

# COURSE: Algebra I

## Grade Level: High School

MAIN/ GENERAL TOPIC	SUB-TOPIC:	ESSENTIAL QUESTIONS:	WHAT THE STUDENTS WILL KNOW:	WHAT THE STUDENT WILL BE ABLE TO DO:	Assessments:	WHEN STUDENT DOES IT:
The Language of Algebra	-Variables and Expressions -Order Of Operations -Open Sentences -Properties -Logical Reasoning -Graphs and Functions -Statistics	-How do variables and expressions help us to represent "real life" situations? -How do properties help us to simplify algebraic expressions and equations? -Why is it important to read and interpret graphs and statistics?	- Recognize the properties of identity and equality -Recognize the commutative and associative properties -Identify the hypothesis and conclusion in a conditional statement	-Write mathematical expressions for verbal expressions -Evaluate numerical and algebraic expressions by using the order of operations -Solve equations and equalities -Use the distributive property to evaluate and simplify expressions -Use the commutative and associative properties to evaluate and simplify expressions -Interpret and draw graphs of functions -Analyze data given in tables and graphs and determine whether graphs are misleading	-Practice problems -Quizzes/ tests -Class activities	10 days
Real Numbers	-Rational numbers -Adding and subtracting rational numbers -Multiplying and dividing rational numbers -Statistics- Stem and leaf plots, mean, median, and mode -Simple Probability -Square roots	-Where do you use rational and real numbers? -How do statistical measures and probability help us to interpret data?	-Define rational and irrational number	-Graph rational numbers on a number line -Add, subtract, multiply, and divide rational numbers -Interpret and create stem and leaf plots -Analyze data using mean, median, and mode -Find the probability of an event	-Practice problems -Quizzes/ tests -Class activities	5 days
Solving Linear Equations	-Writing Equations -Solving Equations by Adding, Subtracting, Multiplying, and Dividing -Solving Multi- step Equations	-How do equations and Formulas help us to model "real life" situations?	-Determine whether two ratios form a proportion	-Translate verbal sentences into equations -Solve equations by using multiplication, division, addition, and subtraction -Solve equations with variables on both sides -Solve proportions -Solve percent problems -Solve problems involving percents of increase and decrease -Solve equations and formulas for given variables -Use formulas to solve "real world" problems	-Practice problems -Quizzes/ tests -Class activities	24 days

	<ul style="list-style-type: none"> <li>-Solving equations with variables on each side</li> <li>-Ratios and proportions</li> <li>-Percent of change</li> <li>-Solving equations and formulas for variables</li> <li>-Mixture and distance problems</li> </ul>			<ul style="list-style-type: none"> <li>-Solve mixture and distance problems</li> </ul>		
<ul style="list-style-type: none"> <li>-Graphing Relations and Functions</li> </ul>	<ul style="list-style-type: none"> <li>-The coordinate plane</li> <li>-Transformations</li> <li>-Relations</li> <li>-Equations as relations</li> <li>-Graphing linear equations using a table of values</li> <li>-Functions</li> <li>-Arithmetic sequences</li> <li>-Writing equations from patterns</li> </ul>	<ul style="list-style-type: none"> <li>-How does the coordinate plane help to illustrate special positions and relationships?</li> <li>-What is a function?</li> <li>-What is a relation?</li> </ul>	<ul style="list-style-type: none"> <li>-Determine whether an equation is linear</li> <li>-Determine whether a relation is a function</li> <li>-Recognize arithmetic sequences and patterns</li> </ul>	<ul style="list-style-type: none"> <li>-Locate and graph points on the coordinate plane</li> <li>-Represent relations as a set of ordered pairs, mappings, and graphs</li> <li>-Find the inverse of a relation</li> <li>-Use a relation to determine the range for a given domain and graph the relation</li> <li>-Graph linear equations using a table of values</li> <li>-Find function values</li> <li>-Extend and write formulas for arithmetic sequences and patterns</li> </ul>	<ul style="list-style-type: none"> <li>-Practice problems</li> <li>-Quizzes/ tests</li> <li>-Class activities</li> </ul>	8 days
<ul style="list-style-type: none"> <li>Analyzing Linear Equations</li> </ul>	<ul style="list-style-type: none"> <li>-Slope</li> <li>-Slope and direct variation</li> <li>-Slope-Intercept form of a line</li> <li>-Writing equations in slope-intercept form</li> <li>-Geometry: parallel and perpendicular lines</li> <li>-Scatter-plots and lines of best fit</li> </ul>	<ul style="list-style-type: none"> <li>-What is slope?</li> <li>-What real life relationships are linear?</li> <li>-Why are the slope and y-intercept important?</li> </ul>	<ul style="list-style-type: none"> <li>-Know the definition of slope</li> <li>-Recognize the different forms of linear equations</li> </ul>	<ul style="list-style-type: none"> <li>-Find the slope of a line</li> <li>-Use rate of change to solve problems</li> <li>-Write and graph direct variation equations</li> <li>-Solve word problems involving direct variation</li> <li>-Write and graph linear equations in slope-intercept form</li> <li>-Model real world data with an equation in slope-intercept form</li> <li>-Write an equation of a line given the slope and a point on the line</li> <li>-Write an equation of a line given two points on the line</li> <li>-Write an equation of a line that passes through a given point, parallel and perpendicular to a given line.</li> <li>-Write equations for lines of best fit</li> </ul>	<ul style="list-style-type: none"> <li>-Practice problems</li> <li>-Quizzes/ tests</li> <li>-Class activities</li> </ul>	20 days

