

Grade level: 9th – 11th grade

Course Title: Algebra II

Topic/Concept: Foundations for Functions

Time Allotment: 22-24 Days

Unit Sequence: 1

Major Concepts to be learned:

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| <ul style="list-style-type: none">• Sets of Numbers• Properties of Real numbers• Square Roots• Simplify Algebraic Expressions• Properties of Exponents | <ul style="list-style-type: none">• Relations and Functions and Function Notation.• Function Notation• Exploring Transformations• Introduction to Parent Functions |
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Expected Skills to be demonstrated:

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| <ul style="list-style-type: none">• The students will be able to identify and use the properties of real numbers to simplify and evaluate expressions and equations.• The students will be able to perform basic operations using square roots.• The students will be able to identify the domain and range of a relation and determine whether a relation is a function.• The students will be able to use scientific notation to simplify expressions containing exponents.• The students will be able to evaluate and graph functions. |
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PA Standards/Anchors:

Eligible Content:

2.1.8.A, B, E 2.5.11.A, B, C, D 2.1.11.A 2.2.8.A, B, C 2.2.11.A	M11.A.1.1.1-3 M11.A.2.2.1, 2 M11.A.3.1.1
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Instructional Strategies:

Assessments:

Lecture Performance task Written work Math Binders	Group discussion Cooperative groups Note Taking Graphic Calculators	Minimum of 4 quizzes throughout the unit. One end of unit comprehensive exam. Bell ringers for warm ups daily. Open ended/free response questions.
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Grade level: 9th – 11th grade

Course Title: Algebra II

Topic/Concept: Linear Functions & Inequalities

Time Allotment: 20-22 days

Unit Sequence: 2

Major Concepts to be learned:

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| <ul style="list-style-type: none">• Solving Linear Equations and Inequalities• Proportional Reasoning• Graphing Linear Functions• Writing Linear Functions• Linear Inequalities in Two Variables | <ul style="list-style-type: none">• Transforming Linear Functions• Solving Absolute Value Equations and Inequalities• Transforming Absolute Value Functions |
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Expected Skills to be demonstrated:

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| <ul style="list-style-type: none">• The students will be able to solve and graph linear equations and inequalities.• The students will be able to apply and utilize proportional relationships to solve problems involving rate, similarity, and scales.• The students will be able to use slope-intercept form or point-slope form to solve and graph linear functions.• The students will be able to write and solve absolute value equations and inequalities.• The students will be able to graph absolute value functions.• Graph and transform absolute value functions. |
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PA Standards/Anchors:

Eligible Content:

2.1.8.A, B, D, E
2.8.8.E, F, G
2.1.11.A2.2.8.A, B
2.8.11.A, D, H, J, K, L, N, O, P, Q, S
2.2.11.A2.5.11.A, B, C, D

2.1.8.A, B, D, E
2.1.11.A
2.2.8.A, B
2.2.11.A
2.5.11.A,B,C,D

Instructional Strategies:

Assessments:

<ul style="list-style-type: none">• Cooperative groups• Group discussion• Written work• Graphic organizers• Summarizing	<ul style="list-style-type: none">• Lecture• Performance task• Note Taking• Evaluating• Math Binders
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Minimum of 4 quizzes throughout the unit.
One end of unit comprehensive exam.
Open ended/free response questions.
Bell ringer warm ups/exit tickets.

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Course Title: Algebra II

Topic/Concept: Linear Systems

Time Allotment: 20-22 Days

Unit Sequence: 3

Major Concepts to be learned:

- Systems of linear Equations using graphing methods.
- Systems of Linear Equations using algebraic solving methods.
- Systems of Linear Inequalities.
- Linear Programming.
- Systems of Linear Equations in three dimensions.

Expected Skills to be demonstrated:

- The students will be able to classify a system of linear equations and determine the number of solutions.
- The students will be able to solve a system of linear equations using the substitution method, elimination method, or by graph.
- The students will be able to solve a system of linear inequalities.
- The students will be able to graph points and linear equations in three dimensions.
- The students will be able to solve a system of linear equations in three variables algebraically and represent the solutions graphically
- The students will be able to solve real world problems involving systems of equations using linear programming.

PA Standards/Anchors:

Eligible Content:

2.1.8.A, B, E 2.1.11.A 2.2.8.A, B 2.2.11.A	2.8.8.C, E, F, G, H, I	M11.A.2.1.1-5 M11.A.2.2.1-3 M11.D.3.2.1-3
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Instructional Strategies:

Assessments:

Coooperative groups Group discussion Written work Note Taking Summarizing Math Binders	Lecture Performance task Hands-on activity Graphic organizers Graphic Calculators	Minimum of 3 quizzes throughtout the unit. One end of unit comprehensive exam. Bell ringer warm up/Exit Ticket Open ended/ free response questions.
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Grade level: 9th – 11th grade

Course Title: Algebra II

Topic/Concept: Quadratic Functions

Time Allotment: 30-35 Days

Unit Sequence: 4

Major Concepts to be learned:

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| <ul style="list-style-type: none">• Use Transformation to graph Quadratic Functions• Properties of Quadratic Func. In Standard Form• Solve Quadratic Func. By Graph• Factor Quadratic Functions• Solve Quadratic Func. With Algebra | <ul style="list-style-type: none">• Complete the Square• Complex Numbers and Roots• Quadratic Inequalities• Operations with Complex Numbers |
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Expected Skills to be demonstrated:

