

# Mediapolis Community School

## Mathematics Standards (K-12)

- A. Students will understand and apply a variety of math concepts.
- B. Students understand and apply methods of estimation.
- C. Students will apply strategies, concepts, and computations to solve a variety of math problems.
- D. Students will interpret data presented in a variety of ways.
- E. Students will perform computation tasks with accuracy.

*(Revised Summer 2004)*

## Math Interval Benchmarks

(The K-2 interval benchmarks were adapted from AEA 9 and revised for incorporation with Mediapolis Math Standards in the spring of 2004. The 3-5, 6-8 and 9-12 interval benchmarks are from the Iowa Department of Education and were used for the Iowa Technical Adequacy Project alignment checking process in the spring of 2003.)

### \*Kindergarten-Grade 2 Interval Benchmarks

***Standard 1: Students will understand and apply a variety of math concepts.***

1. Students describe the properties of numbers and number systems.
2. Students understand the properties of operations.
3. Students understand measurable attributes and the process of measurement.
4. Students use a variety of techniques for measurement.
5. Students identify similarities and differences between simple geometric shapes.
6. Students can create and extend simple patterns.
7. Students can sort, classify, and order objects.

***Standard 2: Students will understand and apply methods of estimation.***

1. Students make reasonable estimates.

***Standard 3: Students will apply strategies, concepts, and computations to solve a variety of math problems.***

1. Students use a variety of strategies to solve problems.
2. Students can explain the process used to solve a numerical problem.
3. Students use geometric reasoning to solve problems.

***Standard 4: Students will interpret data presented in a variety of ways.***

1. Students collect, organize, and display data to answer a question.
2. Students read and interpret data.

***Standard 5: Students will perform computation tasks with accuracy.***

1. Students use models to represent mathematical situations.
2. Students comprehend mathematical terms and representations.
3. Students begin to compute fluently (and applies reasonable estimation skills).

### \*Grades 3-5 Interval Benchmarks

***Standard 1: Students will understand and apply a variety of math concepts.***

1. Students understand and apply number properties and operations.
2. Students understand and apply concepts and procedures of algebra.
3. Students understand and apply concepts of geometry.
4. Students understand and apply concepts of measurement.
5. Students understand and apply concepts in probability and statistics.

***Standard 2: Students understand and apply methods of estimation.***

1. Students understand and apply concepts and procedures of standard rounding, order of magnitude, and number sense.

***Standard 3: Students will apply strategies, concepts, and computations to solve a variety of math problems.***

1. Students solve math problems.
2. Students understand and apply problem-solving approaches and procedures.

***Standard 4: Students will interpret data presented in a variety of ways.***

1. Students can use tables and graphs to locate and read information.
2. Students interpret data from a variety of sources.

***Standard 5: Students will perform computation tasks with accuracy.***

1. Applies addition concepts and procedures to compute with accuracy.
2. Applies subtraction concepts and procedures to compute with accuracy.
3. Applies multiplication concepts and procedures to compute with accuracy.
4. Applies division concepts and procedures to compute with accuracy.

### \*Grades 6-8 Interval Benchmarks

***Standard 1: Students will understand and apply a variety of math concepts.***

1. Students understand and apply number properties and operations.
2. Students understand and apply concepts and procedures of algebra.
3. Students understand and apply concepts of geometry.
4. Students understand and apply concepts of measurement.
5. Students understand and apply concepts in probability and statistics.

***Standard 2: Students understand and apply methods of estimation.***

1. Students understand and apply concepts and procedures of standard rounding, order of magnitude, and number sense.

***Standard 3: Students will apply strategies, concepts, and computations to solve a variety of math problems.***

1. Students solve math problems.
2. Students understand and apply problem-solving approaches and procedures.

***Standard 4: Students will interpret data presented in a variety of ways.***

1. Students can use tables and graphs to locate and read information.
2. Students interpret data from a variety of sources.

***Standard 5: Students will perform computation tasks with accuracy.***

1. Applies addition concepts and procedures to compute with accuracy.
2. Applies subtraction concepts and procedures to compute with accuracy.
3. Applies multiplication concepts and procedures to compute with accuracy.
4. Applies division concepts and procedures to compute with accuracy.

### \*Grades 9-12 Interval Benchmarks

***Standard 1: Students will understand and apply a variety of math concepts.***

1. Students understand and apply number properties and operations.
2. Students understand and apply concepts and procedures of algebra.
3. Students understand and apply concepts of geometry and measurement.
4. Students understand and apply concepts in probability and statistics.

***Standard 2: Students understand and apply methods of estimation.***

1. Students understand and apply concepts and procedures of standard rounding, order of magnitude, and number sense.

***Standard 3: Students will apply strategies, concepts, and computations to solve a variety of math problems.***

1. Students solve math problems requiring multiple steps and operations.
2. Students can reason quantitatively.

***Standard 4: Students will interpret data presented in a variety of ways.***

1. Students can make inferences based on data presented in a variety of way.

2. Students can interpret data from a variety of sources.

***Standard 5: Students will perform computation tasks with accuracy.***

1. Applies addition concepts and procedures to compute with accuracy.
2. Applies subtraction concepts and procedures to compute with accuracy.
3. Applies multiplication concepts and procedures to compute with accuracy.
4. Applies division concepts and procedures to compute with accuracy.

# Math

# Kindergarten

## **Integrated Course Abilities** [Apply the following to each content standard.]

The student will use reasoning and higher order thinking skills with a variety of strategies to solve problems in math.

The student will be able to communicate with other people by means of both oral and written expression about math.

The student will be able to connect and apply math knowledge and skills to a variety of purposes in real life.

Students will experience and develop an awareness of contributions of diverse societies and cultures as well as both men and women, and persons with disabilities, to the field of mathematics.

