

MATHEMATICAL AND LOGICAL THINKING OUTCOMES
PRESCHOOL AND KINDERGARTEN PREP

- 1. Number Concepts and Operations**
 - A. Demonstrate increasing interest in and awareness of numbers and counting
 - B. Demonstrate understanding of one-to-one correspondence between objects and numbers
 - C. Demonstrate ability to count in sequence
 - D. Demonstrate ability to state the number that comes next up to 9 or 10
 - E. Demonstrate beginning ability to combine and separate numbers of objects

- 2. Patterns and Relationships**
 - A. Recognize and duplicate simple patterns
 - B. Sort objects into subgroups by one or two characteristics
 - C. Order or sequence several objects on the basis of one characteristic

- 3. Spatial Relationships/Geometry**
 - A. Identify and name common shapes
 - B. Use words that show understanding of order and position of objects

- 4. Measurement**
 - A. Recognize objects measured by height, length, weight, and time
 - B. Make comparisons between at least two groups of objects

- 5. Mathematical Reasoning**
 - A. Use simple strategies to solve mathematical problems

MATH OUTCOMES

Kindergarten

- 1. Apply skills of mathematical representation, communication and reasoning.**
 - A. Create and solve word problems using actions, objects, words, pictures, or numbers.
 - B. Estimate and check that answers are reasonable.
 - C. Explain to others how a problem was solved.
 - D. Explore basic addition and subtraction using calculators
 - E. Create and solve words problems using actions, objects, words, pictures or numbers.

- 2. Represent quantities using whole numbers and understand relationships among whole numbers.**
 - A. Demonstrate age appropriate ability to count forward and backward.
 - B. Count and identify the number of objects in a set.
 - C. Compare the number of objects in two or more sets.
 - D. Identify one more or one less of any given number.
 - E. Skip count by 2's to 20, 5's to 50, and 10's to 100.
 - F. Verbally count 20 or more objects in a random arrangement.
 - G. Compare and order numbers to 20.
 - H. Identify and write numerals to 100.
 - I. Identify one half of a set of concrete objects.
 - J. Demonstrate understanding of odd and even qualities.

- 3. Add and subtract whole numbers up to 6 in real-world and mathematical problems.**
 - A. Recognize the number of objects up to 6, without counting.
 - B. Add and subtract whole numbers up to 6, using concrete objects.
 - C. Orally identify randomly shown numbers from 0-100.
 - D. Explore basic addition and subtraction.

- 4. Sort, classify and compare objects based on their attributes and understand repeating patterns.**
 - A. Sort objects in a set by one attribute such as size, shape, color or thickness.
 - B. Identify an object that does not belong in a set
 - C. Recognize, describe and extend repeating patterns involving up to three elements using objects, pictures, sounds or movements.
 - D. Create AB, AAB, AABB, ABC, ABBC, ABCD patterns.
 - E. Use and identify symbols +, -, =.
 - F. Write and solve addition and subtraction number sentences.
 - G. Compare numbers using <, > symbols.

- 5. Depict data with objects and pictures.**
 - A. Represent data about classmates or their surroundings by using objects or pictures.
 - B. Explore basic addition and subtraction using calculators.
 - C. Sort, classify, and compare objects in a set in more than one way,
 - D. Recognize, describe, and extend repeating patterns involving up to four elements.
 - E. Identify and use patterns on a number grid.
 - F. Explore skip-counting patterns using the calculator.

- 6. Students will understand the meaning of terms used to describe location and placement of objects.**
 - A. Locate and describe placement of objects with terms such as: on, inside, outside, above, below, over, under, beside, between, in front of, behind, next to, top, bottom.
 - B. Demonstrate ordinal number concepts 1st through 5th.
 - C. Explore symmetry of objects and designs through paper folding and cutting.

- 7. Sort two-and three- dimensional shapes.**
 - A. Sort two-and three-dimensional shapes according to their geometrical attributes.
 - B. Identify and draw a square, circle, rectangle, triangle, oval, star, heart, and rhombus and introduce hexagon, and trapezoid shapes.

- 8. Understand terms and comparative language used in various measurement situations. Identify tools to measure time. Identify coins.**
 - A. Compare and order objects by length, weight, volume, temperature or size and use appropriate vocabulary such as longer than, holds more, smaller.
 - B. Explain that clocks and calendars are instruments to measure time.
 - C. Recognize the following coins: penny, nickel, dime and quarter.
 - D. Compare and order events based on time and use appropriate vocabulary such as yesterday, today or tomorrow to describe relative time.
 - E. Identify and write time to the hour and introduce time to the half hour.
 - F. Identify the value of a penny, nickel, dime, and recognize a quarter.
 - G. Experience activities involving temperature, measurement, weight, fractional parts of a whole, and tally marks.

