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### Algebra II Mathematics First Quarter

#### Unit 1: Functions

**Module 1: Analyzing Functions**

1.2  F.IF.4, F.IF.6, A.CED.2, S.ID.6  
Characteristics of Function Graphs  
For a function that models a relationship between two quantities, interpret key features and sketch graphs showing key features.  
- I CAN determine key attributes of a function and how they are related to the function’s graph.

1.4  F.BF.4(+)  
Inverses of Functions  
Find inverse functions.  
- I CAN find the inverse of a function and prove that it is an inverse of the given function.

**Module 2: Absolute Value Functions, Equations, and Inequalities**

2.1  F.IF.4, F.IF.7, A.CED.2, F.BF.3  
Graphing Absolute Value Functions  
Graph piecewise-defined functions including absolute value functions.  
- I CAN identify the features of the graph of an absolute value function.

2.2  A.CED.1, A.REI.3, A.REI.11  
Solving Absolute Value Equations  
Create equations and inequalities in one variable and use them to solve problems.  
- I CAN solve an absolute value equation.

2.3  A.CED.1, A.REI.3, F.IF.7  
Solving Absolute Value Inequalities  
Create equations and inequalities in one variable and use them to solve problems.  
- I CAN solve an absolute value inequality graphically or algebraically.

#### Unit 2: Quadratic Equations

**Module 3: Quadratic Equations**

3.1  N.CN.1, A.REI.4  
Solving Equations by Taking Square Roots  
Know there is a complex number i such that $i^2 = -1$, and every complex number has the form $a+bi$ with a being real.  
- I CAN tell what an imaginary number is and how it is useful in solving Quadratic equations.

3.2  N.CN.1, N.CN.2  
Complex Numbers  
Use the relation $i^2 = -1$ and the commutative, associative, distributive properties to add, subtract, & multiply complex numbers.  
- I CAN add, subtract, and multiply complex numbers.
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Vocabulary

Module 4
Center
Circles
Directrix
Distance
Focus
Linear systems with 2 and 3 unknowns
Parabolas
Radius
System of linear quadratic equations
Vertex

Module 5:
Cubic functions and transformations
End behavior
Factor
Polynomial functions
Turning points
x-intercepts
Zeros

Research-based Instructional Practices

• Actively seek out and encourage student’s thoughts and points of view, and allow students to make choices.
• Explicitly connect lesson content to students’ lives.
• Encourage meaningful peer interactions and promote peer conversations.
• Give students the floor. Avoid dominating classroom conversations by maintaining a balance of teacher and student talk. Help students consider different perspectives. Present and encourage multiple and varied points of view. Convey how and when to use concepts and procedures and the difference between them.
• Assist your students to define and refine their understanding by presenting an assortment of examples and contrasting non-examples that illustrate the concept or procedure.
• Offer extended opportunities for students to examine and analyze information. Engage students in higher-order thinking skills by giving them chances to explore data and evidence.
• Provide opportunities for students to make predictions and brainstorm consequences. Encourage them to discover and evaluate their own answers.
• Challenge students with open-ended tasks that have a variety of solutions and require students to think about how to use their knowledge in creative ways.
• Help students monitor their own thinking by showing them how you approach a problem and the questions you ask yourself to monitor your own thinking process. Model the process by thinking out loud.
• Help students think about their own learning by offering opportunities to reflect on, plan, and share their developing thought processes.

Yvonne Caamal Canul
Superintendent

Mark Coscarella, Ed.D.
Deputy Superintendent

Camela Diaz
Interim Assistant Director for Student Learning

Delsa Chapman
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Introduction to Your Mathematics Pacing Guide
### Module 4: Quadratic Relations and Systems of Equations

#### 4.1: A.CED.2, A.CED.3, G.GPE.1, G.GPE.4
**Circles**
Represent constraints by equations or inequalities, and interpret solutions as viable or non-viable options in a modeling context.

☐ **I CAN** put the equation of a circle in standard form and I know how to find the center of the circle and the radius from the equation.

#### 4.2: A.CED.2, A.CED.3, G.GPE.2
**Parabolas**
Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.

☐ **I CAN** use the distance formula to drive the equations for both vertical and horizontal parabolas.

#### 4.3: A.REI.7
**Solving Linear-Quadratic Systems**
Solve a simple system consisting of a linear equation and a quadratic equation in two variables algebraically and graphically.

☐ **I CAN** solve a system composed of a linear equation in two variables and a quadratic equation in two variables.

#### 4.4: A.REI.6, A.CEI.3
**Solving Linear Systems in Three Variables**
Solve systems of linear equations exactly.

☐ **I CAN** find the solutions of a system of three linear equations in three variables.

### Module 5: Polynomial Functions

#### 5.2: F.IF.7
**Graphing Polynomial Functions**
Graph polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior.

☐ **I CAN** sketch the graph of a polynomial function in intercept form.
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Mathematical Practices
- Make sense of problems and persevere in solving them.
- Reason abstractly and quantitatively.
- Construct viable arguments and critique the reasoning of others.
- Model with mathematics.
- Use appropriate tools strategically.
- Attend to precision.
- Look for and make use of structure.
- Look for and express regularity in repeated reasoning.

Vocabulary
- Module 6
  - Binomial
  - Binomial Experiment
  - Binomial Probability
  - Binomial Theorem
- Factoring
- Factor Theorem
- Irreducible Factor
- Pascal’s Triangle
- Polynomial
- Remainder Theorem
- Synthetic Theorem
- Synthetic substitution
- Module 7
  - Coefficients
  - Multiplicity
  - Rational
  - Root
  - Zeros

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# Algebra II
## Unit 3: Polynomials

**Module 6: Polynomials**

6.1: A.APR.1, F.BF.1  
**Adding and Subtracting Polynomials**  
Understand that polynomials form a system closed under the operations of addition and subtraction.

