

The Common Denominator

A Family Math Newsletter
Algebra 1 Unit 4: Quadratics

The students begin their study of the structure of quadratic and polynomial expressions and equations. They identify the characteristics of these equations and expressions, and perform operations on them. The unit puts heavy emphasis on the relationship between the form of a quadratic function and the graph of the function, emphasizing the key graphical characteristics identified from the structure and form of the quadratic function (i.e. standard, vertex, factored forms). The students continue their study of quadratic functions, focusing on solving quadratic equations algebraically. The following topics will be studied:

Unit at a Glance

Topic	Skills	Length
Topic A: Polynomial Expressions	<ul style="list-style-type: none">Adding and Subtracting PolynomialsMultiplying Polynomials	10 (45-minute) periods 5 (90-minute) periods
Topic B: Graphs of Quadratic Functions	<ul style="list-style-type: none">Graphing Quadratic FunctionsConnecting Intercepts, Zeros, Factors	10 (45-minute) periods 5 (90-minute) periods
Topic C: Solving Quadratic Equations	<ul style="list-style-type: none">Using Factors to Solve EquationsUsing Square Roots to Solve EquationsLinear, Exponential, and Quadratic Models	20 (45-minute) periods 10 (90-minute) periods
Topic D: Other Functions	<ul style="list-style-type: none">Functions and Inverses	4 (45-minute) periods 2 (90-minute) periods

Exploring Mathematics

Sports Applications

A football field measures 360 feet long by 160 feet wide. Suppose the NFL was considering extending the field but they are not sure by how many feet in each direction. If they extend the field by x feet in each direction, what would the new dimensions be? What is the new perimeter of the field? What is the new area of the field? Be sure to use correct units.

Real World Connections

Watch the videos below to see how the graphs of quadratics appear in the real world!

[Epic Trick Shot Battle](#)

[Quadratic Functions and Parabolas in the Real World](#)

[Fireworks](#)

Real-World Applications

Have you ever thought about where can you find examples of linear, exponential, and quadratic models in the real-world? Think about which model (linear, exponential, or quadratic) would be most appropriate for the scenarios listed below:

The path of shooting a basketball into a hoop

The high temperatures for each day this year

A savings account balance that collects compound interest every month

A taxi service that charges an initial fee of \$5 and charges \$1.50 per mile afterwards

A culture of bacteria that doubles in population every hour

Resource Toolkit

HMH Algebra 1 Textbook, Interactive Student Edition, or Student Resources

Topic A

Unit 7: Polynomial Operations, Module 17: Adding and Subtracting Polynomials, Lessons 17.1-17.3
Unit 7: Polynomial Operations, Module 18: Multiplying Polynomials, Lessons 18.1-18.3

Topic B

Unit 8: Quadratic Equations, Module 19: Graphing Quadratic Functions, Lessons 19.1-19
Unit 8: Quadratic Equations, Module 20: Connecting Intercepts, Zeros, and Factors, Lessons 20.1-20.3

Topic C

Unit 9: Quadratic Equations and Modeling, Module 21: Using Factors to Solve Quadratic Equations, Lessons 21.1-21.3
Unit 9: Quadratic Equations and Modeling, Module 22: Using Square Roots to Solve Quadratic Equations, Lessons 22.1-22.5
Unit 9: Quadratic Equations and Modeling, Module 23: Linear, Exponential, and Quadratic Models, Lessons 23.1-23.

Topic D

Unit 10: Inverse Relationships, Module 24: Functions and Inverses, Lessons 24.1-24.4

Homework Help

Topic A:

Unit 7, Module 17

Lesson 17.1: Understanding Polynomials, Reading Strategies
Lesson 17.2: Adding Polynomials, Reteach
Lesson 17.3: Subtracting Polynomials, Reteach

Unit 7, Module 18

Lesson 18.1: Multiplying Polynomial Expression by Monomials, Reteach
Lesson 18.2: Multiplying Polynomial Expressions, Practice and Problem Solving: D
Lesson 18.3: Special Products of Binomials, Reteach
Khan Academy: [Introduction to Polynomials](#)

Topic B

Unit 8, Module 19

Lesson 19.1: Understanding Quadratic Functions, Reading Strategies
Lesson 19.2: Transforming Quadratic Functions, Math on the Spot Video
Lesson 19.3: Interpreting Vertex Form and Standard Form, Reading Strategies

Unit 8, Module 20

Lesson 20.1: Connecting Intercepts and Zeros, Reading Strategies
Lesson 20.2: Connecting Intercepts and Linear Factors, Math on the Spot Video
Lesson 20.3: Applying the Zero Product Property to Solve Equations, Reteach

Khan Academy: [Graphing Quadratic Functions](#)

Topic C

Unit 9, Module 21

Lesson 21.1: Solving Equations by Factoring $x^2 + bx + c$, Reteach
Lesson 21.2: Solving Equations by Factoring $ax^2 + bx + c$, Math on the Spot Video
Lesson 21.3: Using Special Factors to Solve Equations, Success for English Learners

Unit 9, Module 22

Lesson 22.1: Solving Equations by Taking Square Roots, Reading Strategies
Lesson 22.2: Solving Equations by Completing the Square, Reteach
Lesson 22.3: Using the Quadratic Formula to Solve Equations, Success for English Learners
Lesson 22.4: Choosing a Method for Solving Quadratic Equations, Reading Strategies
Lesson 22.5: Solving Nonlinear Systems, Math on the Spot Video

Unit 9, Module 23

Lesson 23.1: Modeling with Quadratic Functions, Reteach
Lesson 23.2: Comparing Linear, Exponential, and Quadratic Models, Math on the Spot Video

Khan Academy: [Factoring Quadratic Expressions](#)

Topic D

Unit 10, Module 24

Lesson 24.1: Graphing Polynomial Functions, Success for English Learners
Lesson 24.2: Understanding Inverse Functions, Math on the Spot Video
Lesson 24.3: Graphing Square Root Functions, Reading Strategies
Lesson 24.4: Graphing Cube Root Functions, Math on the Spot Video

Khan Academy

[Into to Inverses](#)
[Graphs of Radical Functions](#)

