Curriculum: Ginger Lathrop

Learning-Focused Toolbox

Date: October 19, 2011 ET

Teacher / Team Name: Mrs. Lathrop

Topic: Polynomial and Rational Functions

Days: 10

Subject(s): Math

Grade(s): 10th, 11th, 12th

Know:

F.IF.5 -- Unranked

Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. For example, if the function h(n) gives the number of person-hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function.

A.APR.2 -- Unranked

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).

A.APR.3 -- Unranked

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.

N.CN.1 -- Unranked

Know there is a complex number i such that $i^2 = -1$ and every complex number has the form a + bi with a and b real.

N.CN.9 -- Unranked

Know the Fundamental Theorem of Algebra; show that it is true for quadratic polynomials.

Understand:

Relations and functions are mathematical relationships that can be represented and analyzed using words, tables, graphs, and equations.

Do:

F.IF.4 -- Unranked

For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.

F.IF.7 -- Unranked

Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.

F.IF.7a -- Unranked

Graph linear and quadratic functions and show intercepts, maxima, and minima.

F.IF.7c -- Unranked

Graph polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior.

F.IF.7d -- Unranked

Graph rational functions, identifying zeros and asymptotes when suitable factorizations are available, and showing end behavior.

F.IF.8a -- Unranked

Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a context.

A.APR.6 -- Unranked

Rewrite simple rational expressions in different forms; write a(x)/b(x) in the form q(x) + r(x)/b(x), where a(x), b(x), q(x), and r(x) are polynomials with the degree of r(x) less than the degree of b(x), using inspection, long division, or, for the more complicated examples, a computer algebra system.

N.CN.2 -- Unranked

Use the relation i2 = –1 and the commutative, associative, and distributive properties to add, subtract, and multiply complex numbers.

N.CN.3 -- Unranked

Find the conjugate of a complex number; use conjugates to find moduli and quotients of complex numbers.

N.CN.7 -- Unranked

Solve quadratic equations with real coefficients that have complex solutions.

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Common Assessments on what students should know and do in this unit:

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Key Learning: **Relations and functions are mathematical relationships that can be represented and analyzed using words, tables, graphs, and equations.**

Unit Essential Question(s): **How do you graph and find zeros of polynomial functions?**

Concept: **Quadratic Functions and Models**	Concept: **Polynomial Functions of HIgher Degree**	Concept: **Polynomial and Synthetic Division**
Lesson Essential Question(s): How do you sketch graphs and write equations for parabolas? (A)	**Lesson Essential Question(s):** How do you sketch the graphs of polynomial functions? (A)	**Lesson Essential Question(s):** How do you divide a polynomial by another polynomial and interpret the result? (A)
Vocabulary: polynomial function, quadratic function, symmetry, axis, vertex, standard form of a quadratic	**Vocabulary:** continuous, power functions, Leading Coefficient Test, repeated zeros	**Vocabulary:** long division, synthetic division, The Remainder Theorem

Concept: **Finding Zeros of Polynomial Functions**	Concept: **Complex Numbers**
Lesson Essential Question(s): How do you find all zeros of a polynomial function? (A)	**Lesson Essential Question(s):** How do you perform operations with complex numbers? (A)
Vocabulary:	**Vocabulary:**

Additional Information:

Attached Document(s):

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Vocab Report for Topic: Polynomial and Rational Functions

Days: 10

Subject(s): Math

Grade(s): 10th, 11th, 12th

Concept: Quadratic Functions and Models

polynomial function -
quadratic function -
symmetry -
axis -
vertex -
standard form of a quadratic -

Concept: Polynomial Functions of HIgher Degree

continuous -
power functions -
Leading Coefficient Test -
repeated zeros -

Concept: Polynomial and Synthetic Division

long division -
synthetic division -
The Remainder Theorem -

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Days: 10

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Concept: Quadratic Functions and Models

5. Acquisition Lesson

Plan for the Concept, Topic, or Skill -- Not for the Day

Lesson Essential Question:

How do you sketch graphs and write equations for parabolas?

What do students need to learn to be able to answer the Essential Question?

Assessment Prompt 1: Analyze graphs of quadratic functions.
Assessment Prompt 2: Write quadratic functions in standard form and use the results to sketch graphs of functions.
Assessment Prompt 3: Use quadratic functions to model and solve real-life problems.

Activating Strategy:

Draw a picture/diagram.