Solving Linear Inequalities	<ul style="list-style-type: none"> <li>-Solving linear inequalities by using addition, subtraction, multiplication, and division</li> <li>-Solving multi-step inequalities</li> <li>-Solving compound inequalities</li> <li>-Solving absolute value equations and inequalities</li> <li>-Graphing inequalities in two variables</li> </ul>	<ul style="list-style-type: none"> <li>-Why are inequalities useful?</li> <li>-Why is absolute value important?</li> </ul>	<ul style="list-style-type: none"> <li>-Know the definition of absolute value</li> </ul>	<ul style="list-style-type: none"> <li>- Solve linear inequalities by using addition, subtraction, multiplication, and division</li> <li>-Solve multi-step inequalities</li> <li>-Solve compound inequalities using the words “and” and “or” and graph their solution sets</li> <li>-Graph inequalities on the coordinate plane</li> <li>-Solve real world problems involving linear inequalities</li> </ul>	<ul style="list-style-type: none"> <li>-Practice problems</li> <li>-Quizzes/ tests</li> <li>-Class activities</li> </ul>	8 days
Solving Systems of Linear Equations and Inequalities	<ul style="list-style-type: none"> <li>-Graphing systems of equations</li> <li>-Substitution</li> <li>-Elimination</li> <li>-Graphing systems of inequalities</li> </ul>	<ul style="list-style-type: none"> <li>-How does graphing a system of equations or inequalities help us to model real life situations?</li> <li>-How do you interpret the solution to a system of equations and inequalities?</li> </ul>	<ul style="list-style-type: none"> <li>-Determine whether a system of linear equations has zero, one, or infinite many solutions</li> <li>-Determine the best method for solve systems of equations</li> </ul>	<ul style="list-style-type: none"> <li>-Solve systems of equations and inequalities by graphing and algebraic methods (substitution/elimination)</li> <li>-Solve real world problems using systems of equations and inequalities</li> </ul>	<ul style="list-style-type: none"> <li>-Practice problems</li> <li>-Quizzes/ tests</li> <li>-Class activities</li> </ul>	18 days
Polynomials	<ul style="list-style-type: none"> <li>-Multiplying monomials</li> <li>-Dividing monomials</li> <li>-Scientific notation</li> <li>-Polynomials</li> <li>-Adding and subtracting polynomials</li> <li>-Multiplying a polynomial by a monomial</li> <li>-Multiplying polynomials</li> <li>-Special products</li> </ul>	<ul style="list-style-type: none"> <li>-How do exponent rules help us to simplify polynomial expressions?</li> <li>-How does scientific notation help to express large and small numbers?</li> </ul>	<ul style="list-style-type: none"> <li>-Know the rules of exponents</li> <li>-Know the degree of a polynomial</li> </ul>	<ul style="list-style-type: none"> <li>-Multiply, divide, add, and subtract polynomials using the rules of exponents</li> <li>-Express numbers in scientific notation and standard notation</li> <li>-Find products and quotients of numbers expressed in scientific notation</li> <li>-Solve and simplify equations using polynomials</li> </ul>	<ul style="list-style-type: none"> <li>-Practice problems</li> <li>-Quizzes/ tests</li> <li>-Class activities</li> </ul>	15 days

