Sacred Heart School
Course Syllabus

Class Subject: Grade 6 Mathematics (Advanced)
Teacher Information: Barbara Hamanaka
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Course Description: The purpose of the advanced math program is to move more quickly through the topics covered in a standard math program so that students in the eighth grade are prepared to cover a high school level Algebra I course. This will enable them to enroll in the sophomore level math course once they enter high school.

General Course Objectives:
ALGEBRA

Number Properties and Operations
The student will:

- Understand the commutative and associative properties of addition and multiplication
- Use the order of operations
- Add, subtract, multiply, and divide whole numbers and decimals
- Add, subtract, multiply, and divide fractions and mixed numbers
- Convert fractions to decimals and vice versa
- Work with percents
- Interchange decimals, fractions, and percents
- Understand the distributive property

Integers
The student will:

- Understand the placement of integers on a number line
- Determine the absolute value of a number
- Order integers
- Add and subtract integers
- Multiply and divide integers

Equations
The student will:

- Solve addition and subtraction equations
- Solve multiplication and division equations
- Solve multi-step equations
- Solve equations with variable on both sides
- Convert verbal sentences to algebraic equations
- Formulate an equation from a problem situation

Inequalities
The student will:

- Write and graph inequalities in one variable
- Solve inequalities by adding and subtracting
- Solve inequalities by multiplying and dividing

RATIOS, RATES, AND PROPORTIONS

Proportional Reasoning
The student will:

- Solve proportions
- Set up proportions from problem situations
  Rates and unit rates
  Similar figures
  Maps and scale drawings
  Percents

GEOMETRY

Geometry in a Plane
The student will:

- Identify, measure and draw angles
- Identify and classify triangles
- Determine supplementary and complementary angles
- Know how to classify polygons
- Know the definition of congruent and similar figures
- Use proportions to solve geometric problems
- Use the Pythagorean Theorem to solve geometric problems
- Determine the perimeter of polygons
- Calculate the area of triangles, rectangles, parallelograms, trapezoids, circles, and irregular figures which can be divided into some of the above

Geometry of Space
The student will:

- Explore surface area of prisms and cylinders
- Explore volumes of prisms, cylinders, pyramids, and cones

Coordinate Geometry
The student will:

- Plot ordered pairs
- Determine positive, negative, or lack of correlation of data

DATA ANALYSIS AND PROBABILITY

Graphing and Tables

The student will:

- Become familiar with and be able to organize data with the following types of graphs:
    - Bar graphs
    - Histograms
    - Line graphs
    - Circle graphs
    - Line plots
    - Scatter plots
    - Stem-and-Leaf plots

Probability

The student will:

- Determine the probability of a simple event
- Compare theoretical and experimental probabilities

Instructional Strategies: Include but are not limited to the following:

Formal instruction and questioning, continuous problem solving by students during class, collaborative learning, individual instruction

Assessment:

Written exams, homework, class participation, teacher observation

Materials:

Textbook – Mathematics – Course 2, Charles, et. al. Pearson Prentice Hall, 2010
Teacher generated materials
White boards and markers
Calculators
Protractors
Compasses

Sacred Heart School
Course Syllabus

Class Subject: Grade 7 Mathematics (Advanced)
Teacher Information: Barbara Hamanaka
Sacred Heart School : 860-445-0611
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Course Description: The purpose of the advanced math program is to move more quickly through the topics covered in a standard math program so that students in the eighth grade are prepared to cover a high school level Algebra I course. This will enable them to enroll in the sophomore level math course once they enter high school.

General Course Objectives:
ALGEBRA

Integers
The student will:
- Add and subtract integers
- Multiply and divide integers

Equations
The student will:
- Understand the order of operations
- Solve addition and subtraction equations
- Solve multiplication and division equations
- Solve multi-step equations
- Solve equations with variable on both sides
- Convert verbal sentences to algebraic equations
- Formulate an equation from a problem situation

Inequalities
The student will:
- Write and graph inequalities in one variable
- Solve inequalities by adding and subtracting
- Solve inequalities by multiplying and dividing

RATIOS, RATES, AND PROPORTIONS

Proportional Reasoning
The student will:
- Solve proportions
- Set up proportions from problem situations
  Rates and unit rates

Similar figures – indirect measurement
Maps and scale drawings
Percents

RATIONAL NUMBERS

Equivalent Forms of Rational Numbers
The student will:

