

COMMUNITY UNIT SCHOOL DISTRICT 200

Applied Math High School Regular Level – Multiple 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 notation in equivalent forms
- practice calculator functions relative to percentages, fractions, and decimals
- 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
- practice functional applications of pi and square roots
 - apply algebraic fundamentals to practical situations

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 numbers, integers and rational numbers
- practice functional applications of whole numbers, integers, integers and rational numbers
- 6.B.3b b. apply primes, factors, divisors, multiples, common factors and common multiples in solving problems
- practice problems involving reducing radicals or factoring
- 6.B.3c c. identify and apply properties of real numbers including pi, squares, and square roots
- practice functional applications of pi and square roots
- 6.B.4 d. select and use appropriate arithmetic operations in practical situations
- use arithmetic skills to calculate measures of angles, segment lengths, distance, and midpoints

Essential Learning 3 (Learning Standard C)	Compute and estimate using mental mathematics, paper and pencil methods, calculators and computers
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| Critical Content | 6.C.3a | a. | select computational procedures and solve problems with whole numbers, fractions, decimals, percents and proportions <ul style="list-style-type: none"> practice calculator functions for computational procedures |
| | 6.C.3b | b. | show evidence that computational results using whole numbers, fractions, decimals, percents and proportions are correct and/or that estimates are reasonable <ul style="list-style-type: none"> demonstrate ability to check answer |
| | 6.C.4 | c. | determine whether exact values or approximations are appropriate <ul style="list-style-type: none"> practice problems involving measurement or currency |
| | 6.C.5 | d. | determine the level of accuracy needed for computations involving measurement and irrational numbers |

Essential Learning 4 (Learning Standard D)	Solve problems using comparison of quantities, ratios, proportions and percents
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| Critical Content | 6.D.4 | a. | solve problems involving recipes or mixtures, financial calculations and geometric similarity using ratios, proportions and percents |
| | 6.D.5 | b. | solve problems involving loans, mortgages and other practical applications involving geometric patterns of growth <ul style="list-style-type: none"> practice problems involving interest practice problems involving a budget |

**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.2b | a. | solve addition, subtraction, multiplication and division problems using currency <ul style="list-style-type: none"> apply algebraic fundamentals to practical situations |
| | 7.A.3b | b. | apply the concepts and attributes of length, capacity, weight/mass, perimeter, area, volume, time, temperature, and angle measures in practical situations. <ul style="list-style-type: none"> practice functional applications of perimeter, area, volume, time, and temperature |
| | 7.A.4a | c. | apply units and scales to describe and compare numerical data and physical objects <ul style="list-style-type: none"> practice solving problems using formulas |
| | 7.A.4b | d. | 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 |

- practice functional applications of perimeter, area, volume, time, and temperature

Essential Learning 2 (Learning Standard B)	Estimate measurements and determine acceptable levels of accuracy
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| Critical Content | 7.B.2b | a. | estimate conversions between measures within the customary and metric systems <ul style="list-style-type: none"> • practice calculator functions relative to conversions |
| | 7.B.5 | b. | estimate perimeter, area, volume, and capacity of irregular shapes, regions, and solids and explain the reasoning supporting the estimate <ul style="list-style-type: none"> • determine if an answer is valid for a real-life application • use mental math to estimate quantities |

Essential Learning 3 (Learning Standard C)	Select and use appropriate technology, instruments and formulas to solve problems, interpret results and communicate findings
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| Critical Content | 7.C.3a | a. | construct a simple scale drawing for a given situation <ul style="list-style-type: none"> • practice creating a diagram from a worded problem |
| | 7.C.3b | b. | use concrete and graphic models and appropriate formulas to find perimeters, areas, surface areas and volumes of two- and three-dimensional regions <ul style="list-style-type: none"> • practice selecting appropriate formulas to solve for a given word problem |
| | 7.C.4a | c. | make indirect measurements, including heights and distances, using proportions (e.g., finding the height of a tower by its shadow) <ul style="list-style-type: none"> • set up a proportion using similar triangles |
| | 7.C.4b | d. | interpret scale drawings and models using maps and blueprints <ul style="list-style-type: none"> • use a scale factor to determine the actual size and/or length of an object |
| | 7.C.4c | e. | convert within and between measurement systems and monetary systems using technology where appropriate <ul style="list-style-type: none"> • use dimensional analysis to convert measurements to appropriate units for real-life applications |

