CP Algebra 2 - Unit 1 Solving Different Types of Equations

<table>
<tr><th>Learning Goals-Students will...</th><th>Key Questions/Talking Points for Families</th><th>Important Assessments and Resources</th></tr>
<tr><td><u>Know</u>
● How to solve different types of equations for an unknown variable algebraically and verify graphically
● Rewrite expressions in simplest form

<u>Vocabulary List</u>
● Factor
● Laws of exponents
● Radical Equations
● Quadratics
● Cubics
● Absolute value
● Rational Equation
● Rational Exponents
● Extraneous Solution
● Literal Equation</td><td rowspan="3">● Show me how you solve an equation for a missing variable.

● What are the different types of equations you are learning?

● What is the purpose of factoring?

● How do you know your answer is correct?

● Can you get more than one answer? How do you know if they are correct?</td><td><u>Assessments</u>

● Unit Test - Beginning to Mid October

● Quizzes - at least 2 throughout the unit

● Homework and check-ins - throughout unit</td></tr>
<tr><td><u>Understand</u>
● What it means to solve equations
● The connections between algebraic and graphical solutions
● How to choose the most efficient strategy</td><td><u>Teacher contacts:</u>
G. Murillo B. Netter
A. Satin D. Sims
http://publicschools.manchesterct.gov/page.cfm?p=656

<u>Resources:</u>
● Solving Absolute value
● Factoring Quadratics
● Solving Literal Equations
● Solving radicals
● Laws of Exponents
● Khan SAT Practice
● Video Tutorials Website</td></tr>
<tr><td><u>Do</u>
● Solving different types of equations
● Simplifying and evaluating expressions
● Modeling situations using equations
● Verifying solutions graphically using technology</td><td></td></tr>
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CP Algebra 2 - Unit 2: Systems

<table>
<tr><th>Learning Goals-Students will...</th><th>Key Questions/Talking Points for Families</th><th>Important Assessments and Resources</th></tr>
<tr><td rowspan="3"><u>Know</u>
● How to solve systems of equations algebraically and verify graphically
● Solve systems of inequalities graphically
● Interpret solutions to systems of equations and inequalities in a context

<u>Vocabulary List</u>
● System
● Ordered Pairs
● Substitution
● Elimination
● Linear
● Quadratic
● Factor
● Point of Intersection
● Inequalities
● Cost vs. Revenue
● Linear Programming
● Constraints
● Vertices</td><td rowspan="3">● What are the different ways you can solve a system?

● Show me how you solve a system of equations for a point.

● What does a solution mean?

● Why can you get one, multiple, or no solutions? When does each happen?

● What is the purpose of factoring?

● How do you know your answer is correct? Does it make sense?</td><td><u>Assessments</u>
● Unit Test - end of November
● Quizzes - at least 1 throughout the unit
● Performance Task-middle of November
● Homework and check-ins - throughout unit</td></tr>
<tr><td><u>Understand</u>
● What it means to solve a system of equations
● What it means to solve a system of inequalities
● The connections between algebraic and graphical solutions
● How to choose the most efficient strategy
● Why multiple solutions can occur</td><td><u>Teacher contacts:</u>
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<u>Resources:</u>
● Substitution
● Elimination
● Linear Programming
● Khan SAT Practice
● Video Tutorials Website</td></tr>
<tr><td><u>Do</u>
● Use substitution and elimination to solve systems
● Use graphing technology and graph by hand to find intersection points
● Write constraints given a description
● Calculate a maximum profit with vertices</td></tr>
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CP Algebra 2 - Unit 3: Functions and Families

<table>
<tr><th>Learning Goals-Students will...</th><th>Key Questions/Talking Points for Families</th><th>Important Assessments and Resources</th></tr>
<tr><td><u>Know</u>
● Whether or not a relation is a function
● Identify characteristics of functions from multiple representations
● How to transform families of functions using vertical/horizontal shifts and reflections
● Identify a function’s inverse and verify

<u>Vocabulary List</u>
● Function
● Domain
● Range
● Interval
● Combination
● Composition
● Inverses
● Families of Functions
○ Absolute Value
○ Quadratic
○ Cubic
○ Square Root
○ Rational
○ ~Circle~</td><td rowspan="3">● What is a function? How can tell if a relation is a function?
● How can you tell if its inverse is a function?
● What are domain and range?
● What are the families of functions? What do they look like?
● How do those functions move given the equation?(shifts and reflections)</td><td><u>Assessments</u>
● Unit Test - mid January
● Quizzes - at least 2 throughout the unit
● Performance Task- mid January
● Homework and check-ins - throughout unit</td></tr>
<tr><td><u>Understand</u>
● Functions and their inverses
● The connections between a function, its graph, and characteristics</td><td rowspan="2"><u>Teacher contacts:</u>
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http://publicschools.manchesterct.gov/page.cfm?p=656

<u>Resources:</u>
● Combinations and Composites (video)
● Inverse Functions
● Domain and Range
● Relations vs. Functions
● Translations and Reflections
● Khan SAT Practice
● Video Tutorials Website</td></tr>
<tr><td><u>Do</u>
● Represent domain and range in interval notation
● Evaluate functions given x or f(x) by graph, table, and algebraically
● Combine, compose, and evaluate functions by graph, table, and algebraically
● Transform families of functions using vertical/horizontal shifts and reflections
● Write a function with a description of shifts and the family
● Determine a function’s inverse and verify by composing them</td></tr>
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CP Algebra 2 - Unit 4: Quadratics

