compass, protractor, and straight edge. _____
3. Describe and classify angles (alternate interior, corresponding, vertical, complementary and supplementary, right, obtuse, acute, straight) and triangles (equilateral, isosceles, scalene, acute, obtuse and right). _____
4. Construct angles and triangles (congruent and bisected). _____
5. Calculate the sum of the angles of a polygon. _____
6. Identify, classify, and construct regular and irregular polygons (three-sided through n-sided). _____
7. Identify and construct congruent, similar and symmetrical figures. _____
8. Construct and identify the parts of a circle including diameter and radius. _____
9. Analyze three-dimensional objects by applying the knowledge of faces, edges, vertices, and comparison of line segments within the figure._____
10. Analyze, select and present examples of three-dimensional figures in real-life settings. _____

Performance Standard:

C.8.2 Identify and use relationships among the component parts of special and complex 2- and 3-dimensional figures (e.g., parallel sides, congruent* faces).

C. Geometry

7th Grade

1. Predict a pattern for the number of diagonals in a polygon. _____
2. Illustrate perpendicular and parallel lines; congruent and similar figures. _____
3. Determine and calculate correspondence in similar figures and find missing measures. _____
4. Analyze three-dimensional objects by applying the knowledge of faces, edges, vertices, and comparison of line segments within the figure. _____

Performance Standard:

C.8.3 Identify 3-dimensional shapes from 2-dimensional perspectives and draw 2-dimensional sketches of 3-dimensional objects preserving their significant features.

7th Grade

1. Plan and construct physical models to specifications. _____

Performance Standard:

C.8.4 Perform transformations* on 2-dimensional figures and describe and analyze the effects of the transformations on the figures.

7th Grade

1. Translate, rotate and reflect figures on the coordinate plane. _____
2. Design tessellations. _____
3. Compose and diagram dilations. _____

Performance Standard:

C.8.5 Locate objects using the rectangular coordinate system*.

- Employ technology to demonstrate the rectangular coordinate system when grade appropriate.

7th Grade

1. Identify ordered pairs using the rectangular coordinate system. _____
2. Identify and graph the transformations or movements of geometric figures shown on a coordinate grid. _____
3. Translate, rotate, and reflect figures on the coordinate plane. _____
4. Locate and examine points on earth by using the rectangular coordinate system. _____

C. Geometry

Vocabulary

7th Grade

_____ adjacent angle
_____ alternate interior angle
_____ angle bisector
_____ bisects
_____ complementary angle
_____ diagonal
_____ congruent angle
_____ congruent lines
_____ congruent segments
_____ corresponding angle
_____ dilation
_____ irregular polygon
_____ midpoint
_____ perpendicular bisector
_____ rotation
_____ segment bisector
_____ supplementary angle
_____ transversal
_____ vertical angle

D. Measurement

Content Standard: Students in Wisconsin will select and use appropriate tools (including technology) and techniques to measure things to a specified degree of accuracy. They will use measurements in problem-solving situations.

Rationale: Measurement is the foundation upon which much technological, scientific, economic and social inquiry rests. Before things can be analyzed and subjected to scientific investigation, or mathematical modeling*, they must first be quantified by appropriate measurement principles. Measurable attributes* include such diverse concepts as voting preferences, consumer price indices, speed and acceleration, length, monetary value, duration of an Olympic race, or probability of contracting a fatal disease.

Performance Standard:

D.8.1 Identify and describe attributes* in situations where they are not directly* or easily measurable (e.g., distance, area of an irregular figure, likelihood of occurrence).

7th Grade

1. Find irregular figures located in the home and estimate area of each. _____
2. Determine appropriate tools and accurately measure length, mass and volume. _____
3. Use procedures for basic indirect measurement to find area of irregular figures. _____
4. Summarize the process and results of steps 2 and 3 to the class using graphics or other technologies. _____

Performance Standard

D.8.2 Demonstrate understanding of basic measurement facts, principles and techniques including the following:

- approximate comparisons between metric and US customary units (e.g., a liter and a quart are about the same; a kilometer is about six-tenths of a mile.)
- knowledge that direct measurement* produces approximate, not exact, measures.
- the use of smaller units to produce more precise measures.
- employment of appropriate grade level technology.