☐ I CAN add or subtract two polynomials and define the type of the resulting expression.

6.2: A.APR.1, A.APR.4, F.BF.1  
**Multiplying Polynomials**  
Understand the polynomials form a system closed under multiplication.

☐ I CAN multiply polynomials and define the type of the resulting expression.

6.3: A.APR.5(+), A.APR.2, A.APR.3, A.CED.1  
**The Binomial Theorem**  
Know and apply the Binomial Theorem for the expansion of \((x + y)^n\) in powers of \(x\) and \(y\) for a positive integer \(n\), where \(x\) and \(y\) are any numbers, with coefficients determined for the example by Pascal’s Triangle.

☐ I CAN understand how to use the Binomial Theorem to find coefficients.

6.4: A.SSE.1, A.SSE.2, N.CN.8(+), A.APR.3, A.CED.1  
**Factoring Polynomials**  
Use the structure of an expression to identify ways to rewrite it.

☐ I CAN factor a polynomial and I can tell why factoring is useful.

6.5: A.APR.1, A.APR.3, A.APR.6  
**Dividing Polynomials**  
Rewrite simple rational expressions in different forms; write \(a/b(x)\) in the form \(q(x) + r(x)/b(x)\) using inspection and long division.

☐ I CAN divide a polynomial with the correct divisor using synthetic division and long division.

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## Unit 3: Equations

**Module 7: Polynomial Equations**

7.1: A.APR.2, A.APR.3, A.CED.3  
**Finding Rational Solutions of Polynomial Equations**  
Know and apply the Remainder Theorem. For a polynomial \(p(x)\) and a number \(a\), the remainder on division by \(x - a\) is \(p(a)\), so \(p(a) = 0\) if and only if \((x - a)\) is a factor of \(p(x)\).

☐ I CAN find the rational roots of a polynomial equation.

7.2: A.APR.2, A.APR.3, N.CN.9(+), A.REI.1, F.IF.7  
**Finding Complex Solutions of Polynomial Functions**  
Know and apply the Remainder Theorem.

☐ I CAN use the Fundamental Theorem of Algebra and its corollary to find the roots of the polynomial equation \(p(x) = 0\) where \(p(x)\) has degree \(n\).
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### Algebra II

#### Unit 4: Rational Functions, Expressions, and Equations

**Module 9: Rational Expressions and Equations**

- **9.3: A.REI.1, A.REI.2, A.CED.1, A.CED.4**
  - **Rational Functions**
    - Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.
  - **I CAN** solve rational equations algebraically and graphically.

#### Unit 5: Rational Functions, Expressions, and Equations

**Module 10: Rational Functions**

- **10.2: F.IF.4, F.IF.6, F.IF.7, F.BF.3**
  - **Graphing Square Root Functions**
    - Graph square root functions.
  - **I CAN** use transformations of a parent square root function to graph functions of the form \( g(x) = a \cdot \sqrt{x - h} + k \) or \( g(x) = \sqrt{\frac{x}{b}} + k \).

#### Unit 6: Exponential and Logarithmic Functions & Equations

**Module 13: Exponential Functions**

- **13.4: F.LE.A.2, F.IF.C.7e, F.IF.C.7**
  - **Compound Interest**
    - Find an exponential regression model from data.
  - **I CAN** write an exponential equation from a graph, a description, or coordinate pairs.

**Module 14: Modeling with Exponential and Other Functions**

- **14.1: S.ID.B.6a, A.CED.A.2, F.IF.B.4**
  - **Fitting Exponential Functions to Data**
    - Fit a function to the data and use them to solve problems.
  - **I CAN** write an exponential equation from given data and use it to solve problems.
  - **14.2: S.ID.B.6a, A.CED.A.2, F.IF.B.4**
    - **Choosing Among Linear, Quadratic, and Exponential Models**
      - Determine which kind of model is best represented by points on a coordinate plane.
    - **I CAN** determine the correct type of exponential equation to fit given data.

#### Unit 7: Trigonometric Functions

**Module 17: Unit-Circle Definition of Trigonometric Functions**

- **17.1: F-TF.A.1, G-C.C.5**
  - **Angles of Rotation and Radian Measure**
    - Solve an angle's initial and terminal sides and defining standard position of an angle.
  - **I CAN** understand radians measured of an angle as the length of the arc on the unit circle subtended by the angle.

**Module 18: Graphing Trigonometric Functions**

- **18.1: F.IF.C.7e,F.BF.B.3, F.IF.B.4**
  - **Stretching, Compressing and Reflecting Sine and Cosine**
    - Describe features of sine and cosine.
  - **I CAN** graph exponential and logarithmic functions intercepts and end behaviors and trigonometric functions showing period, mid-line, and amplitude.

**Module 19: Introduction to Probability**

- **19.4: S-CP.A.4, S-CP.B.7**
  - **Mutually Exclusive and Overlapping Events**
    - Explain how to determine whether events are mutually exclusive or overlapping.

#### Unit 8: Probability

**Module 20: Conditional Probability and Independence of Events**

  - **Conditional Probability**
    - Find conditional probabilities.
  - **I CAN** use a Venn diagram to decide if events are independent and to approximate conditional probabilities.

#### Unit 9: Statistics

**Module 22: Gathering and Displaying Data**

- **22.1: 22.1S-IC.A.1**
  - **Data-gathering Techniques**
    - Show the relationships among population, census, and parameter, as well as sample, sampling and statistic.
  - **I CAN** understand statistics as a process for making inferences about a given population.