

# Unit 03: An Introduction to Factoring (Chapter 4)

## Weeks 13-18

Content Area: **Template**  
Course(s):  
Time Period: **Full Year**  
Length: **FY**  
Status: **Published**

### Standards Alignment

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### New Jersey Student Learning Standards

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MA.A-SSE	Seeing Structure in Expressions
MA.A-SSE.A	Interpret the structure of expressions
MA.A-SSE.A.1a	Interpret parts of an expression, such as terms, factors, and coefficients.
MA.A-SSE.B	Write expressions in equivalent forms to solve problems
MA.A-SSE.B.3a	Factor a quadratic expression to reveal the zeros of the function it defines.
MA.A-APR	Arithmetic with Polynomials and Rational Expressions
MA.A-APR.B	Understand the relationship between zeros and factors of polynomials
MA.A-APR.B.2	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 $p(x)$ .
MA.A-APR.B.3	Identify zeros of polynomials when suitable factorizations are available, and use the zeros to construct a rough graph of the function defined by the polynomial.
MA.A-REI	Reasoning with Equations and Inequalities
MA.A-REI.B	Solve equations and inequalities in one variable
MA.A-REI.B.4b	Solve quadratic equations by inspection (e.g., for $x^2 = 49$ ), taking square roots, completing the square, the quadratic formula and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as $a \pm bi$ for real numbers $a$ and $b$ .

### Integration of Career Readiness, Life Literacies and Key Skills

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CRP.K-12.CRP1	Act as a responsible and contributing citizen and employee.
CRP.K-12.CRP2	Apply appropriate academic and technical skills.
CRP.K-12.CRP3	Attend to personal health and financial well-being.
CRP.K-12.CRP4	Communicate clearly and effectively and with reason.
CRP.K-12.CRP5	Consider the environmental, social and economic impacts of decisions.
CRP.K-12.CRP6	Demonstrate creativity and innovation.
CRP.K-12.CRP7	Employ valid and reliable research strategies.
CRP.K-12.CRP8	Utilize critical thinking to make sense of problems and persevere in solving them.

CRP.K-12.CRP9	Model integrity, ethical leadership and effective management.
CRP.K-12.CRP10	Plan education and career paths aligned to personal goals.
CRP.K-12.CRP11	Use technology to enhance productivity.
CRP.K-12.CRP12	Work productively in teams while using cultural global competence.

## **Technology / Integration of Computer Science and Design Thinking**

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TECH.8.1.12	Educational Technology: All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.
TECH.8.1.12.C	Communication and Collaboration: Students use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others.
TECH.8.1.12.C.1	Develop an innovative solution to a real world problem or issue in collaboration with peers and experts, and present ideas for feedback through social media or in an online community.

## **Interdisciplinary Connections: NJSL for ELA, Social Studies, Science and/or Math Section**

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### **Capacities of the Literate Individual Students Who are College and Career Ready in Reading, Writing, Speaking, Listening, & Language**

They demonstrate independence.

They build strong content knowledge.

They respond to the varying demands of audience, task, purpose, and discipline.

They comprehend as well as critique.

They value evidence.

## **Integration of Diversity, Equity and Inclusion; Climate Change; Informational and Media Literacy**

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see Crosswalks

## 21st Century Life and Careers

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### Stage I: Desired Results

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### Transfer/Overview/Rationale

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#### Transfer / Overview / Rationale

##### Unit Rationale

The purpose of this unit...

If you model a real world situation with a polynomial, it's often of interest to determine when the polynomial evaluates to zero. One of the tools used in deciding when this happens is factoring. Simple trajectory can be modeled with a quadratic function. If you think of time as the input (x values) and height as the output (y values), then the positive time for which the polynomial evaluates to zero is precisely the time when the object hits the ground.

### Meaning

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### Essential Questions

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Essential Questions

-What can  $x$  equal in real life?

-How can we check that our factors are correct?

-Can the factors help construct an accurate graph to represent the polynomial?

## **Enduring Understanding/Indicators of Understanding**

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Enduring Understanding/Indicators of Understanding

-Many quadratic trinomials can be factored into products of two binomials.

-The Distributive property or FOIL method can be used to multiply two binomials. FOIL can be used in reverse to factor.

-Factoring is often a key skill for solving problems in which you need to find a value for  $x$ .

-Being able to solve for  $x$  is the foundation of Algebra, which itself is the foundation for doing Trigonometry, Calculus and other higher Math.

## **Acquisition (Student Learning Objectives)**

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### **Knowledge**

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Knowledge  
Students will know...

-Zeros of a quadratic function are equivalent to the  $x$ -intercepts of the graph of the function (where  $y$  is 0) which gives information about it graph.

-Finding the zeros of the quadratic function is a way of solving the related quadratic equation set equal to 0.

-The relationship between the x-intercept of the graph of a quadratic function and the x-coordinate of the vertex of that graph.

## **Skills**

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Skills

Student will be skilled at ...

