

Mathematics: Algebra AB

<p>Content Standard #4 Students will have demonstrated proficiency in mathematics by solving problems requiring number sense, accurate computation, accurate measurement, collection of data and statistics, algebraic methods and geometry.</p>
<p>#4A Number sense, properties, and operations</p>
<p>#4B Patterns, functions, and algebraic structures</p>
<p>#4C Data analysis, statistics, and probability</p>
<p>#4D Shape, dimension, and geometric relationships</p>

Description

Algebra AB begins with a review of the real number system. Algebra topics include use and meaning of variables, signed-numbers, algebraic expressions, problem solving, and the solving of equations with one unknown value. This course also emphasizes measures of central tendency and statistics.

Time Allocation
Ninety minutes daily for one smear

Texts/References
Math Mates, Educational Advantage Pty Ltd.

Assessments
Formative
 Quizzes
Summative
 Projects
 Tests
 Midterm and final exams

Grades and Achievement Levels
 Grades are based on completion of assignments and quality of work.

Essential Concepts: Mathematics Algebra AB

Standard #4A Number sense, properties, and operations	Standard #4B Patterns, functions, and algebraic structures	Standard #4C Data analysis, statistics, and probability	Standard #4D Shape, dimension, and geometric relationships
<ul style="list-style-type: none"> • The complex number system includes real numbers and imaginary numbers • Formulate, represent, and use algorithms with real numbers flexibly, accurately, and efficiently • Systematic counting techniques are used to describe and solve problems 	<ul style="list-style-type: none"> • Functions model situations where on quantity determines another and can be represented algebraically, graphically, and using tables • Graphs and tables are used to describe the qualitative behavior of common types of functions • Parameters influence the shape of the graphs of functions • Expressions, equations, and inequalities can be expressed in multiple, equivalent forms • Solutions to equations, inequalities and systems of equations are found using a variety of tools • Quantitative relationships in the real world can be modeled and solved using functions 	<ul style="list-style-type: none"> • Statistical methods take variability into account, supporting informed decision-making through quantitative studies designed to answer specific questions • The design of an experiment or sample survey is of critical importance to analyzing the data and drawing conclusions • Visual displays and summary statistics condense the information in data sets into usable knowledge • Randomness is the foundation for using statistics to draw conclusions when testing a claim or estimating plausible values for a population characteristics • Probability models outcomes for situations in which there is inherent randomness, quantifying the degree of certainty in terms of relative frequency of occurrence 	<ul style="list-style-type: none"> • Attributes of two- and three-dimensional objects are measurable and can be quantified • Objects in the plane and their parts, attributes, and measurements can be analyzed deductively • Objects in the plane can be transformed, and those transformations can be described and analyzed mathematically • Right triangles are central to geometry and its applications

Expectations: Mathematics Algebra AB

Standard #4A Number sense, properties, and operations	Standard #4B Patterns, functions, and algebraic structures	Standard #4C Data analysis, statistics, and probability	Standard #4D Shape, dimension, and geometric relationships
<ol style="list-style-type: none"> 1. Showed that between any two rational numbers there are an infinite number of rational numbers, and that between any two irrational numbers there are also an infinite number of irrational numbers 2. Used appropriate computation methods that encompass estimation and calculation 3. Used technology to perform operations on numbers written in scientific notation 4. Described factors affecting take home pay and calculated the impact (PFL) 5. Designed and used a budget, including income and expenses to demonstrate how living within your means is essential for a secure financial future (PFL) 6. Use combinatorics (Fundamental Counting Principle, permutations and combinations) to solve problems in real-world contexts 	<ol style="list-style-type: none"> 1. Demonstrated the relationship between all representations of linear functions using point-slope, slope-intercept, and standard form of a line 2. Represented linear, functions in a table, graph, and equation and converted from one representation to another 3. Evaluated a function at a given point in its domain given an equation, a table, and a graph 4. Identified the domain and range of a function given an equation, a table, and a graph 5. Identified intercepts, zeros, maxima, minima, and intervals of increase and decrease of a function given an equation, a table, and a graph 6. Made qualitative statements about the rate of change of a function, based on its graph or table 7. Applied transformations to a parent function and interpreted the results verbally, graphically, and symbolically 	<ol style="list-style-type: none"> 1. Selected and used an appropriate display to represent and describe a set of data (for example, scatter plot, line graph and histogram) 2. Fitted curves to scatter plots using informal methods or appropriate technology to determine the type (positive, negative, or non-existent) of relationship between two data sets 3. Determined, analyzed, and used measures of central tendency (such as mean, median, and mode) and measures of variability (such as range and quartiles) in problem-solving situations 4. Evaluated and interpreted probabilities using a normal distribution 5. Developed simulations that demonstrated probability as a long-run relative frequency 6. Applied and solved problems using the concepts of independence and conditional probabilities 	<ol style="list-style-type: none"> 1. Solved for unknown quantities in relationships involving perimeter, area, surface area, and volume 2. Applied the Pythagorean Theorem and its converse to solve real-world problems 3. Used appropriate measurements to solve problems indirectly (for example, find the height of a flagpole using similar triangles) 4. Selected and used appropriate tools and techniques to measure quantities in order to achieve specified degrees of precision, accuracy, and error (or tolerance) or measurements 5. Found and analyzed relationships among geometric figures using transformation (for example, reflections, translations, rotations, dilations) in coordinate systems 6. Calculated the perimeter and area of a two-dimensional and irregular shape 7. Justified, interpreted, and applied the use of formulas for the surface area and volume of three-dimensional shapes