## **Grade Level Expectations/Benchmarks** (with critical objectives/performance indicators)

### **1. Be ready to use words to describe objects.**

- A. Be able to sort and describe objects (color, weight, shape, length and other kinds of size).
- B. Be able to use the words for size and position (more/less, most/least, few/many, large/small, big/little, heavy/light, thick/thin, over/under, above/below, right/left/middle, beside/in front of/behind, first/second/third/etc.).
- C. Know basic shapes (square, circle, triangle, rectangle).

### **2. Be able to identify and continue patterns.**

- A. Be able to predict what comes next.
- B. Be able to copy a pattern from a picture or model.
- C. Be able to add to patterns.
- D. Be able to make your own pattern.

### **3. Be able to count movable objects up to 10.**

- A. Be able to touch and count each item in the right order.

### **4. Be able to match sets with numbers to 20.**

- A. Be able to recognize the numbers 0-20 in random order.
- B. Be able to relate a group of objects to the numerals 6-20.

### **5. Be able to write numbers 0-20.**

- A. Be able to write numbers using correct number formation, in and out of sequence.

### **6. Be able to write numbers 0-100.**

- A. Be able to write numbers using correct number formation and correct sequence.

### **7. Be able to measure in various ways.**

- A. Be able to identify penny, nickel, dime.
- B. Be able to give the value of a penny, nickel, dime.

# Math

## First Grade

### **Integrated Course Abilities** [Apply the following to each content standard.]

The student will use reasoning and higher order thinking skills with a variety of strategies to solve problems in math.

The student will be able to communicate with other people by means of both oral and written expression about math.

The student will be able to connect and apply math knowledge and skills to a variety of purposes in real life.

Students will experience and develop an awareness of contributions of diverse societies and cultures as well as both men and women, and persons with disabilities, to the field of mathematics.

### **Grade Level Expectations/Benchmarks** (with critical objectives/performance indicators)

**1. Be able to read, write, and compare numbers to 100.**

- A. Be able to count out loud to 100.
- B. Be able to write numbers to 100 in order.
- C. Be able to identify and write numbers to 100 out of order.
- D. Be able to order two digit numbers.
- E. Be able to tell if numbers are greater than, less than, or equal.

**2. Be able to count to 100 in many ways.**

- A. Be able to see the pattern in numbers from 0 to 100.
- B. Be able to count and write by 2's, 5's, and 10's to 100.

**3. Understand place value of ones and tens.**

- A. Be able to group objects by ones and tens.
- B. Be able to identify the ones place, tens place, and hundreds place in two digit numbers.

**4. Be able to do addition and subtraction process to 10.**

- A. Know the meaning of symbols (+, -, =).
- B. Be able to use manipulative to add and subtract.
- C. Be able to add or subtract using numbers vertically and horizontally.

**5. Be able to add and subtract two digit numbers without regrouping.**

- A. Be able to solve two digit addition and subtraction problems using manipulatives.
- B. Be able to start process in the ones column.
- C. Be able to correctly line up addition and subtraction problems with two digit numbers.

**6. Be able to measure in various ways.**

- A. Be able to tell time by the hour and half hour.
- B. Be able to identify and give the value of a penny nickel, dime, and quarter.
- C. Be able to count pennies, nickels, and dimes of mixed value.
- D. Be able to understand the concept of linear measurement using nonstandard units of measure.

# Math

## Second Grade

### **Integrated Course Abilities** [Apply the following to each content standard.]

The student will use reasoning and higher order thinking skills with a variety of strategies to solve problems in math.

The student will be able to communicate with other people by means of both oral and written expression about math.

The student will be able to connect and apply math knowledge and skills to a variety of purposes in real life.

Students will experience and develop an awareness of contributions of diverse societies and cultures as well as both men and women, and persons with disabilities, to the field of mathematics.

### **Grade Level Expectations/ Benchmarks** (with critical objectives/performance indicators)

- 1. Be able to read, write, and compare numbers 100 to 999 and understand hundreds place value.**
  - A. Know that each place (hundreds, tens, ones) can be any number (0 to 9) and be able to read three digit numbers.
  - B. Know that each hundreds number must have three digits and be able to make three digit numbers.
  - C. Know  $<$ ,  $>$ ,  $=$ , and be able to use them appropriately when comparing numbers up to 999.
  - D. Know the sequence of numbers up to 999.
  
- 2. Be able to easily recall addition and subtraction facts and processes to 18.**
  - A. Know the fact families and “double” facts.
  - B. Be able to work number sentences vertically and horizontally.
  - C. Be able to skip count starting at any point.
  
- 3. Be able to add and subtract two and three digit numbers with regrouping.**
  - A. Be able to line up two digit numbers to add and subtract.
  - B. Be able to regroup numbers greater than ten in the next column in addition.
  - C. Be able to regroup in subtraction if the top digit is smaller than the digit below.
  - D. Be able to use manipulatives to show understanding of regrouping.
  
- 4. Be able to measure using various standard units: linear (inch, foot, yard, centimeter, meter); liquid (cup, pint, quart, gallon, liter); time (second, minute, half-hour, hour, day); and money (pennies, nickels, dimes, quarters, and half dollars)**
  - A. Be able to properly place a ruler when measuring.
  - B. Be able to measure an inch and centimeter and use rulers to measure up to 12 inches and 25 cm correctly.
  - C. Be able to recognize down to oneself inch and one centimeter.
  - D. Be able to recognize and accurately measure out a given amount of liquid using cup, pint, quart, gallon, and liter.
  - E. Be able to tell time to the 5-minute intervals.
  - F. Be able to identify and count pennies, nickels, dimes, quarters and half dollars.
  
- 5. Be able to recognize and label fractions in halves, thirds, and fourths.**
  - A. Know that a fraction is part of a whole and be able to identify a fractional part.
  - B. Be able to divide a circle, square, rectangle into  $1/2$ ,  $1/3$ ,  $2/3$ ,  $1/4$ , and  $3/4$ .
  
- 6. Be able to recognize different geometric shapes.**
  - A. Know geometric shapes.
  - B. Know how many sides and corners shapes have.
  
