

Lesson Title: Polynomial Arithmetic

Unit Title: High School Algebra

Teacher Candidate: Cameron Sume

Subject, Grade Level, and Date: Applied Algebra, 9-12, January 27, 2015

Placement of Lesson in Sequence

Previously in the quarter, the students have been finding and seeing structure in expressions. They have also recently been solving equations to find the value of x . Due to the fact that the students have been able to quickly do these problems, we will be moving towards working with polynomials and the various skills used in solving problem.

Central Focus and Essential Questions

The central focus of this lesson is to be able to factor polynomials to calculate the zeroes of the functions so that you can draw a rough graph of the function. Students will start out by using FOIL to multiply binomials. This process will allow the students to start to recognize patterns in distribution for when they must factor the polynomials. Students will also learn the polynomial identities so that polynomial arithmetic becomes simpler and easier.

Content Standards

CCSS.MATH.CONTENT.HSA.APR.A.1

CCSS.MATH.CONTENT.HSA.APR.B.2

CCSS.MATH.CONTENT.HSA.APR.B.3

CCSS.MATH.CONTENT.HSA.APR.C.4

CCSS.MATH.CONTENT.HSA.APR.C.5

Learning Outcomes	Assessment
<p>The students will be able to successfully use the FOIL method with binomials.</p> <p>The students will be able to factor polynomials to find the zeroes which will allow them to draw a rough graph of the function.</p> <p>The students will be able to use the identities to solve polynomials.</p>	<p>To formatively assess the students, multiple things will be done. The homework that is assigned each day will be collected and graded to assess the students' daily progress towards meeting the learning target. Also, a quiz will be given to establish a benchmark of the students learning and what improvements/changes need to be made.</p> <p>Throughout the lessons, there will be numerous times where I will call on students to have them express their understanding in class.</p>

Learning Targets	Student Voice
<p>I can successfully use the FOIL method when using binomials to create a polynomial.</p> <p>I can create a rough graph of the polynomial by first factoring the function and then finding the zeroes.</p>	<p>The students will have multiple opportunities to voice their understanding of the learning targets throughout the lesson. They will be called on to answer questions out loud as well as on the board as we work through the learning progression. Doing so will allow the students to show their learning progress and allow any necessary changes be made to improve the students' overall learning.</p>

Prior Content Knowledge and Pre-Assessment

The students already know the distributive property for multiplication and how to use PEMDAS. They also know how to find the zeroes of linear functions.

Academic Language Demands

Vocabulary & Symbols	Language Functions	Precision, Syntax & Discourse
<ul style="list-style-type: none"> Factoring Zeroes 	<ul style="list-style-type: none"> These vocabulary words are vital to being able to answer questions in the learning progression and in meeting the standard. Students must know what the terms mean if they want to be able to answer the question. 	Students must use these methods for solving the problems so that when we move towards more complex polynomials they can do it correctly.

Language Target	Language Support	Assessment of Language Target
I can accurately define what it means to “factor” a polynomial and what “zeros” of a function are.	At the beginning of the lesson, I will explain to the student what it means when I use the words “factor” and “zeroes”. I will constantly ask the students to remind me of these definitions.	Continually asking the students to define these terms in class will allow me to assess their understanding of the language target. I will also provide written opportunities on the homework, quizzes, and/or test for the students to define these terms.

Lesson Rationale (Connection to previous instruction and Objective Standards)

Since the students have been working on the distributive properties, these lessons will build on those concepts as the students strengthen their understanding of polynomials and the arithmetic involved.

Differentiation, Cultural Responsiveness and/or Accommodation for Individual Differences

The students in this class are easily distracted and struggle with math concepts. Due to this, the students will be provided with notebooks that will be turned in each day where they will receive points for taking notes and successfully answer the warm up and exit problems. This is done to ensure that all students are focused throughout the lessons and will have resources to use on their unit tests.

Materials – Instructional and Technological Needs (attach worksheets used)

This lesson will require notebooks, pencils, white board, and a document camera.

Teaching & Instructional Activities

Time	Teacher Activity	Student Activity	Purpose
Lesson 1	Arithmetic with polynomials	Copy notes and other info in their notebooks. Answer warm up and exit problems.	Step 1 towards meeting the standards and passing the quiz and test. The notebooks allow the teacher to collect all of the students work.
Lesson 2	Finding zeroes of binomials	Copy notes and other info in their notebooks. Answer warm up and exit problems.	Next towards meeting the standards and passing the quiz and test. The notebooks allow the teacher to collect all of the students work.
Lesson 3	Factoring polynomials	Copy notes and other info in their notebooks. Answer warm up and exit problems.	Next towards meeting the standards and passing the quiz and test.

			The notebooks allow the teacher to collect all of the students work.
Quiz	Quiz	Quiz	To determine how well the students are learning the material and if we need to slow down or not.
Lesson 4	Polynomial Identities	Copy notes and other info in their notebooks. Answer warm up and exit problems.	Next towards meeting the standards and passing the quiz and test. The notebooks allow the teacher to collect all of the students work.
Test	Test	Test	To assess the students overall learning throughout the learning progression.