Murrieta Valley Unified School District　　　　　　　　**REVISED: March 2016**
HIGH SCHOOL COURSE OUTLINE

Course Title:　　　　　　Math 96 Intermediate Algebra

Department:　　　　　　Mathematics

Course #:　　　　　　　2476

Grade Level/s:　　　　　11 and 12

Length of Course:　　　Year

Prerequisite/s:　　　　　By placement: Grade C or better in Geometry or Math II, District
　　　　　　　　　　　　　　Assessment results and/or Teacher Recommendation

UC/CSU (A-G) Req:　　　(C) Mathematics/Algebra 2

Brief Course Description:　Math 96, Intermediate Algebra, incorporates the new California
State Standards and Practice Standards in Mathematics and
prepares students for college-level coursework and is aligned with
Math 96 at Mt. San Jacinto College. This course is designed to
provide students with a strong foundation in algebra, graphing and
problem-solving skills. Course topics include linear, absolute
value, quadratic, polynomial, exponential and logarithmic
functions; relations and functions; systems of equations involving
three variables; and conics. Successful completion of this course
prepares students to take high school Pre-Calculus or a transfer-
level mathematics course, such as College Algebra, at community
college.

The purpose of Math 96 Intermediate Algebra is to delve deeper
into the mathematics presented in Math 2 (or Algebra 1-Geometry
course sequence). Students will continue to learn higher
mathematical topics such as Rational Expressions, Exponential,
Logarithmic and Trigonometric Functions, in addition to Probability
and Statistics. Students work closely with expressions that define
functions, competently manipulate algebraic expressions, and
model situations. Students solve quadratic equations over the set
of complex numbers and solve exponential equations using
properties of logarithms. Students will explore and present
mathematical concepts graphically, numerically, algebraically and
verbally. Students routinely use the standards for mathematical
practice to make sense of problems, justify solutions and
conclusions, model with mathematics, and strategically use
technology to analyze and solve real-world problems.

Course Title: Math 96 Intermediate Algebra

I.   GOALS

The students will:
A. Select the correct set from the natural, whole, integer, rational and real number sets to which a number belongs

B. Produce the solution to quadratic, rational, absolute value and radical equations

C. Produce the solution to quadratic and rational applications

D. Solve quadratic inequalities and absolute value inequalities of the form $|ax + b| > n$, $|ax + b| < n$, and $|ax + b| = n$, where n can be positive, negative or zero

E. Choose the right procedure to factor polynomials of higher degrees

F. Produce the simplified form of an expression containing integer and rational exponents and radical expressions

G. Decide if a given graph represents a function and state the domain and range

H. Deduce the solution to a system of three equations in three variables

I. Produce the simplified form of a negative radicand utilizing a factor of i

J. Construct the graphs of functions (quadratic, square root, and exponential) and conic sections

K. Formulate the logarithmic equivalent of an exponential function

L. Produce the simplified form of complex fractions

These goals are aligned with the California State Standards, including the Standards of Mathematical Practices.

II.   OUTLINE OF CONTENT FOR MAJOR AREAS OF STUDY

<u>Semester 1</u>

A. Basics of Algebra
   1. Identify and classify sets of numbers
   2. Use the natural, whole, integer, rational and irrational real number subset structure
   3. Write a solution in set builder notation
   4. Find the subset, union and intersection of sets and introduce the empty set
   5. Evaluate the absolute value of irrational numbers
   6. Graph irrational numbers on the real number line
   7. Use the Pythagorean theorem
   8. Simplify expressions using commutative, associative, identity, inverse and distributive properties of real numbers

Course Title: Math 96 Intermediate Algebra

      9. Identify and use the reflexive, symmetric, transitive and substitution properties of equality
    10. Identify and use the transitive and trichotomy properties of inequality
    11. Use linear equations to solve application problems
    12. Solve absolute value equations and inequalities and graph its solution set
    13. Apply the definitions, terminology and theorems of inequalities and polynomials
    14. Use the additive and multiplicative properties of inequality
    15. Factor polynomials
    16. Use long division of polynomials to simplify quotients
    17. Apply definitions, terminology and theorems of exponents
    18. Identify the laws of exponents and relate to variable exponents
    19. Evaluate and simplify expressions with exponents

B. Rational, Exponential and Radical Expressions
    1. Apply definitions, terminology and theorems of rational, exponential and radical expressions
    2. Add, subtract, multiply and divide rational expressions
    3. Simplify complex fractions
    4. Use long division to simplify rational expressions
    5. Find the solution of equations with rational expressions
    6. Solve application problems by solving rational expressions
    7. Evaluate, simplify, add, subtract, multiply and divide rational exponent and radical expressions
    8. Translate expressions with rational exponents to their radical equivalents and vice versa
    9. Find solutions to radical equations