- 7. Be able to find information on a pictograph and bar graph.**
  - A. Be able to identify numbers/amounts on a graph.

# Math

## Third Grade

### **Integrated Course Abilities** [Apply the following to each content standard.]

The student will use reasoning and higher order thinking skills with a variety of strategies to solve problems in math.

The student will be able to communicate with other people by means of both oral and written expression about math.

The student will be able to connect and apply math knowledge and skills to a variety of purposes in real life.

Students will experience and develop an awareness of contributions of diverse societies and cultures as well as both men and women, and persons with disabilities, to the field of mathematics.

### **Grade Level Expectations/Benchmarks** (with critical objectives/performance indicators)

**1. Be able to read, write, and compare whole numbers through four digits and round two- and three digit numbers to the nearest ten.**

- A. Be able to read and write to 9,999.
- B. Be able to compare whole numbers for greater, lesser, and equal.
- C. Be able to find tens, hundreds, and thousands places.
- D. Know and be able to apply the rules for rounding off numbers.

**2. Be able to recall addition and subtraction facts through 18 and multiplication and division 0 to 9.**

- A. Be able to use manipulative to understand facts.
- B. Be able to use strategies to memorize facts.
- C. Be able to use basic facts in real life situations.
- D. Be able to check addition using subtraction and subtraction using addition.

**3. Be able to regroup numbers up to four digits in addition and subtraction.**

- A. Be able to line up four digit numbers to add and subtract.
- B. Be able to regroup numbers greater than ten in the next column in addition.
- C. Be able to complete each column in addition and subtraction before moving on to the next.
- D. Be able to regroup in subtraction if the top digit is smaller than the digit below.
- E. Be able to use manipulative to understand regrouping.

**4. Be able to read, write, illustrate, and compare fractions with like denominators.**

- A. Know placement of numerator and denominator and be able to say and write fractions correctly.
- B. Know meaning of denominator as the whole and numerator as parts of the whole and be able to tell which fraction is larger.
- C. Be able to use manipulatives and pictures to illustrate and compare fractions.

**5. Be able to identify, measure, and describe plane and geometric figures.**

- A. Be able to identify, measure, label, and draw squares, circles, triangle, rectangles, pentagons, hexagons, and octagons.
- B. Be able to identify and label cubes, spheres, cylinders, cones, pyramids, and rectangular prisms.
- C. Be able to describe plane and geometric figures in terms of shape, sides, perimeter, area, and examples.
- D. Be able to match congruent figures and draw a line of symmetry.

**6. Be able to use standard units of linear and liquid measurement, time, and money.**

- A. Be able to measure to the nearest centimeter, half -inch.
- B. Be able to select appropriate units to measure length [centimeter, meter, kilometer; inch, foot, yard, mile]; capacity [milliliter, liter, cup, pint, quart, gallon]; time [second, minute, hour, day]; and money [coins and bills]
- C. Be able to compare units of measurement (as listed in B)
- D. Be able to estimate amounts using appropriate units.
- E. Be able to tell time to one-minute intervals.
- F. Be able to count a mixture of coins and bills.

**7. Be able to read and interpret data.**

- A. Be able to read information from graphs and tables.
- B. Be able to interpret information from graphs/tables.

# Math

## Fourth Grade

### **Integrated Course Abilities** [Apply the following to each content standard.]

The student will use reasoning and higher order thinking skills with a variety of strategies to solve problems in math.

The student will be able to communicate with other people by means of both oral and written expression about math.

The student will be able to connect and apply math knowledge and skills to a variety of purposes in real life.

Students will experience and develop an awareness of contributions of diverse societies and cultures as well as both men and women, and persons with disabilities, to the field of mathematics.

### **Grade Level Expectations/Benchmarks** (with critical objectives/performance indicators)

#### **1. Be able to read, write, and compare whole numbers through seven digits and decimals to hundredths.**

- A. Be able to read and write to millions place.
- B. Know each place value to million.
- C. Be able to compare  $<$ ,  $>$ ,  $=$  for whole numbers.

#### **2. Be able to round four-digit numbers to the nearest thousand and estimate sums and differences.**

- A. Know place value to round off to thousands.
- B. Be able to find digit to the right.
- C. Be able to estimate sums and differences.
- D. Be able to solve sum or difference and determine why the estimate was close or not.

#### **3. Be able to add and subtract whole numbers to seven places.**

- A. Be able to line up seven digit numbers
- B. Be able to regroup in addition.
- C. Be able to correctly use commas.
- D. Be able to regroup in subtraction.
- E. Be able to check with addition and subtraction.
- F. Be able to add and subtract decimals through hundredths.

#### **4. Know multiplication and division facts.**

- A. Be able to demonstrate multiplication and division through the use of manipulative.
- B. Be able to readily recall multiplication facts to ten.
- C. Be able to readily recall division facts to ten.

#### **5. Be able to multiply using one and two digit multipliers and divide four digit dividends by a one digit divisor.**

- A. Be able to line up numbers
- B. Be able to regroup numbers.
- C. Be able to correctly place the partial products.
- D. Be able to use zero as a placeholder.
- E. Be able to correctly place quotient.
- F. Be able to find and correctly place a remainder.

#### **6. Be able to regroup, add, and subtract fractions with like denominators.**

- A. Be able to add and subtract numerators.
- B. Be able to simplify to lowest terms.
- C. Be able to regroup if required.
- D. Be able to compare fractions with like denominators.

#### **7. Know and be able to use various intermediate geometric terms and shapes.**

- A. Know figures up to eight sides.
- B. Know lines, rays, points, and line segments.
- C. Be able to plot coordinates on a graph.
- D. Know right angles, lines of symmetry/congruence, and parallel, perpendicular, and intersecting lines.

#### **8. Be able to use standard units of linear and liquid measurement, time, and money.**

- A. Be able to measure to the nearest centimeter or nearest half-inch.
- B. Be able to select appropriate units to measure length, capacity, time, and money, and temperature.
- C. Be able to find perimeter.

