

Course Title: Algebra I

Topic/Concept: Foundations of Algebra

Time Allotment: 14 days

Unit Sequence: 1

**Major Concepts to be learned:**

1. Evaluate numerical and algebraic expressions according to the order of operations.
2. Add, subtract, multiply, and divide with real numbers.
3. Perform calculations involving powers, exponents, and square roots.
4. Simplify expressions using the Commutative, Associative, and Distributive properties of real numbers.

**Expected Skills to be demonstrated:**

1. Evaluate for a given value and determine the reasonableness of that output.
2. Be able to perform the basic operations for all real numbers.

**PA Standards/Anchors:**

**Eligible Content:**

M8.A.1.1            2.1.8.A, B  
M8.A.2.1            2.1.11. A  
M8.A.3.3            2.2.8.A  
M8.D.2.1

- M8.A.1.1.2
- M8.A.2.1.1
- M8.A.3.3.1
- M8.D.2.1.3
- M11.A.2.2.1
- M11.A.1.1.1,3
- M11.D.1.1.2

**Instructional Strategies:**

**Assessments:**

Coooperative groups            Problem solving activities  
Lecture                              Hands-on activity  
Note Taking                        Math Binders

- Math binders
- Quizzes
- Tests
- Open-ended question

Course Title: Algebra I

Topic/Concept: Solving equations in one-variable

Time Allotment: 18 days

Unit Sequence: 2

**Major Concepts to be learned:**

1. To solve one-variable equations involving one step.
2. To solve one-variable equations involving two or more steps.
3. To solve an equation for a given value.
4. To use and apply rates, ratios, and proportions.
5. To apply applications of percent of change to solve a variety of percent situations.

**Expected Skills to be demonstrated:**

1. To solve any type of one-variable equation and check the answer for accuracy.
2. Be able to find tax, discounts, markup, commission, and sale prices using proportions and/or equations.

**PA Standards/Anchors:**

**Eligible Content:**

M8.A.2.2      2.2.11.A  
M8.A.3.1      2.8.11.D, H, J, N, L, K, P  
M8.A.3.2      2.8.8.J, F  
M8.D.2.1      2.11.8.B

- M8.A.2.2.1                  M11.A.2.1.3
- M8.A.2.2.2                  M11.D.3.1.1
- M8.A.3.1.2                  M11.D.2.1.3
- M8.A.3.2.1

**Instructional Strategies:**

**Assessments:**

Cooperative groups	Problem solving activities
Lecture	Group discussion
Research	Hands-on activity
Note Taking	Summarizing
Math Binders	

- Math binders
- Quizzes and tests
- Open-ended question

Course Title: Algebra I

Topic/Concept: Solving inequalities in one-variable

Time Allotment: 11 days

Unit Sequence: 3

**Major Concepts to be learned:**

1. To solve one-variable inequalities using one step.
2. To solve one-variable inequalities using two or more steps.
3. To solve compound inequalities.
4. To solve absolute-value inequalities.

**Expected Skills to be demonstrated:**

1. To read tables and charts that use inequalities.
2. To graph solutions on the number line.
3. To represent solutions using set and interval notation.

**PA Standards/Anchors:**

**Eligible Content:**

M8.D.2.1            2.8.8.F  
M8.D.2.2            2.8.11.D, H, J, N, L, K

- M8.D.2.1.1
- M8.D.2.1.2
- M8.D.2.2.1
- M11.D.2.1.1

**Instructional Strategies:**

**Assessments:**

Problem solving activities  
Hands-on activity  
Note Taking  
Lecture  
Math Binders  
Outlining

- Math binders
- Quizzes
- Tests
- Open-ended question

Course Title: Algebra I

Topic/Concept: General functions and their applications

Time Allotment: 11 days

Unit Sequence: 4

**Major Concepts to be learned:**

1. To graph and interpret situations comparing distance versus time.
2. To define a relation and determine if it is a function by the vertical line test and examining the domain.
3. To graph functions using charts and tables. Analyze data by using scatter plots and trend lines.
4. To determine if a sequence is arithmetic and find the pattern and terms of that sequence.

**Expected Skills to be demonstrated:**

1. Be able to determine trends by analyzing data in graphical or table form.
2. Be able to write a function to represent/model a situation. Be able to graph functions.

**PA Standards/Anchors:**

**Eligible Content:**

M8.C.3.1 M8.D.1.1 M8.D.2.2 M8.D.4.1 M8.E.4.1	<ul style="list-style-type: none"><li>• M8.D.4.1.1</li><li>• M8.D.4.1.2</li><li>• M8.D.4.1.3</li><li>• M8.E.4.1.1</li><li>• M8.E.4.1.2</li></ul>	M8.C.3.1.1 M8.D.1.1.1 M8.D.1.1.3 M8.D.2.2.1
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**Instructional Strategies:**

**Assessments:**

Cooperative groups Lecture Performance tasks Note Taking Graphic Calculators	Problem solving activities Group discussion Hands-on activity Math Binders	<ul style="list-style-type: none"><li>• Math binders</li><li>• Quizzes</li><li>• Tests</li><li>• Open-ended problem</li></ul>
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Course Title: Algebra I

Topic/Concept: Linear functions

Time Allotment: 13-14 days

Unit Sequence: 5

**Major Concepts to be learned:**

1. Identify and graph linear functions using various methods (tables, graphs, relations, intercepts).
2. Find rates of change and slope and discuss their relationships.
3. To write linear equations in 2 forms: slope-intercept and standard form.
4. Apply transformations to linear equations and discuss the affects of changing the slope and y-intercept.