7th Grade

1. Compare and contrast metric and customary units of measure. _____
2. Demonstrate that each unit of measurement is part of another either smaller or larger unit. _____
3. Distinguish when it is necessary to use smaller units for more precise measurements. _____

D. Measurement

Performance Standard

D.8.3 Determine measurement directly* using standard units (metric and US customary) with these suggested degrees of accuracy:

- lengths to the nearest mm or 1/16 of an inch
- weight (mass) to the nearest 0.1 g or 0.5 ounce
- liquid capacity to the nearest ml
- angles to the nearest degree
- temperature to the nearest Centigrade and Fahrenheit degree
- elapsed time to the nearest second

7th Grade

1. Determine measurements to the following degrees of accuracy:
   - length to the nearest sixteenth, eighth, quarter, half-inch, foot, yard, millimeter, centimeter, meter _____
   - weight to the nearest ounce, pound, gram, and kilogram _____
   - temperature to the nearest degree in Celsius and Fahrenheit _____
   - time to the nearest second _____
   - liquid capacity to the nearest ounce, cup, pint, quart, half-gallon, gallon, milliliter, liter, and fluid ounce _____
   - angles to the nearest degree. _____
2. Determine appropriate units to measure length, mass, temperature, capacity and time. ___
3. Apply measurement skills to real life problems. _____

Performance Standard

D.8.4 Determine measurements indirectly* using:

- estimation
- conversion of units within a system (e.g., quarts to cups, millimeters to centimeters)
- ratio and proportion (e.g., similarity*, scale drawings*)
- geometric formulas to derive lengths, areas, volumes of common figures (e.g., perimeter, circumference, surface area)
- the Pythagorean* relationship
- geometric relationships and properties for angle size (e.g., parallel lines and trans-versals; sum of angles of a triangle, vertical angles*)

7th Grade

1. Convert units within metric/customary systems. _____
2. Estimate measurement indirectly by using non-standard units. _____
3. Create ratio and proportion/scale drawings. _____
4. Apply geometric formulas to calculate:
   - perimeter and circumference. _____
   - area of triangles, quadrilaterals, and circles. _____
   - surface area and volume of rectangular prisms and cylinders. _____

D. Measurement

5. Distinguish geometric relationships and properties for angle size (parallel lines and transversal; vertical, supplementary, corresponding, and alternate interior; sum of the angles of triangle.) _____
6. Apply the Pythagorean Theorem ($a + b = c$). _____
7. Solve basic rate problems (unit price, distance per unit of time). _____
8. Examine the relationship between perimeter and area (using perimeter to find area and area to find perimeter). _____
9. Apply measurement skills to real life problems. _____

Vocabulary

7th Grade

_____ altitude (segment in quadirilateral)
_____ base (of trapezoid)
_____ hypotenuse
_____ leg
_____ Pythagorean Theorem
_____ similar figures
_____ similar polygons

E. Statistics and Probability

Content Standard: Students in Wisconsin will use data collection and analysis, statistics and probability in problem solving situations, employing technology where appropriate.

Rationale: Dramatic advances in technology have launched the world into the Information Age, when data are used to describe past events or predict future events. Whether in the business place or in the home, as producers or consumers of information, citizens need to be well versed in the concepts and procedures of data analysis in order to make informed decisions.