# Math

## Fifth Grade

### **Integrated Course Abilities** [Apply the following to each content standard.]

The student will use reasoning and higher order thinking skills with a variety of strategies to solve problems in math.

The student will be able to communicate with other people by means of both oral and written expression about math.

The student will be able to connect and apply math knowledge and skills to a variety of purposes in real life.

Students will experience and develop an awareness of contributions of diverse societies and cultures as well as both men and women, and persons with disabilities, to the field of mathematics.

### **Grade Level Expectations/Benchmarks** (with critical objectives/performance indicators)

**1. Be able to read, write, and estimate whole numbers through nine digits and decimals to thousandths.**

- A. Be able to read whole numbers and decimals and write whole numbers and decimals that are orally given.
- B. Be able to estimate sums, differences, and products of whole numbers and decimals by rounding.

**2. Be able to multiply using three digit numbers.**

- A. Be able to round to estimate products.
- B. Be able to complete each partial step.
- C. Be able to use zero as a placeholder.
- D. Be able to add partial steps to find total.

**3. Be able to divide using two digit divisors.**

- A. Be able to round to estimate quotient.
- B. Be able to complete each partial step.
- C. Be able to complete whole process.
- D. Be able to apply division skills to solve problems.

**4. Be able to work with metric units using manipulatives.**

- A. Know metric prefixes (kilo, centi, milli) and values.
- B. Be able to measure length, width, and volume.

**5. Be able to add/subtract fractions with like denominators to  $\frac{1}{16}$  and multiply/divide to  $\frac{1}{8}$ .**

- A. Be able to add and subtract numerator.
- B. Be able to make an improper fraction.
- C. Be able to cross multiply.
- D. Be able to invert a divisor.
- E. Be able to reduce to lowest terms.

**6. Be able to compare and order fractions and decimals using  $<$ ,  $>$ ,  $=$ .**

- A. Know terms and symbols  $<$ ,  $>$ ,  $=$ .
- B. Be able to compare decimals using place value.
- C. Be able to find a common denominator.
- D. Be able to compare numerators once common denominators are found.

**7. Understand and be able to apply  $+$ ,  $-$ ,  $\times$ ,  $\div$  to decimals to thousandths.**

- A. Be able to write decimals as fractions.
- B. Be able to identify correct place value after decimal.
- C. Be able to add decimals to thousandths.
- D. Be able to subtract decimals to thousandths.
- E. Be able to multiply decimals to thousandths.
- F. Be able to divide decimals to thousandths.

**8. Be able to recognize, identify, and classify various geometric terms and shapes.**

- A. Be able to identify and measure acute, obtuse, and right angles.
- B. Be able to identify basic and complex geometric shapes and classify geometric shapes by attribute.

# Math

## Sixth Grade

### Integrated Course Abilities [Apply the following to each content standard.]

The student will use reasoning and higher order thinking skills with a variety of strategies to solve problems in math.

The student will be able to communicate with other people by means of both oral and written expression about math.

The student will be able to connect and apply math knowledge and skills to a variety of purposes in real life.

Students will experience and develop an awareness of contributions of diverse societies and cultures as well as both men and women, and persons with disabilities, to the field of mathematics.

### Grade Level Expectations/ Benchmarks (with critical objectives/performance indicators)

#### 1. Be able to use standard and metric units of measure.

- A. Know and know how to find the standard and metric units of measure (linear, weight, volume).
- B. Be able to change units within a system.
- C. Be able to choose best unit of measure.
- D. Be able to estimate solutions involving measurement.
- E. Be able to apply operations to units of measurement.

#### 2. Be able to compare and order integers.

- A. Be able to compare  $<$ ,  $>$ ,  $=$  for positive and negative whole numbers.
- B. Be able to place positive and negative whole numbers on a line graph.
- C. Be able to apply values of positive and negative numbers.
- D. Be able to record and write positive and negative numbers.
- E. Be able to list positive and negative numbers from least to greatest and greatest to least.

#### 3. Be able to integrate the use of the four operations with whole and decimal numbers estimating and finding actual answers.

- A. Know place value (hundred thousandths to trillions).
- B. Be able to read and write numbers from hundred thousandths to trillions (standard form and words).
- C. Be able to round whole numbers to millions.
- D. Be able to add whole numbers and decimal numbers from millionths to trillions.
- E. Be able to subtract numbers with decimals.
- F. Be able to multiply up to three-digit places.
- G. Be able to divide by two-digit divisors.
- H. Be able to use estimating strategies.
- I. Be able to compute average (mean).

#### 4. Be able to estimate and calculate averages and percentages and know about ratios and proportions.

- A. Know terms average, ratio, proportion, percentage.
- B. Be able to determine an average.
- C. Be able to estimate and find a percentage of a number.
- D. Be able to convert decimals, percents, and fractions from one to another.
- E. Be able to write a ratio and proportion.

#### 5. Possess a basic understanding of the four operations with fractions and mixed numbers.

- A. Know the principles of prime factorization (least common multiple and greatest common factor).
- B. Be able to find a common denominator.
- C. Be able to add and subtract fractions.
- D. Be able to multiply and divide fractions.
- E. Be able to reduce to lowest terms.
- F. Be able to convert improper fractions and create whole and mixed numbers.

#### 6. Be able to calculate the linear dimensions of polygons and the area of squares, rectangles, and triangles.

- A. Be able to identify and illustrate basic geometric figures and measure and construct angles.
- B. Know and be able to apply formulas for perimeter, area, circumference, and volume of geometric figures.

# Math

## Seventh Grade

### **Integrated Course Abilities** [Apply the following to each content standard.]

The student will use reasoning and higher order thinking skills with a variety of strategies to solve problems in math.

The student will be able to communicate with other people by means of both oral and written expression about math.

The student will be able to connect and apply math knowledge and skills to a variety of purposes in real life.

