

05-Factoring Polynomials

Content Area: **Math**
Course(s):
Time Period: **Full Year**
Length: **3 weeks (10-12 blocks)**
Status: **Published**

General Overview, Course Description or Course Philosophy

In this unit, students will expand on their knowledge of operations with monomials and polynomials to factor polynomial expressions. They will learn to identify the structure of the polynomial and use the appropriate factoring method to rewrite the expression in the equivalent factored form. Students will apply this skill when solving and graphing quadratic equations and functions.

OBJECTIVES, ESSENTIAL QUESTIONS, ENDURING UNDERSTANDINGS

Students will understand that:

- Rules of arithmetic and algebra can be used together with equivalence to transform polynomial expressions
- Non-prime polynomials can be factored based on the number of terms, common factors, and defining structures

Essential Questions:

- Can two algebraic expressions that appear to be different be equivalent? Give an example to support your answer.
- How can a polynomial be expressed in different ways based on its structure?
- How do the terms of a trinomial help you determine its factored form?

CONTENT AREA STANDARDS

A.CED

A. Create equations that describe numbers or relationships

A.REI

A. Understand solving equations as a process of reasoning and explain the reasoning

B. Solve equations and inequalities in one variable

C. Solve systems of equations

D. Represent and solve equations and inequalities graphically

A.SSE

A. Interpret the structure of expressions

B. Write expressions in equivalent forms to solve problems

HS Functions

F.BF

A. Build a function that models a relationship between two quantities

B. Build new functions from existing functions

F.IF

A. Understand the concept of a function and use function notation

B. Interpret functions that arise in applications in terms of the context

C. Analyze functions using different representations

MA.A-APR.A.1	Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials.
MA.A-SSE.A.2	Use the structure of an expression to identify ways to rewrite it. For example, see $x^4 - y^4$ as $(x^2)^2 - (y^2)^2$, thus recognizing it as a difference of squares that can be factored as $(x^2 - y^2)(x^2 + y^2)$.
MA.A-SSE.A.1a	Interpret parts of an expression, such as terms, factors, and coefficients.
MA.A-SSE.A.1b	Interpret complicated expressions by viewing one or more of their parts as a single entity.

RELATED STANDARDS (Technology, 21st Century Life & Careers, ELA Companion Standards are Required)

9.1.8.RM.1: Determine criteria for deciding the amount of insurance protection needed.

CS.K-12.3.a	Identify complex, interdisciplinary, real-world problems that can be solved computationally.
CS.K-12.3.b	Decompose complex real-world problems into manageable sub-problems that could integrate existing solutions or procedures.
LA.K-12.NJSLSA.R7	Integrate and evaluate content presented in diverse media and formats, including visually and quantitatively, as well as in words.
TECH.K-12.P.5	Utilize critical thinking to make sense of problems and persevere in solving them.

STUDENT LEARNING TARGETS

Declarative Knowledge

Students will understand that:

- Polynomials are identified using their degree and number of terms
- Non-prime polynomials can be written in standard and factored forms
- The greatest common factor of a polynomial is the largest polynomial that divides evenly into the polynomial

Procedural Knowledge

Students will be able to:

- Classify types of polynomials
- Identify the GCF and factor it out of a polynomial
- Identify the relationship between the factored and standard forms of a trinomial
- Apply guess-and-check and/or the AC method to factor trinomials with varying leading coefficients
- Apply factor by grouping to factor four-term polynomials
- Recognize and factor perfect square trinomials
- Recognize and factor difference of perfect squares

EVIDENCE OF LEARNING

Benchmark Assessments

Benchmark Assessments conducted three times per year, using Pear Assessment (Standards Based Assessments)

Alternate Assessments

- Portfolios
- Verbal Assessment (instead of written)
- Multiple choice
- Modified Rubrics
- Performance Based Assessments

Formative Assessments

- Class Discussion/Exit Cards
- Homework/practice problems (assigned from textbook or various web resources, such as Khan Academy, Albert, Quizizz, or Desmos)

Summative Assessments

- Lesson quizzes
- Teacher-generated unit test
- Performance tasks

RESOURCES (Instructional, Supplemental, Intervention Materials)

Core Instructional Resources

- *Algebra 1: Common Core*, Chapter 8 (sections 5-8)

Supplemental Resources

- [Illustrative Math Tasks](#)
- [Arlington Algebra Project \(Polynomials\)](#)
- [Factoring Flow Chart](#)

INTERDISCIPLINARY CONNECTIONS

Factoring and quadratic equations/functions have many real-world applications that overlap with physics, such

as projectile motion problems (i.e. throwing a ball, diving off a board, etc.).

ACCOMMODATIONS & MODIFICATIONS FOR SUBGROUPS

See link to Accommodations & Modifications document in course folder.