Factoring	<ul style="list-style-type: none"> <li>-Factors and greatest common factors</li> <li>-Factoring using the distributive property</li> <li>-Factoring trinomials</li> <li>-Factoring difference of squares</li> <li>-Perfect squares and factoring</li> </ul>	<ul style="list-style-type: none"> <li>-What is a GCF and how does it help in factoring?</li> <li>-What is the difference between a trinomial, a perfect square trinomial, and the difference in squares?</li> </ul>	<ul style="list-style-type: none"> <li>-Know the definition of GCF</li> <li>-Know the definition of prime and composite numbers</li> </ul>	<ul style="list-style-type: none"> <li>-Find the prime factorizations and GCF of integers and monomials</li> <li>-Factor using the distributive property</li> <li>-Factor trinomials</li> <li>-Factor difference of squares</li> <li>-Solve quadratic equations by factoring</li> </ul>	<ul style="list-style-type: none"> <li>-Practice problems</li> <li>-Quizzes/ tests</li> <li>-Class activities</li> </ul>	14 days
Quadratic and Exponential Functions	<ul style="list-style-type: none"> <li>-Graphing quadratic functions</li> <li>-Solving quadratic equations by graphing</li> <li>-Solving quadratic equations by using the quadratic formula</li> <li>-Exponential functions</li> <li>-Exponential growth and decay</li> <li>-Geometric sequences</li> </ul>	<ul style="list-style-type: none"> <li>-How do quadratic and exponential functions help us to model real world situations?</li> <li>-What is the difference between a quadratic and exponential function?</li> </ul>	<ul style="list-style-type: none"> <li>- Know the difference between a quadratic and exponential function</li> <li>-Know the quadratic formula</li> <li>-Identify data that displays exponential behavior</li> </ul>	<ul style="list-style-type: none"> <li>- Graph quadratic functions</li> <li>-Find the equation of the axis of symmetry and the coordinates of the vertex of a parabola</li> <li>-Solve and estimate solutions of quadratic equations by graphing</li> <li>-Solve quadratic equations by using the quadratic formula</li> <li>-Graph exponential functions</li> <li>-Solve problems involving exponential growth and decay</li> </ul>	<ul style="list-style-type: none"> <li>-Practice problems</li> <li>-Quizzes/ tests</li> <li>-Class activities</li> </ul>	12 days
Radical Expressions and Triangles	<ul style="list-style-type: none"> <li>-Simplifying radical expressions</li> <li>-Operations with radical expressions</li> <li>-Radical equations</li> <li>-Pythagorean theorem</li> <li>-Distance formula</li> <li>-Similar triangles</li> <li>-Trigonometric ratios</li> </ul>	<ul style="list-style-type: none"> <li>-How does the Pythagorean theorem and trigonometric ratios help us to solve real life problems?</li> <li>-How does the distance formula help us to solve real life problems?</li> </ul>	<ul style="list-style-type: none"> <li>-Determine whether a triangle is a right triangle</li> <li>-Determine whether two triangles are similar</li> <li>-Define the sine, cosine, and tangent ratios</li> <li>-Determine whether a radical is in simplest form</li> <li>-Recognize perfect squares</li> </ul>	<ul style="list-style-type: none"> <li>-Simplify radical expressions</li> <li>-Add and subtract radical expressions</li> <li>-Multiply radical expressions</li> <li>-Solve problems using the Pythagorean theorem</li> <li>-Find the unknown measures of sides of two similar triangles</li> <li>-use trigonometric ratios to solve right triangles</li> </ul>	<ul style="list-style-type: none"> <li>-Practice problems</li> <li>-Quizzes/ tests</li> <li>-Class activities</li> </ul>	15 days