Students will experience and develop an awareness of contributions of diverse societies and cultures as well as both men and women, and persons with disabilities, to the field of mathematics.

### **Grade Level Expectations/ Benchmarks** (with critical objectives/performance indicators)

**1. Be completely comfortable with operations with integers.** [Use this standard to allow students to either catch up or enhance higher level skills.]

- A. Understand positive and negative numbers.
- B. Be able to name opposite integers.
- C. Be able to apply four operations to integers.
- D. Be able to apply appropriate operations.
- E. Be able to solve problems using operations.
- F. Be able to use a calculator with integers.

**2. Be able to apply standard and metric measures for temperature, volume, area, mass, and money to real-life situations.**

- A. Know the advantages of each system.
- B. Be able to select appropriate unit.
- C. Be able to use measuring devices.
- D. Be able to translate within a system.
- E. Be able to translate between systems.
- F. Be able to apply all terms properly.

**3. Be able to apply ratios, proportions, averages, and percentages to real-life situations.**

- A. Be able to find equivalent ratios.
- B. Be able to use equivalent fractions and cross products to solve problems.
- C. Be able to calculate mean, median, mode, and range.
- D. Be able to use percent, fraction, decimal equivalents.
- E. Be able to set up and solve percentage problems.
- F. Be able to combine processes to solve problems.
- G. Be able to use a calculator to solve problems related to ratios, proportions, averages, and percentages.
- H. Be able to apply all terms properly.

**4. Be able to apply fractions and decimals to real-life situations.**

- A. Be able to define and know how to calculate repeating and nonrepeating decimals.
- B. Be able to write decimals in scientific notation.
- C. Be able to convert between fractions and decimals.
- D. Know when to use decimals or fractions.
- E. Be able to use operations with decimals & fractions.
- F. Be able to use a calculator with fractions & decimals.

**5. Be able to use geometric principles to draw and compare lengths, area, and volume.**

- A. Know perpendicular and parallel lines, congruence, and similar figures.
- B. Be able to measure and construct lengths, angles, and plane geometric figures and draw 3-D figures.
- C. Be able to calculate and compare area, perimeter, circumference, and volume of geometric figures.

**6. Be able to solve basic algebraic equations.**

- A. Know meaning of variables.
- B. Know inverse operations.
- C. Know properties of equality ( $=$ ,  $+$  and  $-$ ,  $x$  and  $\div$ ).
- D. Be able to substitute answer to check.

# Math

## Eighth Grade

### **Integrated Course Abilities** [Apply the following to each content standard.]

The student will use reasoning and higher order thinking skills with a variety of strategies to solve problems in math.

The student will be able to communicate with other people by means of both oral and written expression about math.

The student will be able to connect and apply math knowledge and skills to a variety of purposes in real life.

Students will experience and develop an awareness of contributions of diverse societies and cultures as well as both men and women, and persons with disabilities, to the field of mathematics.

### **Grade Level Expectations/ Benchmarks** (with critical objectives/performance indicators)

#### **1. Be able to use number properties and operations.**

- A. Be able to write, compare, and order numbers.
- B. Be able to use properties of numbers.
- C. Be able to classify numbers by divisibility.
- D. Be able to add, subtract, multiply, divide
- E. Be able to use place value
- F. Be able to recognize/write numbers in exponential form.

#### **2. Be able to solve consumer/work related problems.**

- A. Be able to find and use formulas.
- B. Be able to determine profit and loss.
- C. Be able to determine commission.
- D. Be able to determine sales tax.
- E. Be able to determine discount, sale price, and original price.
- F. Be able to determine unit cost.
- G. Be able to determine interest, principal, and balance.
- H. Be able to apply general math concepts and computations to solve work related problems.

#### **3. Be able to analyze and interpret statistics and graphs.**

- A. Be able to find range, mean, median, and mode.
- B. Be able to interpret/make line plots, stem and leaf, and scattergrams.
- C. Be able to find/interpret data from a graph/table.
- D. Be able to use terms properly.
- E. Be able to identify/plot points on coordinate plane.
- F. Be able to compare quantities and find ratios.
- G. Be able to find odds and probability and make Predictions based on them.

#### **4. Be able to solve problems using operations with rational numbers.**

- A. Be able to apply four operations to integers.
- B. Be able to choose/apply appropriate operations to solve problems.
- C. Be able to use rounding and estimation to solve problems.
- D. Be able to use number sense to evaluate reasonableness of solutions.

#### **5. Be able to solve problems using measurement, precision, and conversion.**

- A. Be able to measure lengths, volume, and weights in English and metric systems.
- B. Be able to estimate measurements with appropriate Precision.
- C. Know greatest possible error.
- D. Be able to convert within each of the two systems.
- E. Be able to use scientific notation for minute numbers.

#### **6. Be able to draw conclusions and solve problems using geometric principles.**

- A. Be able to calculate areas and perimeters of triangles, quadrilaterals, and other polygons.
- B. Be able to apply volumes and surfaces of prisms, cones, pyramids, cylinders, and spheres.
- C. Know the vocabulary of polygons.
- D. Be able to find missing value of polygons.
- E. Be able to draw conclusions using geometric principles.
- F. Be able to solve problems using geometric principles.

#### **7. Be able to solve multi-step algebraic equations and solve and graph linear equations.**

- A. Be able to apply order of operations.
- B. Be able to substitute and evaluate.
- C. Be able to solve problems by trial and error.
- B. Be able to solve one-step equations.
- E. Be able to solve two-step equations.
- F. Be able to transform using grouping symbols.
- G. Know about functions.
- H. Be able to make tables of solutions.
- I. Be able to graph solutions from a table.

#### **8. Be able to translate from English terms to algebraic equations.**

- A. Know key words for the four operations.
- B. Be able to write expressions.
- C. Be able to recognize the unknown.
- D. Be able to write equation from written/oral problem.
- E. Uses algebraic principles to solve problems

# Math

## Eleventh Grade

### **Integrated Course Abilities** [Apply the following to each content standard.]

The student will use reasoning and higher order thinking skills with a variety of strategies to solve problems in math.