C. Complex Numbers & Quadratic Functions
    1. Use and apply definitions, terminology and theorems of complex numbers
    2. Identify and separate into real and imaginary parts
    3. Rewrite a radical expression with negative radicand as one with a positive radicand by introducing a factor of i
    4. Use and apply definitions, terminology and theorems
    5. Solve a quadratic equation by completing the square, extractions of roots, factoring, and the quadratic formula
    6. Solve real-world word problems that use quadratic equations
    7. Solve quadratic inequalities and graph their solutions
    8. Find the vertex of a quadratic function by completing the square
    9. Graph square root and quadratic functions

D. Systems of Equations
    1. Use and apply definitions, terminology and theorems
    2. Utilize point-slope and slope-intercept forms of an equation in two variables
    3. Identify equations of parallel and perpendicular lines
    4. Utilize substitution, graphing, and addition methods in solving systems of equations
    5. Solve system of equations with two and three variables
    6. Solve application word problems that involve a system of equations

Course Title: Math 96 Intermediate Algebra

<u>**Semester 2**</u>

A. Conic Sections
   1. Identify conic sections by their formulas
   2. Graph and write equations of circles
   3. Graph and write equations of ellipses
   4. Graph and write equations of parabolas
   5. Graph and write equations of hyperbolas
   6. Derive the equation of an ellipse and hyperbola from the foci

B. Exponential and Logarithmic Functions
   1. Use and apply definitions, terminology and theorems
   2. Identify dependent and independent variables
   3. Graph exponential and logarithmic functions
   4. Identify domain and range of a function
   5. Apply the vertical line test
   6. Utilize *f(x)* notation
   7. Evaluate a function in *f(x)* notation
   8. Graph exponential functions, including by translations vertically and horizontally
   9. Translate from logarithmic to exponential form and vice versa

C. Periodic Functions and Trigonometry
   1. Work with angles in standard position
   2. Find coordinates of points on the unit circle
   3. Use radian measure for angles
   4. Identify cycles and periods of periodic functions
   5. Find the amplitude of periodic functions
   6. Graph trigonometric functions

D. Probability & Statistics
   1. Calculate measures of central tendency
   2. Draw and interpret box-and-whisker plots
   3. Find the standard deviation of a set of values
   4. Make a probability distribution and use it to evaluate outcomes of decisions
   5. Use standard deviation in real-world situations

III. ACCOUNTABILITY DETERMINANTS

A. Key Assignments
   1. In the task "Taking Sides" from Number Method: Lecture and demonstration Integration. Lecture and demonstration will be used to illustrate theory, definitions, and concepts. Real-world problems will be utilized to promote comprehension and development of solutions with rational applications.
   2. Method: Discussion Integration. Discussion will be used to reinforce student comprehension of how to produce solutions of quadratic, rational, absolute value and radical equations.
   3. Method: Individual practice Integration. Individual practice will be used to develop students' abilities to construct graphs.

4. Method: Group activities Integration. Students will be engaged in group activities to foster students assisting each other with formulating the logarithmic equivalent of exponential functions.
5. Method: Multimedia demonstrations Integration. Multimedia demonstrations will be utilized to promote understanding of how to deduce solutions of systems of three equations in three variables.
6. Method: Hands-on computer activities Integration. Hands-on computer activities will be utilized to solve absolute value inequalities.

IV. INSTRUCTIONAL MATERIALS AND METHODOLOGIES

A. Required Textbook(s)
   1. Bittinger. Intermediate Algebra. Pearson, 2010. ISBN: 0-321-55718-2

B. Instructional and Assessment Methodologies
   Students' grades shall be determined by the instructor using multiple measures of performance related to the course objectives. Methods of evaluation may include but are not limited to the following:
   1. Method: Class Participation. Class participation will be required so all students are able to explain the process of solving quadratic, rational and absolute value equations. The attendance roster will be used to track class participation each class period and/or week.
   2. Method: Assignments. Assignments will be used to help students develop the skills necessary simplify complex fractions. These assignments can be graded using a rubric developed by the instructor.
   3. Method: Projects (presentation). A presentation can be given by the student on how to factor polynomials of higher degrees. It can be evaluated on correctness and delivery.
   4. Method: Quizzes. Quizzes can be given to evaluate how well students can determine if a graph represents a function along with giving the domain and range for it.
   5. Method: Exams/Tests. Exams can be given to determine if a student can simplify expressions with exponents and radical expressions. These include chapter tests and a final exam. A comprehensive final exam must be given.