

Mathematics

Course: Algebra II

10th Grade

MATH 401/402 Algebra II

1/2 credit
5 times per week; 1 year
Taught in English

This is a required class for all 10th grade students in the Mexican and/or U.S. Diploma program. This course extends what students have learned in the Algebra I course as it develops advanced algebra skills such as systems of equations, advanced polynomials and factorization, radicals, imaginary and complex numbers, quadratics, and rational equations.

Textbook: Carter, John A. et al. Algebra 2 Common Core Edition. McGraw Hill: New York . 2014 Edition

Prerequisite: MATH 300

Benchmark Code – Subject: Algebra II = AII

- Strand 1: Fundamental Skills and Concepts Review
- Strand 2: Functions and their Graphs
- Strand 3: Systems of Equations
- Strand 4: Factorization
- Strand 5: Quadratic Equations and Functions
- Strand 6: Polynomials and Polynomial Functions
- Strand 7: Radical Functions and Rational Exponents
- Strand 8: Exponential and Logarithmic Functions
- Strand 9: Rational Functions

Subject.Grade.Strand#.Standard#. Benchmark#

Example: AII.10.1.1.3 – Algebra 2, Grade 10, Strand 1, Standard 1, Benchmark

Strand 1: Fundamental Skills and Concepts Review

Standard 1: The student evaluates and simplifies expressions.

Benchmark Code	Benchmark
AII.10.1.1.1	The student will use the order of operations to evaluate expressions and use formulas.
AII.10.1.1.2	The student will translate verbal expressions and sentences into algebraic expressions and equations.

Standard 2: The student solves and graphs equations.

Benchmark Code	Benchmark
AII.10.1.2.1	The student will solve multi-step linear equations with variables on both sides, using order of operations and factorization.

AII.10.1.2.2	The student will write and graph linear equations in slope-intercept form and point-slope form.
AII.10.1.2.3	The student will find parallel and perpendicular lines.
AII.10.1.2.4	The student will solve equations involving absolute values.
AII.10.1.2.5	The student will solve inequalities and graph the solution sets.
AII.10.1.2.6	The student will solve compound inequalities using the properties of “and/or”.
AII.10.1.2.7	The student will solve inequalities involving absolute value and graph the solution.
AII.10.1.2.8	The student will write and simplify expressions with exponents using product, quotient, zero, negative and power of a power rules.
AII.10.1.2.9	The student will multiply polynomials, and uses special products of two binomials including: square of a sum, square of a difference, and the product of a sum and difference of same terms.
AII.10.1.2.10	The student will solve a quadratic function from the graph and using order of operations and factorization.

Strand 2: Functions and their Graphs

Standard 1: The student identifies different types of relations and functions and their graphs.

Benchmark Code	Benchmark
AII.10.2.1.1	The student will determine how a relation is a function.
AII.10.2.1.2	The student will graph functions and state its domain and range.
AII.10.2.1.3	The student will identify the domain and range from (linear, quadratic, rational, square root, absolute value, cubic) from the equation and/or graphs.

Strand 3: System of Equations

Standard 1: The student solves systems of equations with two or three variables.

Benchmark Code	Benchmark
AII.10.3.1.1	The student will identify systems as consistent, inconsistent, dependent, and/or independent.
AII.10.3.1.2	The student will solve systems of equations (2 and 3 variables) by graphing substitution and elimination.
AII.10.3.1.3	The student will solve systems of inequalities by graphing.
AII.10.3.1.4	The student will solve systems of equations and inequalities using a graphing calculator.
AII.10.3.1.5	The student will solve word problem using systems of equations.

Standard 2: The student solves systems of equations using matrices.

Benchmark Code	Benchmark
AII.10.3.2.1	The student will perform scalar multiplication on a matrix and solve matrices for determinants and inverses.
AII.10.3.2.2	The student will solve problems using matrix logic.
AII.10.3.2.3	The student will add, subtract, and multiply matrices.

AII.10.3.2.3	The student will evaluate the determinant of a 3 x 3 matrix.
AII.10.3.2.4	The student will find the inverse of a 2 x 2 matrix.
AII.10.3.2.5	The student will solve systems of linear equations by using inverse matrices.
AII.10.3.2.6	The student will solve systems of linear equations by using augmented matrices.
AII.10.3.2.7	The student will use a graphing calculator to solve systems of linear equations.

Strand 4: Factorization

Standard 1: The student uses factorization as a simplification technique.

Benchmark Code	Benchmark
AII.10.4.1.1	The student will factor the greatest common factor out of a polynomial.
AII.10.4.1.2	The student will factor perfect square trinomials.
AII.10.4.1.3	The student will factor differences of squares.
AII.10.4.1.4	The student will factor sum and difference of cubes.
AII.10.4.1.5	The student will factor trinomials with a leading coefficient of 1.
AII.10.4.1.6	The student will factor trinomials with a leading coefficient different than 1.
AII.10.4.1.7	The student will factor polynomials by grouping.
AII.10.4.1.8	The student will know the difference between factorization as a simplification technique and as a solving technique for equations.