Teaching Strategies:

Instruction:

AP #1 -p. 128-129 notes and examples. Vocab sheet with terms: quadratic equation, parabola, axis of symmetry, axis, vertex

AP #2 - p. 131 Standard Form and p. 132 examples 3 and 4

Assignment and/or Assessment:

p. 135-136 #31, 33, 40, 42, 43, 45, 76-79/Day #2 p. 135-136 #31, 33, 40, 42, 43, 45, 76-79, 80, 83, 84, 87

Summarizing Strategy:

3-2-1

Resources and Materials:

Vocab Sheet

Time (in days):

2

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Grade(s): 10th, 11th, 12th

Concept: Polynomial Functions of HIgher Degree

5. Acquisition Lesson

Plan for the Concept, Topic, or Skill -- Not for the Day

Lesson Essential Question:

How do you sketch the graphs of polynomial functions?

What do students need to learn to be able to answer the Essential Question?

Assessment Prompt 1: Find and use zeros of polynomial functions.

Key vocabulary to preview:

continuous

Teaching Strategies:

Instruction:

Discuss continuous (p. 139). Discuss zeros of functions - bottom of p. 142 and top of p. 143. Do p. 149 #48, 54, 59.

Assignment and/or Assessment:

p. 148-149 #27-41 odds, 47-55 odds, 60, 61, 64 and p. 135 #44, Quiz 2.1-2.2, p. 152 #105-114

Time (in days):

2

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Days: 10

Subject(s): Math

Grade(s): 10th, 11th, 12th

Concept: Polynomial and Synthetic Division

5. Acquisition Lesson

Plan for the Concept, Topic, or Skill -- Not for the Day

Lesson Essential Question:

How do you divide a polynomial by another polynomial and interpret the result?

What do students need to learn to be able to answer the Essential Question?

Assessment Prompt 1: Use long division to divide polynomials by other polynomials.
Assessment Prompt 2: Use synthetic division to divide polynomials by binomials of the form x-a.
Assessment Prompt 3: Use the Remainder Theorem.
Assessment Prompt 4: Use the Factor Theorem.

Teaching Strategies:

Assignment and/or Assessment:

p. 159 #6-16 evens, 20-30 evens/p. 159-160 #37, 39-42, 57-64

Time (in days):

2

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Topic: Polynomial and Rational Functions **Days:** 10

Subject(s): Math **Grade(s):** 10th, 11th, 12th

Concept: Finding Zeros of Polynomial Functions

5. Acquisition Lesson

Plan for the Concept, Topic, or Skill -- Not for the Day

Lesson Essential Question:

How do you find all zeros of a polynomial function?

What do students need to learn to be able to answer the Essential Question?

Assessment Prompt 1: Use the Fundamental Theorem of Algebra to determine the number of zeros of polynomial functions.
Assessment Prompt 2: Find rational zeros of polynomial functions.
Assessment Prompt 3: Find conjugate pairs of complex zeros.
Assessment Prompt 4: Find zeros of polynomials by factoring.

Key vocabulary to preview:

conjugate

Teaching Strategies:

Instruction:

AP #1 - Look over example 1 on p. 169 and discuss

AP #2 - Go over the Rational Zero Test and do examples from p. 170-172. Do some, have them do one on their own.

AP #3 - Discuss conjugate pairs. Go over p. 173 notes and examples.

AP #4 - Do notes and examples from p. 174-175.

Assignment and/or Assessment:

p. 179-180 #2, 6, 13, 18, 22, 25, 30, 37-40, 49/Review p. 208-210 #3, 7, 11, 15, 17, 20, 21, 47, 50, 51, 57, 59, 61, 63, 65-68, 69, 71, 73, 83, 85, 87, 91, 93, 99, 101, 103/Chapter 2 TEST

Time (in days):

3

Date: October 19, 2011 ET

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Topic: Polynomial and Rational Functions

Days: 10

Subject(s): Math

Grade(s): 10th, 11th, 12th

Concept: Complex Numbers

5. Acquisition Lesson

Plan for the Concept, Topic, or Skill -- Not for the Day

Lesson Essential Question:

How do you perform operations with complex numbers?

What do students need to learn to be able to answer the Essential Question?

Assessment Prompt 1: How do you use the imaginary unit i to write complex numbers?
Assessment Prompt 2: How do you add, subtract and multiply complex numbers?
Assessment Prompt 3: How do you use complex conjugates to write the quotient of two complex numbers in standard form?
Assessment Prompt 4: How do you find complex solutions of quadratic equations?

Key vocabulary to preview:

imaginary unit i, complex numbers, standard form of a complex number,complex conjugates

Teaching Strategies:

Instruction:

AP #1 - go over notes on p. 162

AP #2 - go over notes and ex's 1-3 on p. 163-165

AP #3 - do ex 4 on p. 165

AP #4 - go over ex 5-6 on p. 166

Assignment and/or Assessment:

p. 167-168 #27-36, 47-52, 65-73 odds

Time (in days):

1

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