**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.2b | a. | construct and solve number sentences using a variable to represent an unknown quantity <ul style="list-style-type: none"> • practice creating and solving linear equations |
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- 8.A.3a b. apply the basic properties of commutative, associative, distributive, transitive, inverse, identity, zero, equality and order of operations to solve problems
 - apply algebraic fundamentals to practical situations
- 8.A.3b c. solve problems using linear expressions, equations and inequalities
- 8.A.4b d. represent mathematical patterns and describe their properties using variables and mathematical symbols
 - practice problems involving compound interest

Essential Learning 2 (Learning Standard B)	Interpret and describe numerical relationships using tables, graphs and symbols
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| Critical Content | 8.B.4a | a. | represent algebraic concepts with physical materials, words, diagrams, tables, graphs, equations, and inequalities and use appropriate technology <ul style="list-style-type: none"> • create algebraic equations or expressions to solve real world applications |
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Essential Learning 3 (Learning Standard D)	Use algebraic concepts and procedures to represent and solve problems
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| Critical Content | 8.D.3b | a. | propose and solve problems using proportions, formulas and linear functions <ul style="list-style-type: none"> • create linear equations to solve problems |
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4. Subject Expectation (State Goal 9) The student will use geometric methods to analyze, categorize, and draw conclusions about points, lines, planes, and space.

Essential Learning 1 (Learning Standard A)	Demonstrate and apply geometric concepts involving points, lines, planes and space
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| Critical Content | 9.A.3a | a. | draw or construct two- and three- dimensional geometric figures including prisms, pyramids, cylinders and cones <ul style="list-style-type: none"> • practice creating a diagram from a worded problem |
| | 9.A.3c | b. | use concepts of symmetry, congruency, similarity, scale, perspective, and angles to describe and analyze two- and three-dimensional shapes found in practical applications (e.g., geodesic domes, a-frame houses, basketball courts, inclined planes, art forms, blueprints) <ul style="list-style-type: none"> • practice and analyze transformations of figures |

Essential Learning 2 (Learning Standard B)	Identify, describe, classify and compare relationships using points, lines, planes and solids
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| Critical Content | 9.B.3 | a. | identify, describe, classify and compare two- and three-dimensional geometric figures and models according to their properties |
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Essential Learning 3 (Learning Standard D)	Use trigonometric ratios and circular functions to solve problems
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| Critical Content | 9.D.3 | a. compute distances, lengths and measures of angles using proportions, the Pythagorean Theorem and its converse <ul style="list-style-type: none"> • practice solving problems involving similar figures • practice using the Pythagorean Theorem |
| | 9.D.4 | b. analyze and solve problems involving triangles (e.g., distances which cannot be measured directly) using trigonometric ratios <ul style="list-style-type: none"> • use trigonometric ratios to solve right triangles |

5. 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
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| Critical Content | 10.A.2b | a. using a data set, determine mean, median, mode and range, with and without the use of technology <ul style="list-style-type: none"> • practice finding the centers and spread of given data |
| | 10.A.2c | b. make predictions and decisions based on data and communicate their reasoning <ul style="list-style-type: none"> • determine the best measure of central tendency from mean, median, or mode |
| | 10.A.3a | c. construct, read and interpret tables, graphs (including circle graphs) and charts to organize and represent data <ul style="list-style-type: none"> • practice creating an equivalent data representation • use data to set up or solve a problem |

Essential Learning 2 (Learning Standard B)	Formulate questions, design data collection methods, gather and analyze data and communicate findings
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| Critical Content | 10.B.3 | a. formulate questions (e.g., relationships between car age and mileage, average incomes and years of schooling), devise and conduct experiments or simulations, gather data, draw conclusions and communicate results to an audience using traditional methods and contemporary technologies |
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Essential Learning 3 (Learning Standard C)	Determine, describe and apply the probabilities of events
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| Critical Content | 10.C.2b | a. compare the likelihood of events in terms of certain, more likely, less likely or impossible <ul style="list-style-type: none"> • make and test conjectures about the results of experiments and simulations |
| | 10.C.2c | b. determine the probability of an event involving “and”, “or” or “not” <ul style="list-style-type: none"> • practice basic understanding of probability |

- 10.C.3a c. determine the probability and odds of events using fundamental counting principles
- compute probabilities for simple compound events