MATH OUTCOMES

First Grade

1. Count, compare and represent whole numbers up to 120, with an emphasis on groups of tens and ones

- A. Use place value to describe, read, write, and represent whole numbers.
- B. Count forward and backward from a given number.
- C. Find a number that is 10 more, or 10 less than a given number
- D. Compare and order whole numbers.
- E. Use words to describe the relative size of numbers.
- F. Create and analyze bar graphs and tally charts.

2. Use a variety of models and strategies to solve addition and subtraction problems in real world.

- A. Use words, pictures, objects, length-based models, numeral and number lines to model and solve addition and subtraction problems in part-part-total, adding to, taking away from and comparing situations.
- B. Compose and decompose numbers up to 12 with an emphasis on making 10
- C. Recognize the relationship between counting and addition and subtraction. Skip count by 2s, 5s, and 10s

3. Recognize and create patterns. Use rules to describe patterns. Use number sentences involving addition and subtraction facts to represent, solve, create real world situations corresponding to number sentences.

- A. Identify and create simple patterns using objects, pictures, numbers and rules
- B. Represent real-world situations involving addition and subtraction basic facts, using objects and number sentences
- C. Determine if equations involving addition and subtraction are true
- D. Use number sense and models of addition and subtraction, such as objects and number lines, to identify the missing number in an equation.
- E. Use addition or subtraction basic facts to represent a given problem situation using a number sentence

4. Describe characteristics of basic shapes. Use basic shapes to compose and decompose other objects in various contexts.

- A. Describe characteristics of two- and three-dimensional objects.
- B. Compose (combine) and decompose (take apart) two- and three-dimensional figures.

5. Use basic concepts of measurement in real-world and mathematical situations involving length, time and money.

- A. Measure the length of an object
- B. Tell time to the hour and half hour.
- C. Identify pennies, nickels and dimes and find the value of a group of these coins, up to one dollar.

MATH OUTCOMES

Second Grade

- 1. Compare and represent whole numbers up to 1,000 with an emphasis on place value**
 - A. Read and write whole numbers up to 1000
 - B. Utilize place value to describe whole numbers between 10 and 1000
 - C. Generate 10 and 100 more or 10 and 100 less than any given three-digit number
 - D. Round numbers up and down to the nearest 10 and 100
 - E. Compare and order numbers up to 1000
 - F. Utilize addition and subtraction to create and obtain information from tables, bar graphs and tally charts

- 2. Demonstrate mastery of addition and subtraction basic facts**
 - A. Utilize strategies to generate addition and subtraction facts focusing on the relationship between the commutative and associative properties
 - B. Demonstrate fluency with basic addition facts and related subtraction facts
 - C. Utilize mental strategies and algorithms based on knowledge of place value to add and subtract two-digit numbers
 - D. Solve real-world and mathematical addition and subtraction problems involving whole numbers up to two digits

- 3. Recognize, create, describe, and use patterns and rules to solve real world mathematical problems**
 - A. Identify, create and describe simple number patterns involving repeated addition or subtraction
 - B. Utilize patterns to solve problems in various contexts

- 4. Utilize number sentences involving addition, subtraction and unknowns to represent and solve real-world and mathematical problems**
 - A. Explain how to interpret number sentences involving addition,
 - B. subtraction and unknowns represented by letters
 - C. Utilize objects and number lines and create real-world situations to
 - D. represent number sentences
 - E. Relate number sense and properties of addition and subtraction to find values for the unknowns that make the number sentences true

5. Identify, describe and compare basic shapes according to their geometric attributes

- A. Describe, compare and classify two- and three-dimensional figures according to number and shape of faces, number of sides, edges and vertices
- B. Identify and name basic two- and three- dimensional shapes

6. Measure and calculate length using tools

- A. Understand the relationship between the size of the unit of measurement and the number of units needed to measure the length of an object
- B. Demonstrate an understanding of the relationship between length the numbers on a ruler using a ruler to measure lengths to the nearest centimeter or inch

7. Utilize time and money in real-world and mathematical situations

- A. Tell time to the quarter-hour and distinguish between a.m. and p.m.
- B. Identify pennies, nickels, dimes and quarters
- C. Find the value of a group of coins that equal a given amount