<table>
<tr><th>Learning Goals-Students will...</th><th>Key Questions/Talking Points for Families</th><th>Important Assessments and Resources</th></tr>
<tr><td><u>Know</u>
• Different forms of a quadratic function
• Use multiple methods to solve for the roots of a quadratic function
• Graphing quadratics in different forms

<u>Vocabulary List</u>
• Quadratic
• Vertex
• y-intercepts
• x-intercept, zeros, roots
• Parabola
• Domain & Range
• Standard, Vertex, Intercept Forms
• Discriminant
• Complex numbers (imaginary & real)</td><td rowspan="3">• What strategies can be used to solve a quadratic? What does it represent?
• Why are there multiple forms of quadratic functions? What information does each form give?
• What does this quadratic look like?
• How do you know if a quadratic has real or non real solutions? What does this look like?</td><td><u>Assessments</u>
• Unit Test - Beginning of March
• Quizzes - at least 2 throughout the unit
• Performance Task- Mid March
• Homework and check-ins - throughout unit</td></tr>
<tr><td><u>Understand</u>
• The connection between multiple forms of quadratics & its graph.
• The most efficient strategy for solving a quadratic equation depends on the structure of the quadratic equation.
• The connection between solutions to algebraic equations, graphical representations & the discriminant of the function.
• Connection between operations on real & complex numbers.</td><td><u>Teacher contacts:</u>
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http://publicschools.manchesterct.gov/page.cfm?p=656

<u>Resources:</u>
• Khan SAT Practice
• Video Tutorials Website
• Math is Fun-Standard Form
• Khan Academy Unit
• Quadratic Formula</td></tr>
<tr><td><u>Do</u>
• Model a problem situation using quadratic expressions
• Adding, subtracting, multiplying complex expressions
• Analyze the structure of each form of a quadratic function
• Solving quadratic equations</td></tr>
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CP Algebra 2 - Unit 5: Polynomial Functions

<table>
<tr><th>Learning Goals-Students will...</th><th>Key Questions/Talking Points for Families</th><th>Important Assessments and Resources</th></tr>
<tr><td>

<u>Know</u>

What a polynomial function is and is not (algebraically and graphically)
The difference between zeros/roots, x-intercepts, and factors
The end behavior of even and odd degree functions
How multiplicities affect the function at x-intercepts

<u>Vocabulary List</u>

Factored Form
Standard Form
Term
Factor
Lead Coefficient
Degree
Local/Global Extrema
Intervals of increase and decrease
End Behavior
Multiplicity
Zeros/Roots

</td><td rowspan="3">

What is a polynomial function? How do you know if a function is not a polynomial?
How do you know the degree of a polynomial function from its equation? From a graph
How do you describe the end behavior of a graph?
How do you know if a function crosses or bounces back at an x-intercept?
How can you tell if a number is a root of a function?

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<u>Assessments</u>

Unit Test - by the end of May
Quizzes - at least 2 throughout the unit
Homework and check-ins - throughout unit

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<u>Understand</u>

Connection between operations of real numbers & operations of polynomial expressions.
The relationship between the degree of a function and the number of extrema and zeros
The relationship between the factors of polynomial functions and the zeros and their multiplicities
How the lead coefficient and degree affect the end behavior of a polynomial function

</td><td>

<u>Teacher contacts:</u>
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<u>Resources:</u>

Khan SAT Practice
Video Tutorials Website
Zeros and Multiplicity (Khan)

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<tr><td>

<u>Do</u>

Create a function or graph that is or is not a polynomial function
Identify local and global extrema and intervals of increase and decrease
Determine the number of zeros and extrema given the degree of a polynomial
Describe the end behavior of a function based on its lead coefficient and degree
Determine zeros and their multiplicities from polynomial functions in factored form
Use long and synthetic division to find factors and roots
Sketch a graph of a polynomial function knowing the zeros/multiplicities and end behavior
Write polynomial functions given a graph or a set of requirements

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CP Algebra 2 - Unit 6: Exponential Functions

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<tr>
<th>Learning Goals-Students will...</th>
<th>Key Questions/Talking Points for Families</th>
<th>Important Assessments and Resources</th>
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<tr>
<td>

<u>Know</u>

- Key characteristics of exponential functions (intercepts, asymptotes, end behavior, domain, range)
- The difference between exponential and linear growth/decay
- How exponential functions model real world situations

<u>Vocabulary List</u>

- Base
- Properties of Exponents
- Horizontal Asymptote
- Natural Exponential Function (e^x)
- Exponential Growth/Decay
- Compound Interest

</td>
<td rowspan="3">

- What does an exponential function look like?
- What's the difference between a linear function and an exponential function?
- How can you solve exponential equations?
- Where do you see exponential functions in the real world?

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<u>Assessments</u>

- **Unit Test** - mid June
- **Homework and check-ins** - throughout unit

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<u>Understand</u>

- Exponential functions are formed by repeated multiplication while linear functions are formed by repeated addition
- Why exponential functions have horizontal asymptotes
- How an exponential function looks with the base $a > 1 \; and \; 0 < a < 1$
- The concept of exponential growth and decay (exponential growth occurs when the base is greater than 1, decay occurs when the base is less than 1)

</td>
<td>

<u>Teacher contacts:</u>

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http://publicschools.manchesterct.gov/page.cfm?p=656

<u>Resources:</u>

- Khan SAT Practice
- Video Tutorials Website
- Solving Exponential Equations

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<u>Do</u>

- Graph exponential functions with transformations
- Solve exponential equations with like bases
- Solve exponential equations graphically
- Write exponential functions from a table or graph
- Model situations with exponential functions

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