Performance Standard

E.8.1. Work with data in the context of real-world situations by:
- formulating questions that lead to data collection and analysis
- designing and conducting a statistical investigation
- using technology to generate displays, summary statistics* and presentations

7th Grade

1. Collect, organize and record real-world data. _____
2. Conduct surveys, experiments or simulations and display results. _____
3. Formulate questions and determine the appropriate data to collect and how to collect data. _____
4. Draw reasonable conclusions about real-world data. _____
5. Use technology to produce a simple database and be able to present it. _____
6. Use technology to produce a simple spreadsheet and present it. _____

Performance Standard

E.8.2 Organize and display data from statistical investigations using:
- appropriate tables, graphs and/or charts (e.g., circle, bar, or line, for multiple sets of data)
- appropriate plots (e.g., line*, stem-and-leaf*, box*, scatter*)

7th Grade

1. Gather and organize data into a table. _____
2. Construct circle graphs. _____
3. Construct bar graphs and line graphs with multiple sets of data. _____
4. Construct line plots, stem and leaf plots, and scatter plots. _____
5. Assess the most effective way of displaying data. _____
6. Create story problems based on collected data for classmates to solve. _____

Performance Standard

E.8.3 Extract, interpret and analyze information from organized and displayed data by using:
- frequency and distribution, including mode* and range*
- central tendencies* of data (mean* and median*)
- indicators of dispersion (e.g., outliers*)

E. Statistics and Probability

7th Grade

1. Predict and calculate the mean, median, mode and range from a set of data. _____
2. Analyze information based on frequency and distribution. _____
3. Assess and select the appropriate scale and interval for graphs or frequency tables. _____
4. Examine the effect of extreme values on measures of central tendency. _____
5. Assess and select the best measure of central tendency to represent data. _____
6. Determine and understand the function of an outlier. _____
7. Solve data problems by extracting, interpreting, and analyzing data. _____

Performance Standard

E.8.4 Use the results of data analysis to:
- make predictions
- develop convincing arguments
- draw conclusions

7th Grade

1. Predict and draw conclusions from data. _____
2. Analyze data from simple line, bar, circle graphs, and scatter plots. _____
3. Apply results of the data analysis to solve problems. _____
4. Determine if the conclusion drawn is valid for the data presented. _____
5. Construct and present arguments to support analysis and display of data. _____

Performance Standard

E.8.5 Compare several sets of data to generate, test, and, as the data dictate, confirm or deny hypotheses.

7th Grade

1. Formulate a hypothesis from multiple sets of actual data. _____
2. Analyze the data to determine the criteria that makes the hypothesis true or false. _____
3. Construct a database on the computer using charts or graphs. _____
4. Prepare a presentation using technology and present it to the class. _____

Performance Standard:

E.8.6 Evaluate presentations and statistical analyses from a variety of sources for:
- credibility of the source
- techniques of collection, organization and presentation of data
- missing or incorrect data
- inferences
- possible sources of bias

E. Statistics and Probability

7th Grade

1. Determine if a source is credible and why. _____
2. Evaluate techniques of collection, organization and presentation of data. _____
3. Determine if any data is missing or incorrect and why. _____

Performance Standard:

E.8.7 Determine the likelihood of occurrence of simple events by:

- using a variety of strategies to identify possible outcomes (e.g., lists, tables, tree diagrams*)
- conducting an experiment
- designing and conducting simulations*
- applying theoretical notions of probability (e.g., that four equally likely events have a 25% chance of happening)
- employing appropriate grade level technology for presentations

7th Grade

1. Use a variety of strategies to identify possible outcomes (lists, tables, tree diagrams.) _____
2. Design and conduct an experiment. _____
3. Design and conduct simulations. _____
4. Apply theoretical notions of probability:
   - permutations _____
   - independent/dependent events _____

Vocabulary

7th Grade

_____ data base	_____ intervals	_____ permutations
_____ extreme values	_____ mean	_____ positive & negative
_____ median	_____ relationships	_____ mode
_____ scale	_____ outlier	_____ sectors range
_____ spreadsheet	_____ stem & leaf plot	_____ trend

_____ independent/dependent events

F. Algebraic Relationships

Content Standard: Students in Wisconsin will discover, describe and generalize simple and complex patterns and relationships. In the context of real-world problem situations, the student will use algebraic techniques to define and describe the problem to determine and justify appropriate solutions.