Strand 5: Quadratic Functions

Standard 1: The student graphs and solves quadratic equations and inequalities.

Benchmark Code	Benchmark
AII.10.5.1.1	The student will solve quadratic equations by factoring, completing the square, and by using the quadratic formula.
AII.10.5.1.2	The student will write and graph quadratic functions in standard form.
AII.10.5.1.3	The student will use discriminants to determine the nature of the zeros of quadratic equations.
AII.10.5.1.4	The student will find the equation of a quadratic function given the graph of the function. (vertex and a point)
AII.10.5.1.5	The student will use a graphing calculator to graph and find the vertex, zeros, and x- and y-intercepts of a quadratic equation.
AII.10.5.1.6	The student will solve quadratic inequalities by factoring, completing the square, and by using the quadratic formula.
AII.10.5.1.7	The student will use a graphing calculator to graph and solve a quadratic inequality.

Strand 6: Polynomials and Polynomial Functions**Standard 1: The student simplifies, factors, and evaluates polynomial functions; and identifies general shapes of the graphs of polynomial functions.**

Benchmark Code	Benchmark
AII.10.6.1.1	The student will multiply and divide monomials.
AII.10.6.1.2	The student will add, subtract and multiply polynomials.
AII.10.6.1.3	The student will divide polynomials using long division.
AII.10.6.1.4	The student will divide polynomials using synthetic division.
AII.10.6.1.5	The student will find factors of polynomials by using the Factor Theorem and synthetic division.
AII.10.6.1.6	The student will factor polynomials and simplify polynomial quotients by factoring.
AII.10.6.1.7	The student will find all possible rational zeros of a polynomial function by using the rational zero theorem. (p's and q's)
AII.10.6.1.8	The student will find the real zeros of a polynomial function and its multiplicity.
AII.10.6.1.9	The student will evaluate polynomial functions.
AII.10.6.1.10	The student will identify the end behavior of polynomial functions.
AII.10.6.1.11	The student will use a graphing calculator to graph polynomial functions and approximate the real zeros of the functions.
A.10.6.1.12	The student will solve non-quadratic equations. (PEMDAS, factorization and rational zero theorem)

Strand 7: Radical Functions and Rational Exponents**Standard 1: The student simplifies expressions containing radicals, complex numbers, or rational exponents, and solves equations containing radicals.**

Benchmark Code	Benchmark
AII.10.7.1.1	The student will simplify radicals having various indices.
AII.10.7.1.2	The student will estimate roots of numbers.
AII.10.7.1.3	The student will simplify radical expressions and add, subtract, multiply, and divide radical expressions.
AII.10.7.1.4	The student will rationalize the numerator and/or denominator of a fraction containing a radical expression.
AII.10.7.1.5	The student will write expressions with radical exponents in simplest radical form and vice versa.
AII.10.7.1.6	The student will evaluate expressions in either exponential or radical form.
AII.10.7.1.7	The student will solve equations containing radicals.
AII.10.7.1.8	The student will simplify square roots containing negative radicands.
AII.10.7.1.9	The student will solve quadratic equations that have pure imaginary solutions.
AII.10.7.1.10	The student will add, subtract, and multiply complex numbers.

AII.10.7.1.11	The student will simplify rational expressions containing complex numbers in the denominator.
Strand 8: Exponential and Logarithmic Functions	
Standard 1: The student simplifies expressions and solves exponential and logarithmic equations.	
Benchmark Code	Benchmark
AII.10.8.1.1	The student will define an exponential function. (not natural)
AII.10.8.1.2	The student will evaluate an exponential function.
AII.10.8.1.3	The student will use a graphing calculator to find a table of values to graph exponential functions.
AII.10.8.1.4	The student will define logarithmic expressions. (not natural)
AII.10.8.1.5	The student will evaluate logarithmic expressions.
AII.10.8.1.6	The student will use a graphing calculator to find a table of values to graph logarithmic functions.
AII.10.8.1.7	The student will write exponential equations in logarithmic form and vice versa.
AII.10.8.1.8	The student will simplify and evaluate expressions using properties of logarithms.
AII.10.8.1.9	The student will use the logarithm Power law. (The logarithm of a power of number is the exponent times the logarithm of the number).
AII.10.8.1.10	The student will solve exponential and logarithmic equations.
Strand 9: Rational Functions	
Standard 1: The student simplifies and solves rational equations.	
Benchmark Code	Benchmark
AII.10.9.1.1	The student will define a rational function.
AII.10.9.1.2	The student will evaluate rational functions.
AII.10.9.1.3	The student will use a graphing calculator to find a table of values to graph rational functions.
AII.10.9.1.4	The student will simplify rational expressions. The student will simplify compound fractions using factorization.
AII.10.9.1.5	The student will add and subtract two rational expressions, finding the least common denominator.
AII.10.9.1.6	The student will solve rational equations.