Rational Expressions and Equations	<ul style="list-style-type: none"> <li>-Inverse variation</li> <li>-Rational expressions</li> <li>-Multiplying rational expressions</li> <li>-Dividing rational expressions</li> <li>-Dividing polynomials</li> <li>-Rational expressions with like denominators</li> <li>-Rational expressions with unlike denominators</li> <li>-Complex fractions</li> <li>-Solving rational equations</li> </ul>	-How do simplifying rational expressions and complex fractions help us to solve problems?	<ul style="list-style-type: none"> <li>-Identify the domain of a rational expressions</li> <li>-Determine whether denominators are like or unlike</li> </ul>	<ul style="list-style-type: none"> <li>-Graph and solve problems using inverse variation</li> <li>-Simplify rational expressions</li> <li>-Multiply rational expressions</li> <li>-Divide rational expressions</li> <li>-Divide a polynomial by a monomial and a binomial</li> <li>-Add and subtract rational expressions with like and unlike denominators</li> <li>-Solve rational equations</li> </ul>	<ul style="list-style-type: none"> <li>-Practice problems</li> <li>-Quizzes/ tests</li> <li>-Class activities</li> </ul>	12 days
Statistics	<ul style="list-style-type: none"> <li>-Sampling and bias</li> <li>-Histograms</li> <li>-Measures of variation</li> <li>-Box-and-Whisker plots</li> </ul>	-How do histograms, matrices, and box-and-whisker plots help us to represent and interpret data?	<ul style="list-style-type: none"> <li>-Know the definition of range and quartiles</li> <li>-Know how to interpret data from histograms, matrices, and box-and-whisker plots</li> </ul>	<ul style="list-style-type: none"> <li>-Interpret and display data in histograms</li> <li>-Find the range of a set of data</li> <li>-Find the quartiles and interquartile range of a set of data</li> <li>-Organize and use data in box-and-whisker plots</li> </ul>	<ul style="list-style-type: none"> <li>-Practice problems</li> <li>-Quizzes/ tests</li> <li>-Class activities</li> </ul>	3 days
Probability	<ul style="list-style-type: none"> <li>-Counting outcomes</li> <li>-Permutations and combinations</li> <li>-Probability of compound events</li> <li>-Probability distributions</li> <li>-Probability distributions</li> </ul>	-How does probability help us to solve real world problems?	<ul style="list-style-type: none"> <li>-Know the difference between permutation and combination</li> <li>-Know the definition of factorial</li> <li>-Know the difference between independent and dependent events</li> <li>-Know the difference between mutually inclusive and mutually exclusive events</li> <li>-Know the difference between theoretical and experimental probability</li> </ul>	<ul style="list-style-type: none"> <li>-Count outcomes using a tree diagram or the Fundamental counting principle</li> <li>-Determine probabilities using combinations and permutations</li> <li>-Determine the probability of two dependant or independent events</li> <li>-Determine the probability of two mutually exclusive or inclusive events.</li> <li>-Use probability distributions to solve real world problems</li> <li>-Use theoretical and experimental probability to represent and solve problems</li> </ul>	<ul style="list-style-type: none"> <li>-Practice problems</li> <li>-Quizzes/ tests</li> <li>-Class activities</li> </ul>	5 days
				<ul style="list-style-type: none"> <li>-Incorporate, integrate and utilize the knowledge and skills that they have acquired throughout the year</li> </ul>	<ul style="list-style-type: none"> <li>-Chapter Tests</li> <li>-Previous Integrated Algebra Regents Exams</li> </ul>	9 days