Algebra 2 Honors Curriculum Guide 2025-2026

Reorganized Function-Based Approach

School: Doral Academy
Teacher: Mrs. Zogovic

This curriculum follows a systematic function-based approach where each function family is explored through four key components: **solving equations, solving inequalities, analyzing graphs and properties, and real-world applications**.

CURRICULUM PHILOSOPHY: THE FOUR-PILLAR FUNCTION APPROACH

For each function family, students will master:

1. **SOLVE EQUATIONS** - Algebraic techniques for finding solutions
2. **SOLVE INEQUALITIES** - Graphical and algebraic methods for inequality solutions
3. **ANALYZE GRAPHS** - Properties, transformations, domain, range, and end behavior
4. **APPLICATIONS** - Real-world modeling and problem-solving

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PRIMARY RESOURCES

FlippedMath Algebra 2 Common Core -- https://algebra2cc.flippedmath.com/
FlippedMath AP Precalculus -- https://precalculus.flippedmath.com/ap-precalc.html
Khan Academy Algebra 2 -- https://www.khanacademy.org/math/algebra2
Khan Academy Trigonometry -- https://www.khanacademy.org/math/trigonometry

Note: (PRC) indicates material from AP Precalculus for enhanced depth and rigor

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QUARTER 1: Aug 14 - Oct 17

Foundation Functions: Linear, Quadratic, and Polynomial

Week	Dates	Major Concepts/Topics	Four-Pillar Focus	Holiday/Special Notes	Resources
1	Aug 14-16	**Unit 1: Linear Functions Review** • Function notation • Domain and range basics	**Graphs:** Linear transformations and families	Short week - School starts	FlippedMath 5.1-5.2 Transformations
2	Aug 19-23	**Linear Functions (4-Pillar Approach)** • Linear equations • Linear inequalities	**Equations & Inequalities:** Systems and graphical solutions		Khan Academy: Linear Functions
3	Aug 26-30	• Linear graphs, slopes, transformations • Linear modeling applications	**Graphs & Applications:** Rate of change and real-world contexts		Professor Leonard: Linear Functions
4	Sep 2-6	**Unit 2: Quadratic Functions** • Solving quadratic equations (factoring, square root, quadratic formula)	**Equations:** Multiple solution methods	**Labor Day - Sep 2**	FlippedMath 6.3 Quadratic Formula
5	Sep 9-13	• Quadratic inequalities (graphical and algebraic) • Sign analysis	**Inequalities:** Parabola regions and test points		Khan Academy: Quadratic Inequalities
6	Sep 16-20	• Quadratic graphs: vertex form, axis of symmetry, transformations	**Graphs:** Vertex, intercepts, end behavior	**Interims Issued - Sep 16**	Desmos: Quadratic Explorer
7	Sep 23-27	• Quadratic applications: projectile motion, optimization, area problems	**Applications:** Real-world modeling		Khan Academy: Quadratic Models
8	Sep 30-Oct 4	**Unit 3: Polynomial Functions** • 🔍 Polynomial equations and factoring techniques	**Equations:** Advanced factoring, synthetic division		FlippedMath 1.1-1.4 Polynomials
9	Oct 7-11	• Polynomial inequalities using sign charts	**Inequalities:** Critical points and interval testing		Khan Academy: Polynomial Inequalities
10	Oct 14-17	• Polynomial graphs: end behavior, zeros, multiplicity • Polynomial modeling	**Graphs & Applications:** Complete analysis	**Quarter 1 Ends Oct 17**	Professor Leonard: Polynomial Graphs

QUARTER 2: Oct 20 - Jan 15

Exponential, Logarithmic, and Operations Review

Week	Dates	Major Concepts/Topics	Four-Pillar Focus	Holiday/Special Notes	Resources
11	Oct 20-24	**Unit 4: Exponential Functions** • Exponential equations	**Equations:** Properties of exponents, change of base	**Teacher Planning Day - Oct 20**	FlippedMath 7.1-7.2 Exponentials
12	Oct 27-31	• Exponential inequalities • Growth vs. decay analysis	**Inequalities:** Exponential comparisons	**Report Cards - Oct 28**	Khan Academy: Exponential Models
13	Nov 3-7	• Exponential graphs: transformations, asymptotes, domain/range	**Graphs:** Complete function analysis		Desmos: Exponential Functions
14	Nov 10-14	• Exponential applications: compound interest, population growth, decay	**Applications:** Financial mathematics and real-world modeling	**Veterans Day - Nov 11**	Khan Academy: Financial Literacy
15	Nov 17-21	**Unit 5: Logarithmic Functions** • Logarithmic equations and properties	**Equations:** Log properties, change of base, solving techniques	**Interims Issued - Nov 18**	FlippedMath 8.1-8.4 Logarithms
16	Nov 24-28	• Logarithmic inequalities	**Inequalities:** Log function behavior	**Thanksgiving Break**	Khan Academy: Logarithmic Functions
17	Dec 1-5	• Logarithmic graphs: inverse relationship, transformations, asymptotes	**Graphs:** Domain restrictions and inverse properties		Professor Leonard: Logarithms
18	Dec 8-12	• Logarithmic applications: pH, decibels, earthquake magnitude	**Applications:** Scientific and real-world contexts	**Early Release Day - Dec 10**	Khan Academy: Log Applications
19	Dec 15-19	**Semester Review & Final Exam**	**All Four Pillars:** Comprehensive integration	**Final Exams Week**	Comprehensive review materials
Winter Break	Dec 22-Jan 6	**Winter Break**		**No School**	
20	Jan 7-10	**Operations Review: Polynomial Division** • Long division • Synthetic division	**Equations:** Division algorithms for polynomial equations		FlippedMath 1.3 Polynomial Division
21	Jan 13-15	**Complex Numbers** • Operations with complex numbers • Complex solutions	**Equations:** Complex solutions to quadratic and polynomial equations	**Quarter 2 Ends Jan 15**	Khan Academy: Complex Numbers