-Factoring out the greatest common factor (GCF) and a binomial GCF

-Factoring a polynomial by grouping terms

-Factoring completely a trinomial of the form  $x^2 + bx + c$  and  $ax^2 + bx + c$

-Factoring a trinomial containing a common binomial

-Factoring a binomial that is the difference of squares

-Identifying and factor a perfect square trinomial

-Recognizing factoring patterns

-Determining and applying appropriate factoring strategies

-Solving quadratic equations by factoring

-Solving applications involving quadratic equations

## **Stage 3: Learning Plan**

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### **Resource and Mentor Texts**

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Resources and Mentor Texts

Beginning Algebra 8th Edition

Kahoot.com

IXL.com

YayMath.com

Kutasoftware.com

Google Classroom

Desmos.com

Graphing Calculator

## **Formative Assessment Strategies**

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Formative Assessment Strategies

-Daily Warm up problems

-Exit Tickets

-Error Analysis

-Chapter section quizzes

-IXL Quizzes

-Kahoot online review games

-Bellringers

-Homework/Classwork

## **Learning Activities/Unit of Study**

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Learning Activities/Unit of Study

-Lecture

-Stations - (Small group instruction, skills practice, online games, board work)

-Board/White Board Work - (solve problems/practice skills at board (360 degree instruction), or at seat with

individual white boards)

-Technology Implementation - (Flipped learning videos to refresh skills, videos to introduce skills, prodigygame.com, Kahoot to reinforce/assess skills, online games to practice skills, utilize internet to research, review and understand skills \*See resources)

-Complete problem of the day - (POD - warm-up from bellringers packet)

-Review/Check Homework - (group check, partner check, whiteboard check)

-Work together to understand and practice the skill - partner work/larger group work to read lesson, and practice skills through “On Your Own” problems incorporated throughout each lesson

-Review and practice skills using a variety of materials - (text, workbook, chromebook, games, activities, discussion)

-Student led instruction

-Error Analysis

-Thumbs up/down/sideways - quick formative assessment to gauge students level of understanding

-Exit Ticket - quick formative assessment to gauge students level of understanding

## **Modifications and/or Accommodations**

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**Suggested Modifications (ELL, Sp. Ed, Gifted, At-risk of Failure)**

### **English Language Learners**

Native language support: The teacher provides auditory or written content to students in their native

language.

**Adjusted Speech:** The teacher changes speech patterns to increase student comprehension. This could include facing the students, paraphrasing, clearly indicating the most important ideas, and speaking more slowly.

**Visuals:** The teacher uses graphics, pictures, visuals, and manipulatives. This helps ELL students better understand and comprehend the subjects at hand.

**Front-Loading Vocabulary:** The teacher front loads vocabulary. This means providing students with a list of important vocabulary words they will need to know for a book, lesson, etc. prior to the lesson being taught. Including pictures to go with the vocabulary words is also very beneficial for the students.

## Special Education Students

**Chunking:** The teacher presents information in a way that makes it easy for students to understand and remember. Chunking is based on the presumption that our working memory is easily overloaded by excessive detail. The best way to deliver information is to organize it into meaningful units. Because students with special needs get overloaded easily, chunking is an effective strategy to use with them.

**Checking for Understanding:** It is important to constantly check for understanding, especially for students who have accommodations. Teachers want to make sure students understand the concepts being covered in a way that makes sense to them.

**Extra time:** The teacher provides students with special needs extra time to complete work or answer questions. It is important to give students enough time to process their thoughts.

**Oral Reading:** The teacher will read work orally to students. Class work such as tests and literature circles may need to be read aloud to the student.

**Timers:** The teacher will use timers as an instructional tool. The use of timers is beneficial for students who have trouble completing tasks. Timers can be helpful so the student is aware of how much time they have to complete an assignment.

## Students with 504 Plans

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## Gifted & Talented Strategies

Extensions/Enrichments: Teachers will provide gifted and talented students with extension/enrichment projects. Students will be challenged to further their understanding, to apply acquired knowledge, and/or to produce something in reference to acquired knowledge.

Modify/Change Activities: Teachers will monitor and modify activities to accommodate those students who need to be challenged further. Additional reading, problem-solving, writing, or project work is necessary for those students who are ready to move on at a rate more accelerated than their peers. In this way, G & T students are provided the same opportunity for support as special needs students.

## Students at Risk of School Failure

Directions or Instructions: Make sure directions and/or instructions are given in limited numbers. Give directions/instructions verbally and in simple written format. Ask students to repeat the instructions or directions to ensure understanding occurs. Check back with the student to ensure he/she hasn't forgotten.

Peer Support: Peers can help build confidence in other students by assisting in peer learning. Many teachers use the 'ask 3 before me' approach. This is fine, however, a student at risk may have to have a specific student or two to ask. Set this up for the student so he/she knows who to ask for clarification before going to you.

Alternate or Modified Assignments: Always ask yourself, "How can I modify this assignment to ensure the students at risk are able to complete it?" Sometimes you'll simplify the task, reduce the length of the assignment or allow for a different mode of delivery. For instance, many students may hand something in, the at-risk student may jot notes and give you the information verbally. Or, it just may be that you will need to assign an alternate assignment.

Increase One to One Time: When other students are working, always touch base with your students at risk and find out if they're on track or needing some additional support. A few minutes here and there will go a long way to intervene as the need presents itself.

Contracts: It helps to have a working contract between you and your students at risk. This helps prioritize the tasks that need to be done and ensure completion happens. Each day write down what needs to be completed, as the tasks are done, provide a checkmark or happy face. The goal of using contracts is to eventually have the student come to you for completion sign-offs.

Hands On: As much as possible, think in concrete terms and provide hands-on tasks. This means a child doing math may require a calculator or counters. The child may need to tape record comprehension activities instead of writing them. A child may have to listen to a story being read instead of reading it him/herself.

Tests/Assessments: Tests can be done orally if need be. Break tests down in smaller increments by having a portion of the test in the morning, another portion after lunch and the final part the next day.

Seating: Seat students near a helping peer or with quick access to the teacher. Those with hearing or sight issues need to be close to the instruction which often means near the front.