

COMMUNITY UNIT SCHOOL DISTRICT 200

Introduction to Algebra 2 High School Intermediate Level - Two Semesters

1. Subject Expectation (State Goal 6) **The student will demonstrate and apply a knowledge and sense of numbers, including numeration and operations (addition, subtraction, multiplication, division), patterns, ratios and proportions.**

Essential Learning 1 (Learning Standard A)	Demonstrate knowledge and use of numbers and their representations in a broad range of theoretical and practical settings
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| Critical Content | 6.A.3 | a. | represent fractions, decimals, percentages, exponents, and scientific notations in equivalent form <ul style="list-style-type: none">• multiply and divide monomials• simplify expressions involving laws of exponents• find products and quotients of numbers expressed in scientific notation• express numbers in scientific and decimal notation• add, subtract, multiply, and divide polynomials |
| | 6.A.4 | b. | identify and apply the associative, commutative, distributive and identity properties of real numbers, including special numbers such as pi and square roots <ul style="list-style-type: none">• recognize and combine like terms• add, subtract, and multiply polynomials• use the GCF and the distributive property to factor polynomials |
| | * | | • use grouping techniques to factor polynomials with four or more terms |
| | * | | • simplify expressions involving <ul style="list-style-type: none">- rationalizing denominator (no conjugates)- addition, subtraction, multiplication, and division |

Essential Learning 2 (Learning Standard B)	Investigate, represent and solve problems using number facts, operations (addition, subtraction, multiplication, and division) and their properties, algorithms and relationships
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| Critical Content | 6.B.3a | a. | solve practical computation problems involving whole number, integers and rational numbers <ul style="list-style-type: none">• simplify expressions using rational numbers including<ul style="list-style-type: none">- applying the four arithmetic operations- positive or negative numbers raised to even or odd powers- absolute value |
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- 6.B.3c b. identify and apply properties of real numbers, including pi, squares, and square roots.
- identify numbers as integers, rational or irrational
 - simplify radicals with and without variables (assume all variables are positive)
 - find approximate values for square roots

2. Subject Expectation (State Goal 7) **The student will estimate, make and use measurements of objects, quantities and relationships and determine acceptable levels of accuracy.**

Essential Learning 1 (Learning Standard A)	Measure and compare quantities using appropriate units, instruments and methods
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- Critical Content 7.A.4b a. apply formulas in a wide variety of theoretical and practical real-world measurement applications involving perimeter, area, volume, angle, time temperature, mass, speed, distance, density, and monetary values
- solve application problems by
 - defining variables
 - setting up an equation
 - applying formula

Essential Learning 2 (Learning Standard B)	Estimate measurements and determine acceptable levels of accuracy
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- Critical Content 7.B.4 a. estimate and measure the magnitude and directions of physical quantities (e.g., velocity, force, slope) using rulers, protractors and other scientific instruments including timers, calculators and/or computers
- find and estimate the slope of a line from
 - graph
 - two points
 - equation
 - table

3. Subject Expectation (State Goal 8) **The student will use algebraic and analytical methods to identify and describe patterns and relationships in data, solve problems and predict results.**

Essential Learning 1 (Learning Standard A)	Describe numerical relationships using variables and patterns
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- Critical Content 8.A.3a a. apply the basic properties of commutative, associative, distributive, transitive, inverse, identity, zero, equality and order of operations to solve problems
- use order of operations to evaluate expressions
- 8.A.3b b. solve problems using linear expressions, equations and inequalities
- solve linear equations systematically using addition,

- subtraction, multiplication, and division
 - one-step problems
 - two-step problems
 - multi-step problems
- 8.A.4b c. represent mathematical patterns and describe their properties using variables and mathematical symbols
 - name the coefficient of a term
 - write an equation for horizontal and vertical lines
 - * • factor trinomials in the form $ax^2 + bx + c$
 - * • factor binomials that are the difference of squares
 - * • factor perfect square trinomials
 - * • simplify rational expressions
 - state the excluded values of the variables
 - * • multiply and divide rational expressions

Essential Learning 2 (Learning Standard B)	Interpret and describe numerical relationships using tables, graphs and symbols
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- Critical Content
- 8.B.3 a. use graphing technology and algebraic methods to analyze and predict linear relationships and make generalizations from linear patterns
 - find the degree of a polynomial
 - determine whether a given relation is a function
 - identify and graph ordered pairs on a coordinate plane
 - 8.B.4a b. represent algebraic concepts with physical materials, words, diagrams, tables, graphs, equations and inequalities
 - use appropriate technology
 - translate verbal expressions into mathematical expressions
 - graph quadratic functions using a table
 - translate verbal sentences into equations, formulas, or inequalities
 - solve application problems by
 - setting up an equation
 - applying formulas
 - identify domain and range of a relation
 - graph lines and determine point of intersection
 - graph horizontal and vertical lines given an equation
 - find an equation of a line using
 - point and slope
 - two points
 - table
 - graph
 - solve one-variable inequalities and graph the solutions
 - compound
 - absolute value
 - write an equation of a line that passes through a given point and is parallel or perpendicular to the graph of a given equation
 - graph linear inequalities in one or two variables (coordinate plane)
 - graph a solution to a system of inequalities (coordinate plane)
 - find roots of a quadratic equation by graphing

- solve quadratic equations by using
 - quadratic formula
 - factoring (zero-product property)
 - square roots
- 8.B.4b c. use the basic functions of absolute value, square root, linear, quadratic and step to describe numerical relationships
- find and estimate the slope of a line from
 - graph
 - two points
 - equation
 - table
 - graph a line using
 - table
 - x and y intercept
 - point and slope

Essential Learning 3 (Learning Standard C)	Solve problems using systems of numbers and their properties
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- Critical Content 8.C.4.a a. analyze and report the effects of changing coefficients, exponents and other parameters on functions and their graphs
- solve a system of equations using
 - graphing
 - elimination
 - substitution
- 8.C.4.b b. apply algebraic properties and procedures with matrices, vectors, functions and sequences using data found in business, industry and consumer situations
- find the vertex and the equation of the axis of symmetry
 - solve application problems

Essential Learning 4 (Learning Standard D)	Use algebraic concepts and procedures to represent and solve problems
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- Critical Content 8.D.3a a. solve problems using numeric, graphic or symbolic representations of variables, expressions, equations and inequalities
- solve a system of equations using
 - graphing
 - elimination
 - substitution
 - solve radical equations
 - graph inequalities on number lines
- 8.D.3b b. propose and solve problems using proportions, formulas and linear functions
- 8.D.3c c. apply properties of power, perfect squares and square roots
- solve radical equations
 - solve quadratic equations
 - simplify radicals
- 8.D.4 d. formulate and solve linear and quadratic equations and linear inequalities algebraically and investigate nonlinear inequalities using graphs, tables, calculators and computers
- solve one-variable inequalities using addition, subtraction,

multiplication, division, and graph the solutions (number line)

- one-step problems
- two-step problems
- multi-step problems

- * • solve application problems

**1. Subject Expectation
(State Goal 10)**

The student will collect, organize and analyze data using statistical methods; predict results; and interpret uncertainty using concepts of probability.

**Essential Learning 1
(Learning Standard A)**

Organize, describe and make predictions from existing data

Critical Content 10.A.4c

- a. predict from data using interpolation, extrapolation and trend lines, with and without the use of technology
- find an equation of a line using
 - $y = key$
 - two points
 - table