QUARTER 3: Jan 20 - Apr 2

Rational Functions and Trigonometric Functions

Week	Dates	Major Concepts/Topics	Four-Pillar Focus	Holiday/Special Notes	Resources
22	Jan 20-24	**Unit 6: Rational Functions** • Simplifying rational expressions • Operations with rational expressions	**Foundation:** Building blocks for rational functions	**MLK Day - Jan 20**	FlippedMath 3.1-3.3 Rational Expressions
23	Jan 27-31	• Complex fractions • Domain and range of rational expressions	**Graphs:** Domain restrictions and discontinuities		Khan Academy: Rational Expressions
24	Feb 3-7	• Rational equations (LCD method, cross multiplication)	**Equations:** Solving techniques and extraneous solutions		Professor Leonard: Rational Equations
25	Feb 10-14	• Rational inequalities (sign analysis, critical points)	**Inequalities:** Test intervals and boundary behavior	**Early Release Day - Feb 11**	Khan Academy: Rational Inequalities
26	Feb 17-21	• Rational function graphs: vertical/horizontal/oblique asymptotes, holes	**Graphs:** Complete asymptotic analysis	**Presidents Day - Feb 17**	Desmos: Rational Function Explorer
27	Feb 24-28	• Rational function applications: rates, work problems, optimization	**Applications:** Real-world rational modeling		Khan Academy: Rational Models
28	Mar 3-7	**Unit 7: Trigonometric Functions - Introduction** • Unit circle • Radian/degree conversion	**Foundation:** Building trigonometric understanding		Khan Academy: Unit Circle
29	Mar 10-14	• Basic trigonometric equations (sin, cos, tan)	**Equations:** Unit circle solutions	**Teacher Planning Day - Mar 12**	FlippedMath Trigonometry
30	Mar 17-21	• Trigonometric inequalities	**Inequalities:** Periodic solutions and intervals		Khan Academy: Trig Equations
Spring Break	Mar 24-28	**Spring Break**		**No School**	
31	Mar 31-Apr 2	• Trigonometric graphs: amplitude, period, phase shift, vertical shift	**Graphs:** Complete periodic function analysis	**Quarter 3 Ends Apr 2**	Desmos: Trig Function Explorer

QUARTER 4: Apr 6 - Jun 5

Advanced Trigonometry and Integration

Week	Dates	Major Concepts/Topics	Four-Pillar Focus	Holiday/Special Notes	Resources
32	Apr 6-10	**Unit 7: Trigonometric Functions (Continued)** • Trigonometric applications: periodic phenomena, waves	**Applications:** Real-world periodic modeling		Khan Academy: Trig Applications
33	Apr 13-17	**Unit 8: Trigonometric Identities** • Fundamental identities • Pythagorean identities	**Equations:** Identity verification and simplification	**Early Release Day - Apr 15**	Professor Leonard: Trig Identities
34	Apr 20-24	• Sum and difference formulas • Double angle and half angle formulas	**Equations:** Advanced trigonometric equations	**Spring Holiday - Apr 21**	Khan Academy: Trig Identities
35	Apr 27-May 1	**Unit 9: Advanced Equations and Systems** • Systems with trigonometric functions	**Equations:** Integration of function families	**Interims Issued - Apr 28**	FlippedMath Systems
36	May 4-8	• Parametric equations (PRC) • Polar coordinates (PRC)	**Graphs:** Alternative coordinate systems		AP Precalculus: Parametric
37	May 11-15	**Unit 10: Function Analysis and Modeling** • Comparing function families	**All Four Pillars:** Comprehensive function comparison		Khan Academy: Function Comparison
38	May 18-22	• Advanced modeling projects • Function composition and inverse functions	**Applications:** Real-world mathematical modeling		Student choice modeling projects
39	May 25-29	**Statistics Integration** • Normal distributions • Probability applications	**Applications:** Statistical modeling and analysis	**Memorial Day - May 26**	Khan Academy: Statistics
40	Jun 2-5	**Final Projects & Course Wrap-up** • Portfolio presentations • Course reflection	**All Four Pillars:** Comprehensive integration	**Early Release Days Jun 2-4 Quarter 4 Ends Jun 5**	Final project presentations