The student will be able to communicate with other people by means of both oral and written expression about math.

The student will be able to connect and apply math knowledge and skills to a variety of purposes in real life.

Students will experience and develop an awareness of contributions of diverse societies and cultures as well as both men and women, and persons with disabilities, to the field of mathematics.

### **Grade Level Expectations/ Benchmarks** (with critical objectives/performance indicators)

#### **1. Be able to perform the four basic operations of addition, subtraction, multiplication, and division involving:**

- A. Whole numbers
- B. Integers
- C. Fractions
- D. Decimals
- E. Be able to choose appropriate operations to solve problems.
- F. Be able to apply order of operations.
- G. Be able to use a calculator to perform operations and solve problems.
- H. Be able to use estimation and number sense to evaluate reasonableness of solutions.

#### **2. Be able to solve problems using measurement, precision, and conversion.**

- A. Be able to understand and use measures of length, volume, and weight in English and metric systems.
- B. Be able to convert within each of the two systems.
- C. Be able to round off measurement and error.
- D. Be able to determine appropriate precision of measurement.
- E. Be able to estimate and evaluate reasonableness of measurement.

#### **3. Be able to analyze data and use the basic principles of statistics and graphs.**

- A. Be able to find range, mean, median, and mode.
- B. Be able to find and interpret data from a graph/table.
- C. Be able to compare quantities and make estimates of differences.
- D. Be able to identify/plot points on a coordinate plane.
- E. Be able to make predictions based on probability.

#### **4. Be able to use geometric principles to draw conclusions and solve problems.**

- A. Be able to calculate areas and perimeters of triangles, quadrilaterals, and other polygons.
- B. Be able to apply volumes and surfaces of prisms, cones, pyramids, cylinders, and spheres.
- C. Be able to recognize and use the vocabulary of polygons.
- D. Be able to find missing value of polygons.
- E. Draw conclusions and solve problems using geometric principles.

#### **5. Use basic algebraic principles to solve equations and other word problems.**

- A. Be able to operate with integers.
- B. Be able to solve equations using addition, subtraction, multiplication, and division.
- C. Be able to solve equations using number properties.
- D. Know the sign rules for addition, subtraction, multiplication, and division.
- E. Be able to apply order of operations.
- F. Be able to evaluate and graph equations.
- G. Be able to use the step-by-step approach to problem solving (especially for equations).
- H. Be able to solve verbal or written problems by organizing, writing, and solving equations.
- I. Be able to identify and use basic algebraic ideas such as terms, variables, coefficients, exponents, polynomials, equalities, and inequalities.
- J. Be able to combine like terms.
- K. Be able to use associative, commutative, and distributive properties.
- L. Be able to use the four basic operations to isolate a variable.
- M. Know the difference between equality and inequality.
- N. Be able to simplify algebraic expressions.
- O. Be able to identify and solve linear equations.
- P. Be able to use algebra to solve problems involving ratio, proportion, percent, and geometry.

# Math

## General Mathematics

### Integrated Course Abilities [Apply the following to each content standard.]

The student will use reasoning and higher order thinking skills with a variety of strategies to solve problems in math.

The student will be able to communicate with other people by means of both oral and written expression about math.

The student will be able to connect and apply math knowledge and skills to a variety of purposes in real life.

Students will experience and develop an awareness of contributions of diverse societies and cultures as well as both men and women, and persons with disabilities, to the field of mathematics.

### Course Content (with critical objectives/performance indicators)

- 1. Be able to apply math and problem-solving methods to the process of earning income.**
  - A. Be able to communicate about income (want ads, resumes, interviews, wages/salaries, cooperation, math terms).
  - B. Be able to compare salaries and convert hourly wages to weekly and yearly income.
  - C. Be able to figure a paycheck with standard FICA and income tax deductions.
  - D. Be able to calculate raises and determine pay for quota and piecemeal work.
- 2. Be able to apply math and problem-solving methods to income and sales taxes.**
  - A. Be able to communicate about taxes (forms, manuals, basic terms, cooperation, math terms).
  - B. Be able to complete the 1040EZ form and calculate cost of sales tax for various purchases.
- 3. Be able to apply math and problem-solving methods to daily transportation.**
  - A. Be able to communicate about transportation (want ads, interest, loans, basic terms, cooperation, math terms).
  - B. Be able to calculate total cost of purchasing cars (loans, maintenance, fuel, insurance, parking, storage).
  - C. Be able to calculate costs of public transportation and compare to cost of purchase or to cost of a combined plan.
- 4. Be able to apply math and problem-solving methods to housing.**
  - A. Be able to discuss housing costs intelligently (want ads, deposits, leases, cooperation, math terms).
  - B. Be able to calculate total cost of various rental options (deposits, monthly rent, phone, utilities, sharing plans).
  - C. Be able to calculate total cost of a basic home purchase (down payment, monthly payments, taxes, insurance, utilities, phone, use of escrow, maintenance).
  - D. Be able to compare rent to purchase.
- 5. Be able to apply math and problem-solving methods to shopping, purchasing, and gambling.**
  - A. Be able to communicate when shopping (advertising, credit, layaway, cooperation, math terms).
  - B. Be able to analyze sales for actual costs including comparing by cost per unit.
  - C. Be able to determine with justification the generally most economical grocery store that is available.
  - D. Be able to compare costs of outright purchase, layaway, credit card, and bank loan for various purchases.
  - E. Be able to determine odds of various gambling games, to analyze odds of lotteries and pull tabs, and to formulate a plan to prevent gambling from becoming a personal problem.
- 6. Be able to apply math and problem-solving methods to banking, savings, and investment.**
  - A. Be able to communicate about savings and basic investment (cooperation, basic terms, math terms).
  - B. Be able to calculate various forms of simple and compound interest and compare different available savings options.
  - C. Be able to select, establish, and maintain a checking account.
- 7. Be able to apply math and problem-solving methods to budgets.**
  - A. Be able to discuss budgets intelligently (cooperation, basic terms, math terms).
  - B. Be able to determine various living expenses from general budget plans and from life.
  - C. Be able to apply general budget plans to a given real-life situation.
  - D. Be able to establish and maintain a budget.