MATH OUTCOMES

Third Grade

- 1. Compare and represent whole numbers up to 100,000 with an emphasis on place value and equality.**
 - A. Read, write and represent whole numbers up to 100,000.
 - B. Use place value to describe whole numbers between 1000 and 100,000
 - C. Find 10,000 more or 10,000 less than a given five-digit number.
 - D. Round numbers to the nearest 10,000, 1000, 100 and 10. Round up and round down to estimate sums and differences.
 - E. Compare and order whole numbers up to 100,000
 - F. Add and subtract multi-digit numbers, using efficient and general procedures based on knowledge of place value, including standard algorithms.
 - G. Use addition and subtraction to solve real-world and mathematical problems involving whole numbers.

- 2. Add and subtract multi-digit whole numbers; represent multiplication and division in various ways; solve real-world and mathematical problems using arithmetic.**
 - A. Represent multiplication facts by using a variety of approaches, such as repeated addition, equal-sized groups, arrays, area models, equal jumps on a number line and skip counting. Represent division facts by using a variety of approaches, such as repeated subtraction, equal sharing and forming equal groups. Recognize the relationship between multiplication and division.
 - B. Solve real-world and mathematical problems involving multiplication and division.
 - C. Use strategies and algorithms based on knowledge of place value, equality and properties of addition and multiplication to multiply a two- or three-digit number by a one-digit number.

- 3. Understand meanings and uses of fractions in real-world and mathematical situations.**
 - A. Read and write fractions with words and symbols.
 - B. Understand that the size of a fractional part is relative to the size of the whole.
 - C. Order and compare unit fractions and fractions with like denominators by using models and an understanding of the concept of numerator and denominator.

- 4. Use single-operation input-output rules to represent patterns and relationships and to solve real-world and mathematical problems.**
 - A. Create, describe, and apply single-operation input-output rules involving addition, subtraction and multiplication to solve problems in various contexts

- 5. Use number sentences involving multiplication and division basic facts and unknowns to represent and solve real-world and mathematical problems; create real-world situations corresponding to number sentences.**
 - A. Use multiplication and division basic facts to represent a given problem situation using a number sentence.

- 6. Use geometric attributes to describe and create shapes in various contexts.**
 - A. Identify parallel and perpendicular lines in various contexts, and use them to describe and create geometric shapes.
 - B. Sketch polygons with a given number of sides or vertices.

- 7. Understand perimeter as a measurable attribute of real-world and mathematical objects. Use various tools to measure distances.**
 - A. Use half units when measuring distances.
 - B. Find the perimeter of a polygon by adding the lengths of the sides.
 - C. Measure distances around objects.

- 8. Use time, money and temperature to solve real-world and mathematical problems.**
 - A. Tell time to the minute, using digital and analog clocks. Determine elapsed time to the minute.
 - B. Know relationships among units of time.
 - C. Make change up to one dollar in several different ways.
 - D. Use an analog thermometer to determine temperature to the nearest degree in Fahrenheit and Celsius.

- 9. Collect, organize, display, and interpret data. Use labels and a variety of scales and units in displays.**
 - A. Collect, display and interpret data using frequency tables, bar graphs, picture graphs and number line plots.

MATH OUTCOMES

Fourth Grade

I. Number & Operations

- A. Understand the meanings, uses, and representations of numbers.
 - 1. Read and write whole numbers up to 1,000,000,000 and decimals through thousandths; identify place value and values of digits; write numbers in different forms.
 - 2. Read, write, and model fractions.
 - 3. Find multiples and factors of whole numbers less than ten.

- B. Understand equivalent names for numbers.
 - 1. Use numerical expressions.
 - 2. Rename basic fractions as decimals and percents.

- C. Understand common numerical relations.
 - 1. Compare and order whole numbers up to 1,000,000,000 and decimals through thousandths, integers between -100 and 0 and benchmark fractions.

- D. Compute accurately.
 - 1. Basic addition and subtraction facts, including decimals through hundredths.
 - 2. Multiplication and division facts through $10 * 10$, and fact extensions.
 - 3. Solve problems involving multiplication and division of multi-digit whole numbers.
 - 4. Solve problems involving the addition and subtraction of like and unlike denominators.

- E. Make reasonable estimates of computations.

- F. Understand meanings of operations.

II. Patterns, Functions, and Algebra

- A. Understand patterns and functions.
 - 1. Extend, describe, and create numeric patterns.

- B. Use algebraic notation to represent and analyze situations and structures.
 - 1. Use conventional notation to write expressions and number sentences using the four basic arithmetic operations and explained solutions.