FUNCTION FAMILY LEARNING SEQUENCE

For Each Function Family, Students Will:

SOLVE EQUATIONS

- Master algebraic techniques specific to each function type
- Use appropriate tools (factoring, quadratic formula, properties, etc.)
- Check for extraneous solutions
- Solve systems involving the function

SOLVE INEQUALITIES

- Apply graphical methods (test points, boundary analysis)
- Use algebraic methods (sign charts, critical points)
- Interpret solutions in interval notation
- Consider domain restrictions

ANALYZE GRAPHS

- Identify key features (intercepts, asymptotes, extrema)
- Analyze transformations and families
- Determine domain and range
- Describe end behavior and continuity

APPLICATIONS

- Model real-world situations
- Interpret mathematical results in context
- Optimize solutions for practical problems
- Connect to other disciplines (physics, economics, etc.)

ASSESSMENT STRATEGY BY FUNCTION FAMILY

Four-Pillar Assessment Rubric

Mastery Level (4): Demonstrates complete understanding across all four pillars

Proficient Level (3): Shows solid understanding with minor gaps

Developing Level (2): Basic understanding with some misconceptions

Beginning Level (1): Limited understanding requiring significant support

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TECHNOLOGY INTEGRATION FOR FOUR-PILLAR APPROACH

EQUATION SOLVING TOOLS

- Symbolab Step-by-Step Solutions
- Wolfram Alpha Problem Solver
- TI-84 Calculator techniques

INEQUALITY ANALYSIS TOOLS

- Desmos Graphing Calculator
- GeoGebra Inequality Explorer
- Sign chart generators

GRAPH ANALYSIS TOOLS

- Desmos Function Transformations
- GeoGebra Function Families
- FlippedMath Interactive Graphs

APPLICATION MODELING TOOLS

- Khan Academy Real-World Problems
- Desmos Activity Builder
- Statistical analysis software

RATIONAL FUNCTIONS: COMPREHENSIVE OPERATIONS REVIEW

BEFORE RATIONAL FUNCTIONS - ESSENTIAL SKILLS REVIEW:

1. **Polynomial Long Division**
    - Step-by-step algorithm
    - Applications to simplifying rational expressions
    - Connection to synthetic division
2. **Synthetic Division**
    - When and how to use
    - Finding zeros and factors
    - Remainder theorem applications
3. **Complex Fractions**
    - Simplification techniques
    - LCD method vs. division method
    - Applications in rational expressions
4. **Domain and Range Analysis**
    - Identifying restrictions
    - Vertical asymptotes vs. holes
    - Horizontal and oblique asymptotes

TRIGONOMETRY INTEGRATION STRATEGY

TRIGONOMETRIC FUNCTIONS FOUR-PILLAR APPROACH:

TRIGONOMETRIC EQUATIONS:

- Basic equations using unit circle
- Multiple angle solutions
- Identity applications
- Inverse trigonometric functions

TRIGONOMETRIC INEQUALITIES:

- Periodic solution sets
- Graphical interpretation
- Interval notation with periods

TRIGONOMETRIC GRAPHS:

- Amplitude, period, phase shift, vertical shift
- Transformations of parent functions
- Domain and range considerations
- Asymptotic behavior (for tan, cot, sec, csc)

TRIGONOMETRIC APPLICATIONS:

- Periodic phenomena (sound waves, tides, seasons)
- Right triangle applications
- Law of sines and cosines
- Harmonic motion modeling

PRECALCULUS PREPARATION (PRC) TOPICS

ADVANCED TOPICS FOR COLLEGE READINESS:

- **Parametric Equations** - Alternative function representations

- **Polar Coordinates** - Circular coordinate systems
- **Vectors and Matrices** - Linear algebra foundations
- **Advanced Function Composition** - Composite function analysis
- **Sequence and Series** - Discrete mathematics connections
- **Mathematical Modeling** - Real-world problem solving

CONTACT INFORMATION & SUPPORT

Mrs. Kristina Zogovic
Email: kzogovic@doralacademy.org
Office Hours: Daily 7:15-7:45 AM and 3:15-4:00 PM
Course Website: Link

Student Support Resources:

- **FlippedMath Videos:** 24/7 access to instructional content
- **Khan Academy Practice:** Personalized learning with immediate feedback
- **Peer Tutoring:** NHS Honor Society mathematics support
- **Parent Communication:** Regular progress updates and resource sharing
- **Office Hours:** Individual and small group assistance

This reorganized curriculum follows a systematic four-pillar approach to function families, ensuring students develop comprehensive understanding through equations, inequalities, graphs, and applications. The integration of trigonometry and advanced operations provides strong preparation for AP Precalculus and college-level mathematics.