Expectations: Mathematics Algebra AB continued

Standard #4A Number sense, properties, and operations	Standard #4B Patterns, functions, and algebraic structures	Standard #4C Data analysis, statistics, and probability	Standard #4D Shape, dimension, and geometric relationships
<ol style="list-style-type: none"> 7. Used number sense to estimate and justify the reasonableness of solutions to problems involving rational numbers and common irrational numbers (for example, circumference, area of a circle, and Pythagorean Theorem) 8. Applied appropriate computational methods to solve multi-step problems involving rational numbers 9. Determined when estimation is an appropriate method to solve a problem and described what error might result from estimation 10. Used ratios, proportions, and percents in problem-solving situations that involved rational numbers 	<ol style="list-style-type: none"> 8. Described geometric relationships algebraically 9. Represented functional relationships using written explanations, tables, equations, and graphs, and described the connections among these representations 10. Interpreted a graphical representation of a real-world situation 11. Solved problems involving functions and relations using calculators, graphs, tables, and algebraic methods 12. Solved equations with more than one variable for a given variable (for example, solve for p in $I = prt$ or for r in $C = 2\pi r$) 13. Performed and justified steps in generating equivalent expressions by identifying properties using the commutative, associative, inverse, and identity properties 	<ol style="list-style-type: none"> 7. Solved real-world problems with informal use of combinations and permutations 8. Graphed data sets, created a scatter plot, and identified the control (independent) variable and dependent variable 9. Determined a line of best fit from a scatter plot using visual techniques 10. Showed how extrapolation may lead to faulty conclusions 11. Used Person's correlation coefficient as a measure of strength and interpreted the slope and y-intercept in the context of the problem 12. Explained the role of p-values in determining statistical significance 13. Determined the margin of error associated with an estimate of a population characteristic 14. Analyzed the cost of insurance as a method to offset the risk of a situation (PFL) 	<ol style="list-style-type: none"> 8. Applied the effect of dimensional change, utilizing appropriate units and scales in problem-solving situations involving perimeter, area, and volume 9. Classified polygons according to their similarities and differences 10. Applied properties of angles including corresponding, exterior, interior, vertical, complementary, and supplementary angles to solve problems. 11. Justified the results using two-column proofs, paragraph proofs, flow charts, or illustrations

Expectations: Mathematics Algebra AB continued

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	<ul style="list-style-type: none"> 14. Used appropriate measurements to solve problems indirectly (for example, find the height of a flagpole using similar triangles) 15. Solved equations for one variable in terms of the others 16. Solved systems graphically 17. Represented, solved, and interpreted problems in various contexts using linear functions 18. Analyzed the impact of interest rates on a personal financial plan (PFL) 19. Analyzed various lending sources, services, and financial institutions (PFL) 	<ul style="list-style-type: none"> 15. Formulated appropriate research questions that can be answered with statistical analysis 16. Determined appropriate data collection methods to answer a research question 17. Explained how data might be analyzed to provide answers to a research question 18. Identified the characteristics of a well-designed and well-conducted survey 19. Identified the characteristics of a well-designed and well-conducted experiment 20. Differentiated between the inferences that can be drawn in experiments versus observational studies 21. Identified and chose appropriate ways to summarize numerical or categorical data using tables, graphical displays, and numerical summary statistics and accounting for outliers when appropriate 22. Described the relationship between two categorical variables using percents 	