NOTE: During the second semester the instructor will also present pre-algebra materials matching individual abilities as much as possible to determine scope of content.

# Math

## Basic Algebra

### **Integrated Course Abilities** [Apply the following to each content standard.]

The student will use reasoning and higher order thinking skills with a variety of strategies to solve problems in math.

The student will be able to communicate with other people by means of both oral and written expression about math.

The student will be able to connect and apply math knowledge and skills to a variety of purposes in real life.

Students will experience and develop an awareness of contributions of diverse societies and cultures as well as both men and women, and persons with disabilities, to the field of mathematics.

### **Course Content** (with critical objectives/performance indicators)

1. **Be able to operate with integers.**
  - A. Know the sign rules for add, subtract, multiply, and divide.
  - B. Be able to apply order of operations.
  - C. Be able to calculate using the four basic operations.
  
2. **Be able to select and apply formulas.**
  - A. Be able to evaluate algebraic equations.
  - B. Be able to apply formulas for triangle, rectangle, square, parallelogram, trapezoid, and circle.
  - C. Be able to insert data into formula.
  - D. Be able to graph an equation.
  
3. **Be able to solve equations.**
  - A. Be able to apply properties of arithmetic.
  - B. Be able to identify terms, variables, and coefficients.
  - C. Be able to combine like terms.
  - D. Be able to use associative, commutative, and distributive properties.
  - E. Be able to use four basic operations to isolate a variable.
  - F. Know difference between equality and inequality.
  - G. Be able to solve inequalities.
  - H. Be able to solve proportions.
  - I. Be able to identify and solve linear equations.

# Math Algebra I

## **Integrated Course Abilities** [Apply the following to each content standard.]

The student will use reasoning and higher order thinking skills with a variety of strategies to solve problems in math.

The student will be able to communicate with other people by means of both oral and written expression about math.

The student will be able to connect and apply math knowledge and skills to a variety of purposes in real life.

Students will experience and develop an awareness of contributions of diverse societies and cultures as well as both men and women, and persons with disabilities, to the field of mathematics.

## **Course Content** (with critical objectives/performance indicators)

1. **Be able to connect arithmetic and algebraic principles.**
  - A. Be able to 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. Be able to translate from the concrete level of thinking to the abstract level.
  
2. **Be able to simplify expressions using real numbers.**

A. Be able to identify terms, variables, and coefficients.	E. Know and be able to apply order of operations.
B. Be able to do four operations with real numbers.	F. Know associative, commutative, distributive properties.
C. Be able to combine like terms.	
D. Be able to express fractional coefficients in lowest terms.	
  
5. **Be able to determine, solve, and graph linear equations with one or more variables.**

A. Be able to use basic operations to isolate variable.	C. Be able to graph linear equations by plotting points.
B. Be able to translate words into algebraic symbols And equations	D. Be able to recognize and use the slope-intercept form of a line for graphing.
  
6. **Understand and be able to use polynomials.**
  - A. Be able to identify, add, and subtract types of polynomials and their parts.
  - B. Be able to identify and factor a common monomial factor.
  - C. Be able to multiply and divide polynomials.
  - D. Be able to recognize special binomials (square binomial, perfect squares, difference of squares).
  - E. Know the zero product property and know how to relate to factors of polynomials.
  
7. **Be able to solve and graph linear inequalities.**

A. Be able to use number line, symbolism ( $\neq$ , $<$ , $>$ , $\leq$ , $\geq$ ).	D. Be able to graph a line in a coordinate plane.
B. Know difference between equality and inequality.	E. Know that multiplying or dividing by a negative reverses the direction of the inequality.
C. Be able to solve inequalities.	
  
8. **Be able to solve equations that contain rational expressions.**

A. Be able to identify a rational expression.	D. Be able to identify/solve equations by substitutions, factoring, and graphing.
B. Be able to apply operations to rational expressions.	
C. Be able to identify and solve linear equations.	E. Be able to translate life problems into math language.
  
9. **Be able to solve quadratic equations by factoring.**

A. Be able to recognize quadratic equations.	D. Be able to factor through reverse FOIL.
B. Be able to recognize and use distributive property.	E. Be able to apply the zero product property.
C. Be able to find the greatest monomial factor.	F. Be able to solve linear equations.

# Math Algebra II

## Integrated Course Abilities [Apply the following to each content standard.]

The student will use reasoning and higher order thinking skills with a variety of strategies to solve problems in math.

The student will be able to communicate with other people by means of both oral and written expression about math.

The student will be able to connect and apply math knowledge and skills to a variety of purposes in real life.

Students will experience and develop an awareness of contributions of diverse societies and cultures as well as both men and women, and persons with disabilities, to the field of mathematics.

## Course Content (with critical objectives/performance indicators)

### 1. Be able to solve, graph, and analyze linear equations and inequalities.

- A. Be able to write an equivalent equation or inequality in simplest form.
- B. Know slope-intercept, standard, point-slope form.
- C. Be able to use ordered pairs to graph or in a solution set.
- D. Know the relationship between the ordered pairs and graph and equation.
- E. Know slope, intercepts, domain, and range.

### 2. Be able to solve, graph, and analyze nonlinear equations/inequalities by various methods.

- A. Be able to write an equivalent equation or inequality in simplest form.
- B. Be able to solve: factoring, completing the square, and quadratic formula.
- C. Be able to determine ordered pairs in a solution set.
- D. Be able to relate ordered pairs, graph, and equation.
- E. Be able to find vertex, maximum, and minimum.
- F. Know domain and range.