2. Evaluate numeric expressions using grouping symbols.
3. Apply the distributive property of multiplication over addition.

III. Geometry, Measurement, and Reference Frames

- A. Investigate characteristics and properties of two- and three-dimensional geometric shapes.
 1. Identify, draw, and describe benchmark geometric terminology.
 2. Describe, compare, and classify plane and solid figures using appropriate geometric terms.
- B. Apply transformations and symmetry.
- C. Understand the systems and processes of measurement, using appropriate techniques and units.
 1. Estimate length and size of angles without tools.
 2. Measure length to nearest $\frac{1}{4}$ inch and $\frac{1}{2}$ centimeter.
 3. Describe and use strategies to measure the perimeter and area of polygons, and estimate the area of irregular shapes.
 4. Describe relationships among units of length.
 5. Use ordered pairs of numbers to name, locate, and plot points in the first quadrant of a coordinate grid.

IV. Data Analysis and Chance

- A. Collect and organize data and use given data to create appropriate charts, tables, bar graphs, line plots, and line graphs.
- B. Use the maximum, minimum, range, median, mode, and graphs to ask and answer questions, draw conclusions, and make predictions.
- C. Understand and apply basic concepts of probability.

MATH OUTCOMES
Fifth Grade

- 1. Apply skills of mathematical representation, communication, and reasoning.**
 - A. Solve word problems using estimation with whole numbers, fractions and decimals.
 - B. Solve problems using pictures, numbers and words to explain the solution to a mathematical problem.
 - C. Name the prime factorization of a factor using factor strings.
 - D. List the factors of a number.

- 2. Read and write fractions, decimals, and whole numbers in a variety of ways.**
 - A. Read and write numbers up to three decimals in numerals and words.
 - B. Write positive and negative integers symbolically and on a number line.
 - C. Recognize equivalent fractions, decimals and percentages.
 - D. Estimate sums, differences and products of whole numbers and decimals by rounding.

- 3. Compute mathematical problems fluently.**
 - A. Use addition, subtraction, multiplication and division of multi-digit whole numbers.
 - B. Add and subtract numbers up to two decimal places.
 - C. Identify place value up to billions.
 - D. Convert fractions, decimals and percents.
 - E. Convert between fractions, mixed and whole numbers.
 - F. Find common denominators and use them to divide fractions.
 - G. Add or subtract numbers with like and unlike denominators.

- 4. Understand and describe patterns in numbers, shapes, tables and graphs.**
 - A. Identify patterns in addition, subtraction, multiplication and division facts.
 - B. Apply order of operations to solve number sentences.
 - C. Create/interpret circle graphs, Venn diagrams, number line plots, stem-and-leaf plots and interpret mystery graphs.
 - D. Compare sets of data

- 5. Represent mathematical relationships using equations.**
 - A. Determine the value of a variable.
 - B. Simplify expressions and equations that have parentheses.
 - C. Evaluate formulas and use formulas to solve problems.
 - D. Turn number stories into equations using variables.

- 6. Represent data and use various measures to draw conclusions.**
 - A. Compare graphic representations of a data set.
 - B. Find the mean, median, mode and range of a data set.

- C. Collect data using measurements, surveys or experiments and chart data using tables and graphs with labels.
 - D. Find maximum and minimum of a data set.
- 7. Understand the concepts of reflection and rotation symmetry.**
- A. Identify rotation and point symmetry.
 - B. Identify reflection and rotation in two-dimensional shapes and designs.
- 8. Sort, classify, compare and describe two and three-dimensional objects.**
- A. Sort three-dimensional objects according to faces, edges and vertices.
 - B. Classify, compare and identify acute, right and obtuse angles.
 - C. Apply properties of adjacent, supplementary, complementary and vertical angles.
 - D. Find angle sums of geometric shapes.
- 9. Measure and calculate length, area and capacity using tools.**
- A. Find surface area of prisms, cylinders and pyramids.
 - B. Define and create tessellations.
 - C. Measure perimeter, area, and capacity.
 - D. Use a formula to find circumference of a circle and area.
 - E. Use a compass and protractor to draw and measure angles formed by intersecting lines.
 - F. Find angle sums of geometric shapes.
 - G. Use a compass to draw a circle with a given radius or diameter.
 - H. Estimate the measure of an angle.