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| <ul style="list-style-type: none">• The students will be able to define, identify, and graph quadratic functions.• The students will be able to solve quadratic equations by graphing, factoring, or completing the square.• The students will be able to define and perform basic operations with imaginary and complex numbers.• The students will be able to solve quadratic equations using the quadratic formula.• The students will be able to solve quadratic inequalities by using a graph or by using algebra. |
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PA Standards/Anchors:

Eligible Content:

2.1.8.A, B
2.1.11.A
2.2.8.A, B, C
2.2.11.A, F
2.5.11.A-D

M11.A.1.1.1-3
M11.A.1.3.1, 2
M11.A.2.1.1
M11.A.2.2.1, 2

Instructional Strategies:

Assessments:

Problem solving activities Group discussion Hands-on activity Graphic organizers Graphic Calculators	Lecture Written work Note Taking Math Binders
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Minimum of 4 quizzes throughout the unit. One end of unit comprehensive exam. Bell ringer/Exit Ticket Open ended/free response questions.
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Grade level: 9th – 11th grade

Course Title: Algebra II

Topic/Concept: Polynomial Functions

Time Allotment: 25-30 days

Unit Sequence: 5

Major Concepts to be learned:

- Basic Operations with Polynomials
- Multiplying Polynomials
- Dividing Polynomials
- Factoring Polynomials
- Finding Real Roots of Polynomial Equations

Fundamental Theorem of Algebra
Graphs of Polynomial Functions

Expected Skills to be demonstrated:

- The students will be able to identify, evaluate, classify, and graph polynomial functions.
- The students will be able to use the distributive property or binomial expansion to multiply 2 or more polynomials.
- The students will be able to use long division or synthetic division to divide two polynomials.
- The students will be able to use the Fundamental Theorem of Algebra to write a polynomial equation.
- The students will be able to use the properties of end behavior to analyze, describe, and graph polynomial functions.

PA Standards/Anchors:

Eligible Content:

2.1.8.A, B, E
2.1.11.A
2.2.8.A, B
2.2.11.A, F

2.5.11.A - D

M11.A.1.1.1, 3
M11.A.1.2.1
M11.A.2.2.1-3
M11.D.2.1.1-5

Instructional Strategies:

Assessments:

Cooperative groups
Lecture
Written work
Graphic organizers
Graphic Calculators

Problem solving activities
Performance task
Note Taking
Math Binders

Minimum of three quizzes throughout the unit.
One end of unit comprehensive exam.
Bell ringer/Exit Tickets
Open ended/free response questions.

Grade level: 9th – 11th grade

Course Title: Algebra II

Topic/Concept: Rational & Radical Functions

Topic Time Allotment: 18-22 days

Unit Sequence: 6

Major Concepts to be learned:

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|--|---|
| <ul style="list-style-type: none">• Variation functions• Multiplying and Dividing Rational Expressions• Adding and Subtracting Rational Expressions• Rational Functions | <ul style="list-style-type: none">• Solve Rational Equations/Inequalities• Radical Expressions and Rational Exponents• Radical Functions• Solving Radical Equations and Inequalities |
|--|---|

Expected Skills to be demonstrated:

- | |
|---|
| <ul style="list-style-type: none">• The students will be able to solve problems involving direct, inverse, joint, and combined variation.• The students will be able to use basic operations to simplify rational expressions and to solve rational equations and inequalities.• The students will be able to graph rational and radical functions• The students will be able to simplify and evaluate radical expressions and expressions that contain rational exponents.• The students will be able to solve radical equations and inequalities. |
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PA Standards/Anchors:

Eligible Content:

2.1.8.A,B 2.1.11.A 2.2.8.A,B 2.2.11.A,F	2.5.11.A, B, C, D 2.8.8.E,F 2.8.11.D,F,G,H,K, L, N, O, P
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M11.A.1.1.1-3 M11.A.2.1.1-5 M11.A.2.2.1-3

Instructional Strategies:

Assessments:

Cooperative groups Problem solving activities Group discussion Note Taking Evaluating Math Binders Graphic Calculators	Minimum of 3 quizzes per unit. One comprehensive exam at the end of the unit. Open-ended/Free Response questions Worksheet Bell Ringer/Exit Ticket
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Grade level: 9th – 11th grade

Course Title: Algebra II

Topic/Concept: Conic Sections

Time Allotment: 18-20 days

Unit Sequence: 7

Major Concepts to be learned:

- Circles
- Ellipses
- Hyperbolas
- Parabolas
- Identifying and Solving Nonlinear Systems of Equations

Expected Skills to be demonstrated:

- The students will be able to write the standard equation of each conic section (circle, ellipse, hyperbola, and parabola).
- The students will be able to identify and graph each conic section(circle, ellipse, hyperbola and parabola).
- The students will be able to identify the integral parts of each conic section.
- The students will be able to solve a system of two equations in two variables that contains at least one second-degree equation.

PA Standards/Anchors:

Eligible Content:

2.1.8.A,B	2.5.11.A,B,C,D	M11.A.1.1.1-3	M11.C.3.1.1-2
2.1.11.A	2.8.8.E,F	M11.A.2.1.1-3	M11.D.3.2.1
2.2.8.A,B	2.8.11.D,E,F,G,H,N,O	M11.A.2.2.1-5	
2.2.11.A,F		M11.C.1.1.1-2	

Instructional Strategies:

Assessments:

Problem solving activities	Lecture	Minimum of 3 quizzes
Group discussion	Hands-on activity	End of chapter cumulative test
Note Taking	Evaluating	Open-ended/Free Response Questions
Math Binders	Graphic Calculators	Worksheet