### 3. Be able to solve, graph, and analyze systems of equations/inequalities by various methods.

- A. Be able to solve by graphing, substitution, and linear combination.
- B. Know and be able to identify the types of solutions.

### 4. Understand and apply functions.

- A. Know the definition of a function.
- B. Be able to use functional notation and graph functions.
- C. Know the attributes of families of functions.
- D. Be able to develop functions from data points.

### 5. Be able to solve trigonometric functions using triangles.

- A. Know sine, cosine, and tangent relationships for right triangle.
- B. Be able to solve missing parts of a right triangle.
- C. Know and be able to apply laws of cosine and sine.
- D. Know cases of multiple or no solutions.

### 6. Understand and use the exponential and logarithmic functions.

- A. Know the relationship between exponential and logarithmic functions.
- B. Know the methods of solving simple logarithmic and exponential equations.
- C. Know the basic properties of and be able to use logarithms to solve problems.

### 7. Be able to perform operations and solve equations using complex numbers.

- A. Know definition of complex numbers.
- B. Be able to apply the basic operations with radicals.
- C. Be able to solve equations with complex solutions.

### 8. Be able to perform operations and solve equations using radicals.

- A. Be able to simplify radicals.
- B. Know the four basic operations with radicals.
- C. Know relationship between rational exponents and their radical form.
- D. Be able to solve linear equations with radical solutions.
- E. Be able to solve quadratic equations with radical solutions.

# Math Geometry

## **Integrated Course Abilities** [Apply the following to each content standard.]

The student will use reasoning and higher order thinking skills with a variety of strategies to solve problems in math.

The student will be able to communicate with other people by means of both oral and written expression about math.

The student will be able to connect and apply math knowledge and skills to a variety of purposes in real life.

Students will experience and develop an awareness of contributions of diverse societies and cultures as well as both men and women, and persons with disabilities, to the field of mathematics.

## **Course Content** (with critical objectives/performance indicators)

### **1. Understand the basic terms and symbols of geometry.**

- A. Be able to apply the undefined terms of geometry.
- B. Know how basic mathematical systems are built.
- C. Be able to identify the basic geometric symbols.
- D. Be able to apply the basic definitions of geometry.

### **2. Understand area, perimeter, and volume.**

- A. Be able to use basic formulas.
- B. Be able to apply formulas to life problems.
- C. Be able to apply the concept of unit label to linear, area, and volume measurement.

### **3. Understand the various types of symmetry and transformation.**

- A. Be able to recognize and use point, line, and rotational symmetry.
- B. Be able to apply the properties of the basic mappings.

### **4. Be able to use concepts of congruence and similarity to compare lengths, areas, and volumes.**

- A. Be able to apply the concepts of congruence and similarity.
- B. Be able to identify the corresponding parts of congruent figures.
- C. Be able to apply methods of proving congruence and similarity.

### **5. Understand angle, line, and circle relationships.**

- A. Be able to apply the relationship of angles with regard to parallel and perpendicular lines and circles.
- B. Be able to apply parallel and perpendicular postulates and theorems.
- C. Be able to apply different types of angles.
- D. Be able to apply the relationship between circles and angles.
- E. Be able to apply the relationship between circles and lines.

### **6. Be able to use geometric instruments to make drawings.**

- A. Be able to identify and correctly use basic construction instruments.
- B. Be able to perform basic constructions.
- C. Be able to solve problems by using constructions.
- D. Be able to conjecture theorems and postulates by using computer-aided constructions.

# Math Calculus

## **Integrated Course Abilities** [Apply the following to each content standard.]

The student will use reasoning and higher order thinking skills with a variety of strategies to solve problems in math.

The student will be able to communicate with other people by means of both oral and written expression about math.

The student will be able to connect and apply math knowledge and skills to a variety of purposes in real life.

Students will experience and develop an awareness of contributions of diverse societies and cultures as well as both men and women, and persons with disabilities, to the field of mathematics.

## **Course Content** (with critical objectives/performance indicators)

### 1. Be able to express advanced mathematical ideas and relationships orally and in writing.

- A. Be able to apply the concepts of group and field.
- B. Be able to work with a conjunction and a disjunction.
- C. Be able to prove by direct, indirect, math induction, and truth tables.

### 2. Possess a working knowledge of trigonometry and be able to manipulate trigonometric identities.

- A. Be able to apply the definitions of trigonometric functions based on unit circle.
- B. Be able to graph using the six trigonometric functions and variables.
- C. Be able to find amplitude, period, and phase.
- D. Be able to apply the results of combining functions.
- E. Be able to apply common identities.
- F. Be able to establish new identification based on other identification.
- G. Be able to solve trigonometric equations.

### 3. Be able to apply trigonometry to find solutions.

- A. Be able to apply the polar coordinate system.
- B. Be able to apply complex numbers and limits.

### 4. Understand vectors and matrices.

- A. Know what a vector and a matrix are.
- B. Be able to apply operations of vectors and matrices.
- C. Be able to show a proof with vectors and matrices.
- D. Be able to solve systems using matrices.

### 5. Understand sequences and series.

- A. Know the difference between arithmetic and geometric sequences and series
- B. Know what a sequence and a series are.
- C. Know the difference between finite and infinite.

### 6. Understand the basics of analytic geometry.

- A. Know the four different conic sections.
- B. Be able to identify the equations of the conic sections.
- C. Be able to graph the conic sections by using the major components of each.

### 7. Be able to use logarithms and exponential functions.

- A. Be able to apply real number exponents.
- B. Be able to apply logarithmic functions and exponential functions.
- C. Be able to apply relationship between a logarithmic and exponential function.
- D. Be able to apply laws and properties of logarithmic and exponential functions.
- E. Be able to solve logarithmic and exponential equations.

### 8. Understand limits.

- A. Know what a limit is.
- B. Be able to find the limit of a function.
- C. Be able to apply limits to the other areas of mathematics.