MATH OUTCOMES

Sixth Grade

1. Compare and order integers.

- A. Compare $<$, $>$, and $=$ for positive and negative whole numbers.
- B. Place positive and negative numbers on a line graph.
- C. Know the values of positive and negative numbers.
- D. Record and write positive and negative numbers.
- E. List positive and negative numbers from least to greatest and greatest to least.

2. Integrate the use of four operations of whole and decimal numbers, finding actual and estimated numbers.

- A. Know place values from hundred-thousandths to trillions.
- B. Write numbers from hundred thousandths to trillions, standard and written form.
- C. Round whole numbers.
- D. Read numbers from hundred thousandths to trillions, standard and written form.
- E. Add whole numbers and decimal numbers from millionths to trillions.
- F. Subtract numbers with decimals.
- G. Multiply up to 3 digit places.
- H. Divide by 2 digit divisors.
- I. Estimate strategies.
- J. Compute the average of a set of numbers.

3. Solve problems using standard and metric units of measure.

- A. Be familiar with and know where to find the standards and metric units of measure (linear, weight, and volume).
- B. Change from one unit of measure to another within the same system.
- C. Choose which unit of measurement is the most appropriate.
- D. Estimate solutions involving measure.
- E. Add, subtract, multiply, and divide units of measurement.

4. Estimate and calculate averages and percents. Know about ratios and proportions.

- A. Determine an average, ratio, proportion and percent.
- B. Estimate and find the percent of a number.
- C. Convert decimals, fractions, and percents from one to another.
- D. Write a ratio.

- 5. Solve multi-step problems using the problem solving method.**
 - A. Gather information.
 - B. Plan use of information.
 - C. Process information.
 - D. Evaluate information.
 - E. Identify and recognize a reasonable answer.
 - F. Choose correct operations to solve problems in daily life.

- 6. Understand the basics of four operations with fractions and mixed numbers.**
 - A. Use the principles factorization (least common multiple and greatest common factor).
 - B. Determine a common denominator.
 - C. Add, subtract, multiply, and divide fractions.
 - D. Reduce to lowest terms.
 - E. Convert improper fractions to create whole and mixed numbers.

- 7. Create and evaluate graphs, charts and tables by using technology.**
 - A. Collect and interpret data.
 - B. Represent data in different types of graphs.
 - C. Create and use a wide variety of charts, graphs, and tables (by hand and with computer).
 - D. Know how to label charts, graphs, and tables.
 - E. Use graphs to solve inequalities.

- 8. Understand the basic algebraic equations.**
 - A. Know meaning of variables.
 - B. Evaluate an expression with a given variable.
 - C. Recognize and combine like terms.
 - D. Solve one-step and two-step equations.

- 9. Understand calculating the linear dimensions of any polygon and the areas of squares, rectangles, and triangles.**
 - A. Identify and illustrate basic geometric figures.
 - B. Know and apply formulas for perimeter, area, and volume of geometric figures.

MATH OUTCOMES

Seventh Grade

- 1. Solve problems with all forms of standard and metric measures (time, money, temperature, linear, volume, area, mass).**
 - A. Apply steps of problem solving.
 1. Read carefully to determine the problem.
 2. Decide what operation to use.
 3. Estimate solution.
 4. Carry out each step of the problem.
 5. Label the answer.
 6. Compare estimation to solution to see if solution makes sense.
 - B. Know appropriate units for what is being measured.
 - C. Use measuring devices (i.e., ruler, scale, protractor).

- 2. Solve problems using ratios, proportions, averages and percentages.**
 - A. Find equivalent ratios.
 - B. Use equivalent fractions and means = extremes to solve proportions.
 - C. Calculate mean, median, mode, and range.
 - D. Recognize percent, fraction, and decimal equivalents.
 - E. Set up and solve percentage problems.
 - F. Combine appropriate processes to solve problems.
 - G. Use a calculator to solve problems related to ratios, proportions, averages and percentages.

- 3. Use a variety of strategies in the problem solving process.**
 - A. Know the different problem solving strategies (patterns, tables, diagrams, work backwards, simplify, brainstorm, and trial and error).
 - B. Understand the problem and choose the appropriate strategy.
 - C. Carry out the strategy.
 - D. Analyze the solution.

- 4. Understand and apply fractions and decimals.**
 - A. Define and know how to calculate repeating and non-repeating decimals.
 - B. Write decimals in scientific notation.
 - C. Convert between fraction and decimals.
 - D. Use decimals or fractions in life situations.
 - E. Use the operations (+, -, x, ÷) with decimals and fractions to solve problems.
 - F. Use a calculator to solve problems related to fractions, decimals.