Rationale: Algebra is the language of mathematics. Much of the observable world can be characterized as having patterned regularity where a change in one quantity results in changes in other quantities. Through algebra and the use of variables* and functions*, mathematical models* can be built which are essential to personal, scientific, economic, social, medical, artistic and civic fields of inquiry.

Performance Standard

F.8.1 Work with algebraic expressions in a variety of ways, including:

- using appropriate symbolism, including exponents* and variables*
- evaluating expressions through numerical substitution
- generating equivalent expressions
- adding and subtracting expressions

7th Grade

1. Use vocabulary symbols and notation of algebra correctly (n,n ,=,<,>). _____
2. Evaluate numerical and simple algebraic expressions using order of operations. _____
3. Demonstrate the use of exponents in algebraic expressions. _____
4. Solve real-life problems involving algebraic expressions. _____
5. Write algebraic expressions from verbal phrases. _____

Performance Standard

F.8.2 Work with linear and nonlinear patterns* and relationships in a variety of ways, including:

- representing them with tables, with graphs and with algebraic expressions, equations and inequalities
- describing and interpreting their graphical representations (e.g., slope*, rate of change, intercepts*)
- using them as models of real-world phenomena
- describing a real-world phenomenon that a given graph might represent

7th Grade

1. Graph equations by plotting points. _____
2. Complete function tables. _____
3. Graph functions. _____
4. Model algebraic expressions. _____
5. Solve problems involving discounts and simple interest. _____
6. Identify inequalities. _____

F. Algebraic Relationships

Performance Standard

F.8.3 Recognize, describe, and analyze functional relationships* by generalizing a rule that characterizes the pattern of change among variables. These functional relationships include exponential growth and decay (e.g., cell division, depreciation)

7th Grade

Performance Standard

F.8.4 Use linear equations and inequalities in a variety of ways, including:

- writing them to represent problem situations and to express generalizations.
- solving them by different methods (e.g., informally, graphically, with formal properties, with technology).
- writing and evaluating formulas (including solving for a specified variable).
- using them to record and describe solution strategies.

7th Grade

1. Identify, solve and graph linear equations by using mental math, the guess and check strategy (use of a replacement set) and inverse operations. _____
2. Solve problems by using a formula. _____
3. Solve equations:
   - proportions _____
   - linear equations using models _____
   - two-step equations using models _____
   - involving percents _____
4. Solve and graph equations:
   - using rational numbers _____
   - with two variables _____
5. Identify, solve and graph inequalities. _____
6. Use a calculator to solve equations. _____
7. Write algebraic equations from verbal sentences. _____
8. Solve for a specified variable. _____
9. Solve more complex problems by writing and solving an equation. _____

Performance Standard

F.8.5 Recognize and use generalized properties and relations, including:

- additive and multiplicative property of equations and inequalities
- commutativity* and associativity* of addition and multiplication
- distributive* property
- inverses* and identities* for addition and multiplication
- transitive* property

F. Algebraic Relationships

7th Grade

1. Recognize, use, and differentiate between the basic properties of arithmetic:
   - Order/Commutative property for +/x. _____
   - Zero property for +/x. _____
   - One/Identity Property for x/÷. _____
   - Inverse property for +/- and x/÷ (12-3=9/9+3=12). _____
   - Property of one for x and ÷. _____
   - Associative property for + and x [5x(3x2)=(5x3)x2]. _____
   - Distributive property. _____
2. Identify and use addition, subtraction, multiplication and division properties of equality. _____

Vocabulary

7th Grade

_____ addition property of equality
_____ base
_____ cubed
_____ multiplicative inverse
_____ powers/exponents
_____ squared
_____ subtraction property of equality
_____ function
_____ multiplication property of equality
_____ division property of equality
_____ equivalent equations
_____ factors
_____ substitution