**Expected Skills to be demonstrated:**

1. Write/state a rule of a function.
2. Match a written situation to its numeric/algebraic expression.
3. Apply the concept of slope to direct variation. Representation of linear functions in various forms.
4. Graphing linear functions using tables, slope, & y-intercept, and x- and y-intercepts.
5. Using linear functions to solve real life applications.
6. Write linear functions given: a point & slope or two points.
7. Write linear functions for parallel and perpendicular lines given the information from skill (6).

**PA Standards/Anchors:**

**Eligible Content:**

M8.D.1.1	2.2.11.A	• M8.B.1.1.4	M11.D.1.1.1
M8.D.2.2	2.8.11.A, D, H, J, K, L, N, O, P, Q	• M8.D.2.2.1	M11.D.3.2.3
M8.D.4.1	2.8.8.F	• M8.D.4.1.3	M11.D.3.2.2
M8.B.1.1		• M8.D.1.1.1	M11.D.3.2.1
		• M8.D.4.1.2	M11.D.2.1.2

**Instructional Strategies:**

**Assessments:**

Cooperative groups	Problem solving activities	• Math binders
Lecture	Performance task	• Quizzes
Graphic Calculators	Hands-on activity	• Tests
Note Taking	Math Binders	• Open-ended question
		• Linear graphing activities with and without the graphing calculator

Course Title: Algebra I

Topic/Concept: Systems of equations and inequalities

Time Allotment: 11 days

Unit Sequence: 6

**Major Concepts to be learned:**

1. To solve systems of linear equations by graphing, substitution, and elimination.
2. To solve systems of linear inequalities.

**Expected Skills to be demonstrated:**

1. Be able to determine solutions using graphing by hand and also using technology.
2. Be able to solve systems of equations by algebraic methods.

**PA Standards/Anchors:**

**Eligible Content:**

M8.D.2.2                      2.8.8.F, 2.8.11.D, H, J, K, L, N

- M8.D.2.2.1
- M11.D.2.1.4
- M11.D.2.1.2

**Instructional Strategies:**

**Assessments:**

Cooperative groups  
Problem solving activities  
Lecture  
Hands-on activity  
Note Taking  
Math Binders  
Graphic Calculators

- Math binder
- Quizzes
- Tests
- Graphing lab
- Open-ended question

Course Title: Algebra I

Topic/Concept: Exponents and polynomials

Time Allotment: 15-16 days

Unit Sequence: 7

**Major Concepts to be learned:**

1. To evaluate powers involving negative exponents.
2. To express numbers in scientific notation and decimal form(standard notation).
3. To use the properties of exponents to simplify algebraic expressions.
4. To add, subtract, and multiply monomials and polynomials.

**Expected Skills to be demonstrated:**

1. To be able to simplify algebraic expressions.
2. Use of the FOIL method (algebraic polynomial expansion) to expand in binomial multiplication.
3. Use of the Distributive Property to expand monomial and polynomial expressions.

**PA Standards/Anchors:**

**Eligible Content:**

M8.A.1.1	2.1.8.A, B	<ul style="list-style-type: none"><li>• M8.A.1.1.1</li><li>• M11.D.2.2.1</li><li>• M11.A.1.1.2</li><li>• M11.A.2.2.1, 2</li><li>• M11.D.2.2.1</li></ul>
M11.D.2.2	2.1.11.A	
	2.8.11.S	

**Instructional Strategies:**

**Assessments:**

Lecture	Student Journals	<ul style="list-style-type: none"><li>• Math binder</li><li>• Quizzes Tests</li><li>• Open-ended question</li><li>• Lab Activity</li></ul>
Hands-on activity	Note Taking	
Graphic organizers	Math Binders	

Course Title: Algebra I

Topic/Concept: Data analysis and probability

Time Allotment: 15 days

Unit Sequence: 8

**Major Concepts to be learned:**

1. To organize and display data in appropriate forms.
2. To examine misleading graphs.
3. To determine experimental and theoretical probabilities.
4. To determine the probability for independent and dependent events.
5. To determine the number of combinations and permutations for a situation.

**Expected Skills to be demonstrated:**

1. Construct a frequency table and then a histogram.
2. Determine if any values in a set of data are outliers.
3. Decide if a problem involves permutations or combinations and apply the appropriate formula to determine the number of outcomes.
4. Decide if multiple events are dependent or independent and calculate the probability of the events occurring.