5. Use the geometric principles to draw and compare lengths, area and volume.

- A. Be familiar with concepts of perpendicular and parallel lines and volume.
- B. Measure the lengths of sides and angles.
- C. Use a compass and protractor to measure and construct angles and plane geometric figures.
- D. Calculate and compare area, perimeter and circumference of geometric figures.

6. Read, interpret, construct and solve problems using graphs.

- A. Know how and when to use each type of graph.
- B. Read and interpret picto, bar, line and circle graphs.
- C. Construct circle graphs.
- D. Plot integer pairs on a coordinate graph.
- E. Use a computer to develop graphs, charts and tables.

7. Solve basic algebraic equations.

- A. Know the meaning of variables.
- B. Know inverse operations.
- C. Know properties of equality [=, (+ and -), (x and ~)].
- D. Substitute answer to check.

8. Draw conclusions and solve problems using geometric principles.

- A. Know areas of triangles, quadrilaterals and other polygons.
- B. Know perimeters of triangles, quadrilaterals and other polygons.
- C. Know volumes of prisms, cones, pyramids, cylinders and spheres.
- D. Know surface area of prisms, cones, pyramids, cylinders and spheres.
- E. Know vocabulary of polygons.
- F. Find missing values of polygons.
- G. Know how to draw conclusions using geometric principles.
- H. Know how to solve problems using geometric principles.

9. Solve multi-step algebraic equations.

- A. Know order of operations (PEMDAS).
- B. Know how to substitute and evaluate.
- C. Know how to solve problems by trial and error.
- D. Solve one-step equations.
- E. Solve two-step equations.
- F. Know how to transform using grouping symbols.

MATH OUTCOMES

Eighth Grade

1. Connect arithmetic and algebraic principles.

- A. Translate life problems from mathematical to algebraic expressions.
- B. Know the sign rules for addition and multiplication of real numbers.
- C. Know order of operations for evaluating mathematical expressions.
- D. Know the properties of arithmetic as they apply to algebra.
- E. Translate from the concrete level of thinking to the abstract level.

2. Use technology to solve algebraic problems.

- A. Know how to graph using a graphing calculator.
- B. Know how to check validity of any technological solution using a calculator.

3. Simplify expressions using real numbers.

- A. Identify terms, variables, and coefficients.
- B. Add, subtract, multiply and divide using real numbers.
- C. Combine like terms.
- D. Express fractional coefficient in lowest terms.
- E. Know order of operations (PEMDAS).
- F. Be able to use associative, commutative and distributive properties.

4. Be able to determine, solve and graph linear equations with one or more variables.

- A. Use 4 basic operations to isolate variable.
- B. Translate words into algebraic symbols and equations.
- C. Graph linear equations through plotting points.
- D. Recognize and use the slope intercept form of a line for graphing.

5. Understand and use polynomials.

- A. Identify types of polynomials and their parts.
- B. Know how to add and subtract polynomials.
- C. Identify and factor a common monomial factor.
- D. Know how to multiply polynomials.

6. Solve and graph linear inequalities.

- A. Use the number line.
- B. Know the difference between equality and inequality.
- C. Solve equalities.
- D. Graph a line in a coordinate plane.
- E. Know symbolism, including not equal to, greater than, less than.
- F. Know that multiplying or dividing by a negative reverses the direction.
- G. Know how to shade the graph.

7. Solve equations which contain rational expressions.

- A. Identify a rational expression.
- B. Demonstrate the application of 4 basic operations to rational expressions.
- C. Identify and solve linear equations.
- D. Identify and solve equations by substitutions, factoring, and graphing.
- E. Translate life problems to mathematical language.

8. Solve quadratic equations by factoring.

- A. Recognize quadratic equations.
- B. Recognize and use distributive property.
- C. Find the greatest monomial factor.
- D. Factor through reverse FOIL.
- E. Understand and apply the zero product property.
- F. Solve linear equations.

9. Solve problems using linear and quadratic equations.

- A. Know how to solve linear and quadratic equations.
- B. Know how to read and understand the problem.
- C. Know how to analyze the given data.
- D. Know how to transfer the information into algebraic form.
- E. Know if the answer is reasonable.

10. Solve equations which contain radical expressions.

- A. Learn to approximate square roots.
- B. Use the Pythagorean theorem.
- C. Add, subtract, multiply and divide radical expressions.
- D. Use the distance formula to solve problems.

11. Advanced topics.

- A. Use the quadratic formula.
- B. Solve equations by completing the square.
- C. Use square root property of quadratic function.