- Write equivalent forms of fractions
- Convert fractions to decimals
- Covert decimals (both terminating and repeating) to fractions

Operations with Rational Numbers
The student will:

- Add and subtract rational numbers
- Multiply and divide rational numbers
- Exponents and scientific notation
- Square roots and irrational numbers
- Use the Pythagorean Theorem to solve problems
- Work word problems using percents - markup, discount, interest

GEOMETRY

Geometry in a Plane
The student will:

- Identify, measure and draw angles
- Identify and classify triangles
- Determine supplementary and complementary angles
- Know how to classify polygons
- Know the definition of congruent and similar figures
- Use proportions to solve geometric problems
- Use the Pythagorean Theorem to solve geometric problems
- Determine the perimeter of polygons
- Calculate the area of triangles, rectangles, parallelograms, trapezoids, circles, and irregular figures which can be divided into some of the above
- Calculate angle measure in polygons
- Construct congruent angles
- Construct perpendicular lines

Geometry of Space
The student will:

- Explore surface area of prisms and cylinders
- Explore volumes of prisms, cylinders, pyramids, and cones

- Similar figures in three dimensions

Coordinate Geometry
The student will:
- Plot ordered pairs
- Translations
- Reflections and Symmetry
- Rotations

DATA ANALYSIS AND PROBABILITY

Data Analysis and Graphing
The student will:
- Find mean, median, and mode
- Make line plots
- Make stem-and-leaf plots
- Make box-and-whisker plots
- Make histograms
- Make circle graphs
- Make Venn diagrams
- Read graphs critically
- Interpret scatter plots
- Choose appropriate graphs
- Learn elements of conducting a good survey

Probability
The student will:
- Use probability to make predictions
- Determine probability of independent events
- Determine probability of dependent events
- Determine permutations and combinations

FUNCTIONS

The student will:
- Relate graphs to events
- Recognize arithmetic and geometric sequences
- Recognize linear and exponential functions
- Recognize the rate of change as the slope of a linear function
- Graph linear functions
- Write an equation for a linear function

Instructional Strategies: Include but are not limited to the following:

Formal instruction and questioning, continuous problem solving by students during class, collaborative learning, individual instruction

Assessment:

Written exams, homework, class participation, teacher observation

Materials:

Textbook – Mathematics – Course 3, Charles, et. al. Pearson Prentice Hall, 2010
Teacher generated materials
White boards and markers
Calculators
Protractors
Compasses

Sacred Heart School
Course Syllabus

Class Subject: Grade 8 Mathematics (Advanced) – Algebra I
Teacher Information: Barbara Hamanaka
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Course Description: The eighth grade advanced math program consists of a high-school level Algebra course. This course prepares the student to step into the second year math program in high school.

General Couse Objectives:
ALGEBRA

Expressions
The student will:

- Understand numerical and variable expressions
- Understand powers and square roots (exponents)
- Correctly use the order of operations in computation
- Simplify expressions by adding, subtracting, multiplying, dividing, and factoring
- Write verbal phrases as algebraic expressions
- Understand the use of formulas
- Be able to rewrite a formula for a specified variable
- Write polynomials in standard form
- Add and subtract polynomials
- Multiply polynomials
- Factor trinomials of the type $x^2 + bx + c$
- Factor trinomials of the type $ax^2 + bx + c$
- Factor by grouping
- Simplify rational expressions
- Multiply and divide rational eexpressions
- Divide polynomials
- Add and subtract rational expressions

Integers
The student will:

- Understand the placement of integers on a number line
- Determine the absolute value of a number
- Order integers
- Add and subtract integers
- Multiply and divide integers

Number Properties

The student will:

- Understand the commutative properties of addition and multiplication
- Understand the associative properties of addition and multiplication
- Understand the distributive property
- Understand the property of the additive inverse
- Understand the property of the multiplicative inverse

Linear Equations

The student will:

- Solve equations by addition and subtraction
- Solve equations by multiplication and division
- Check a solution to an equation
- Write verbal sentences as algebraic expressions
- Formulate an equation from a problem situation
- Solve multistep equations
- Solve equations with variables on both sides
- Solve equations with fractional coefficients
- Solve systems of linear equations by graphical means
- Solve systems of linear equations by substitution
- Solve systems of linear equations by elimination
- Solve systems of linear inequalities by graphical means