**PA Standards/Anchors:**

**Eligible Content:**

M8.E.1.1	2.1.8.E	• M8.E.1.1.1	M8.E.3.2.1
M8.E.3.1	2.8.11.S	• M8.E.1.1.3	M11.A.1.2.1
M8.E.3.2		• M8.E.4.1.2	M11.D.2.2.2
M8.E.4.1		• M8.E.1.1.2	

**Instructional Strategies:**

**Assessments:**

Problem solving activities	Lecture	• Math binder
Group discussion	Math Binders	• Quizzes
Hands-on activity	Note Taking	• Test
Graphic organizers	Summarizing	• Open-ended question/project
Evaluating		

Course Title: Algebra I

Topic/Concept: Factoring polynomials

Time Allotment: 13-15 days

Unit Sequence: 9

**Major Concepts to be learned:**

1. To use various methods of factoring polynomials.

**Expected Skills to be demonstrated:**

1. Factor polynomials using the GCF (Greatest Common Factor).
2. Factor polynomials using the concept of the Distributive Property.

**PA Standards/Anchors:**

**Eligible Content:**

M11.D.2.2            2.1.11.A  
M11.A.1.2            2.8.8.F  
                             2.8.11.D, H, J, K, L, N, Q

- M11.D.2.2.2,
- M11.A.1.2.1
- M11.A.2.2.1,
- M11.D.2.1.5,
- M11.D.4.1.1

**Instructional Strategies:**

**Assessments:**

Coooperative groups            Problem solving activities  
Lecture                                Math Binders  
Hands-on activity                Note Taking

- Math binder
- Quizzes
- Tests
- Factoring lab

Course Title: Algebra I

Topic/Concept: Quadratic functions and equations

Time Allotment: 17 days

Unit Sequence: 10

**Major Concepts to be learned:**

1. Identify the characteristics of quadratic functions.
2. Graph quadratic functions.
3. Solve quadratic equations using multiple methods.

**Expected Skills to be demonstrated:**

1. Identify the axis of symmetry, vertex, domain and range, and opening of quadratic functions.
2. Determine the solution(s) to quadratic equations by the following methods: factoring and the quadratic formula.

**PA Standards/Anchors:**

**Eligible Content:**

M.11.D.2.1	2.6.11.A, C, D 2.6.8.A, E 2.7.11.A, E 2.7.8.A	<ul style="list-style-type: none"><li>• M11.D.2.1.5</li><li>• M11.E.1.1.1, 2</li><li>• M11.E.2.1.1-3</li><li>• M11.E.3.1.1,</li><li>• M11.E.3.2.1</li></ul>
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**Instructional Strategies:**

**Assessments:**

Coooperative groups Lecture Hands-on activity Math Binders	Problem solving activities Group discussion Note Taking Graphic Calculators	<ul style="list-style-type: none"><li>• Math binders</li><li>• Quizzes</li><li>• Tests</li><li>• Open-ended question</li></ul>
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Course Title: Algebra I

Topic/Concept: Exponential and radical functions

Time Allotment: 10 days

Unit Sequence: 11

**Major Concepts to be learned:**

1. To graph exponential and radical functions.
2. To simplify radical expressions.
3. To solve radical equations.

**Expected Skills to be demonstrated:**

1. To graph exponential functions using tables and the graphing calculator.
2. To add and subtract like radical expressions after simplifying.
3. To multiply and divide radical expressions.
4. To solve radical equations using the properties of equality.

**PA Standards/Anchors:**

**Eligible Content:**

M11.A.1.1            2.1.11.A  
M11.A.1.3            2.8.11.K, Q  
M11.A.2.2  
M11.A.3.1

- M11.A.1.1.3,
- M11.A.2.2.1
- M11.A.3.1.1
- M 11.D.4.1.1
- M11.A.2.2.2

**Instructional Strategies:**

**Assessments:**

Problem solving activities  
Note Taking  
Graphic Calculators  
Lecture  
Math Binders

- Math binder
- Quizzes
- Test
- Open-ended question

Course Title: Algebra I

Topic/Concept: Rational Functions and Equations

Time Allotment: 2 weeks

Unit Sequence: 12

**Major Concepts to be learned:**

1. Inverse Variation.
2. Rational functions.
3. Simplifying Rational Expressions.
4. Add, subtract, multiply and divide rational expressions.
5. Dividing Polynomials.
6. Solving rational equations.

**Expected Skills to be demonstrated:**

1. The student will be able to identify, write and graph inverse variations.
2. The student will be able to identify excluded values of rational functions and graph rational functions.
3. The student will be able to simplify rational expressions and identify excluded values of rational expressions.
4. The student will be able to multiply and divide rational expressions.
5. The student will be able to add and subtract rational expressions with and without like denominators
6. The student will be able to divide polynomials by a monomial or binomial.
7. The student will be able to solve rational equations and identify extraneous solutions.

**PA Standards/Anchors:**

**Eligible Content:**

2.8.11.K, Q, S

- M11.D.4.1.1
- M11.D.2.2.3

**Instructional Strategies:**

**Assessments:**

Cooperative groups  
Lecture  
Group discussion  
Note Taking  
Math Binders

- Daily warm-up review exercises.
- Minimum of two quizzes throughout the unit.
- End-of-unit exam.
- Group activities.