Quadratic Equations

The student will:

- Explore graphs of quadratic functions
- Solve quadratic equations by graphing
- Solve quadratic equations by factoring
- Solve quadratic equations using quadratic formula
- Understand the use of the discriminant

Inequalities

The student will:

- Solve inequalities using addition and subtraction
- Solve inequalities using multiplication and division
- Solve multi-step inequalities
- Graph inequalities in one and two variables
- Solve systems of inequalities by graphical means

Graphing

The student will:

- Graph linear function
- Write equations for linear graphs
- Graph quadratic functions

Decimals and Percents
The student will:

- Add and subtract decimals
- Multiply and divide decimal
- Determine equivalent forms of decimal, fractions and percents
- Determine percent of a number
- Solve percent equations

Fractions and Mixed Numbers
The student will:

- Represent a quotient as a fraction
- Determine common denominators
- Compare and order fractions
- Determine equivalent forms of decimal, fractions, and percents
- Add and subtract rational numbers
- Multiply and divide rational numbers
- Solve equations by applying inverse operations
- Simplify rational variable expressions
- Add and subtract rational variable expressions with like denominators
- Add and subtract rational variable expressions with unlike denominators
- Multiply and divide rational variable expressions
- Divide polynomials
- Simplify mixed expressions and complex fractions
- Solve rational equations

Ratios, Proportions,, and Percents
The student will:

- Use equivalent forms of ratios, decimals, and percents
- Calculate the percent of a number
- Use ratios and rates and determine unit ratios and rates
- Use proportions to solve problems including scale drawings and similar figures
- Solve percent equations
- Solve work problems
- Solve proportions involving variable expressions

GEOMETRY

Geometry of a Plane
The student will:

- Understand the definitions of points, lines, and planes
- Understand the definition of parallel lines
- Identify, measure, and draw angles
- Know the definitions of acute, right, obtuse and straight angles

- Know the definition of supplementary and complementary angles
- Know how to classify polygons
- Understand the Venn diagram of quadrilateral relationships
- Know the definition of congruent and similar figures
- Know the properties of similar figures
- Use proportions to solve geometric problems
- Use the Pythagorean Theorem to solve geometric problems
- Solve perimeter, area, and volume problems involving variable expressions

Geometry of Space
The student will:
- Determine surface area
- Determine volume

Coordinate Geometry
The student will:
- Plot ordered pairs
- Recognize patterns in the coordinate plane
- Graph equations with two variable
- Understand linear functions
- Determine the slope of a linear graph
- Graph linear equation based on slope-intercept form
- Write a linear equation based on graphical representation

Rational and Real Numbers
The student will be able to:
- Show that a number is rational
- Classify real numbers as rational or irrational
- Evaluate square roots
- Add and subtract radical expressions
- Multiply and divide radical expressions

MEASUREMENT

Length
The student will determine:
- Length in customary and metric systems
- Perimeter of polygons
- Circumference of circles

Area
The student will determine:
- Area of square and rectangle
- Area of a triangle

- Area of a circle
- Surface area of a prism

Volume
The student will determine the volume of a
- Prism
- Sphere

Indirect Measurement
The student will:
- Use the Pythagorean Theorem
- Use similar triangles

PROBLEM SOLVING
The student will solve word problems in the following categories:
- Consecutive integers
- Cost, income, and value
- Rate – time – distance
- Area
- Percent
- Mixture
- Work
- Ratios and proportions
- Quadratic equations
- Involving more tha one variable
- Wind and water current

USING TECHNOLOGY

Calculator
In appropriate situations students will use the calculator to:
- Calculate powers and square and cube roots
- Multiply and divide decimal with more than four digits
- Perform calculations in scientific notation

Graphing Calculator
The student will:
- Graph linear equations
- Graph quadratic equations
- Graph exponential equations

Instructional Strategies: Include but are not limited to the following:
Formal instruction and questioning, continuous problem solving by students during class, collaborative learning, individual instruction

Assessment:
Written exams, homework, class participation, teacher observation

Materials:
Textbook – Algebra – Structure and Method – Book 1, Brown, Dolciani, et. al., McDougal Littell,, Boston, 2000..
Teacher generated materials
White boards and markers
Scientific Calculators
Graphing Calculators (supplied in class)
Protractors
Compasses