

Cedar Grove School District

Cedar Grove, NJ

2016 | CGHS

College Math

Approved by the Cedar Grove Board of Education

Superintendent of Schools

Mr. Michael J. Fetherman

Board of Education

Mr. Joseph Cicala, President

Mrs. Christine Dye, Vice-President

Mrs. Pam Burke

Mr. Frank Mandala

Mr. Peter Prvulovic

College Math

Course Description

This course is offered to seniors. It will provide the opportunity to master skills that will help them to achieve success on the college level. Important mathematical concepts will be developed in contexts that are relevant to the student. Concepts with meaningful application to non-mathematics disciplines will be covered.

Prerequisite: Algebra II

College Math Course Calendar

	Sep			Oct			Nov			Dec			Jan			Feb			Mar			Apr			May			Jun																						
Unit:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40										
<u>Real Number System</u>																																																		
<u>Linear Equations, Inequalities, and Applications</u>																																																		
<u>Graphs, Linear Equations, and Functions</u>																																																		
<u>Systems of Linear Equations</u>																																																		
<u>Exponents, Polynomials, and Polynomial Functions</u>																																																		
<u>Factoring</u>																																																		
<u>Rational Expressions and Functions</u>																																																		
<u>Roots, Radicals, and Root Functions</u>																																																		
<u>App. A/B/C: Matrices, Matrix Inverses, Determinant</u>																																																		



Barboza, Janine; Mellina, Nicholas

Stage 1: Desired Results

NJ Standards

NJ: 2016 SLS: Mathematics

NJ: Grade 7

The Number System

7.NS.A. Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.

7.NS.A.1. Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram.

7.NS.A.1a. Describe situations in which opposite quantities combine to make 0.

7.NS.A.1b. Understand $p + q$ as the number located a distance $|q|$ from p , in the positive or negative direction depending on whether q is positive or negative. Show that a number and its opposite have a sum of 0 (are additive inverses). Interpret sums of rational numbers by describing real-world contexts.

7.NS.A.1c. Understand subtraction of rational numbers as adding the additive inverse, $p - q = p + (-q)$. Show that the distance between two rational numbers on the number line is the absolute value of their difference, and apply this principle in real-world contexts.

7.NS.A.1d. Apply properties of operations as strategies to add and subtract rational numbers.

7.NS.A.2a. Understand that multiplication is extended from fractions to rational numbers by requiring that operations continue to satisfy the properties of operations, particularly the distributive property, leading to products such as $(-1)(-1) = 1$ and the rules for multiplying signed numbers. Interpret products of rational numbers by describing real-world contexts.

7.NS.A.2c. Apply properties of operations as strategies to multiply and divide rational numbers.

NJ: Grade 8

The Number System


8.NS.A. Know that there are numbers that are not rational, and approximate them by rational numbers.

8.NS.A.2. Use rational approximations of irrational numbers to compare the size of irrational numbers, locate them approximately on a number line diagram, and estimate the value of expressions

Expressions & Equations

8.EE.A. Work with radicals and integer exponents.

8.EE.A.2. Use square root and cube root symbols to represent solutions to equations of the form $x^2 = p$ and $x^3 = p$, where p is a positive rational number. Evaluate square roots of small perfect squares and cube roots of small

perfect cubes. Know that  is irrational.

NJ: HS: Algebra

Mathematical Practice

MP.The Standards for Mathematical Practice describe varieties of expertise that mathematics educators at all levels should seek to develop in their students.

MP.1. Make sense of problems and persevere in solving them.

MP.2. Reason abstractly and quantitatively.

MP.3. Construct viable arguments and critique the reasoning of others.

MP.4. Model with mathematics.

MP.5. Use appropriate tools strategically.

MP.6. Attend to precision.

MP.7. Look for and make use of structure.

MP.8. Look for and express regularity in repeated reasoning.

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Enduring Understandings

Relationships among numbers and number systems form the foundations of number sense and mathematical communications.

Patterns and relationships among operations are essential to making estimates and computing fluently.

Essential Questions

Why do we use set notation?

Why is taking the calculator away today important?

Why do we write things in exponential form?

What do the properties of real numbers do for us?

Why do we classify numbers?

What makes a number real?

Content

1. Basic Concepts
2. Operations on Real Numbers
3. Exponents, Roots, and Order of Operations
4. Properties of Real Numbers

Skills

1.
Write sets using set notation.
Use number lines.
Know the common sets of numbers.
Find additive inverses.
Use absolute value and inequality symbols.
Graph sets of real numbers.
2.
Add real numbers.
Subtract real numbers.
Find the distance between two points on a number line.
Multiply real numbers.
Find reciprocals and divide real numbers.
3.
Use exponents.
Find square roots.
Use the order of operations.
Evaluate algebraic expressions for given values.
4.
Use the distributive property.
Use the identity properties.
Use the inverse properties.
Use the commutative and associative properties.

Use the multiplication property of zero.

Stage 2: Assessment Evidence

Assessments

Quizzes and Tests

Summative: Written Test

Midterms/Final Exams

Summative: Written Test

Class Participation Teacher Observation

Formative: Other Visual Assessments

Homework/Projects

Formative: Other written assessments

Stage 3: Learning Plan

Learning Activities

- Lecture
- Class discussions
- Multiple Intelligences Activities
- Cooperative Learning Structures
- Guided Practice
- Performance Assessments
- Projects
- Simulation activities
- Technology infusion

Resources

Textbook: *Algebra for College Student 7th Edition*
Lial, Hornsby, McGinnis, 2012

Supplementary Materials

Websites



Unit Planner: Linear Equations, Inequalities, and Applications College Math

Tuesday, September 6, 2016, 10:23AM



Cedar Grove High School > 2016-2017 > High School > Mathematics > College Math (D) > Week 6 - Week 10

Barboza, Janine; Mellina, Nicholas

Stage 1: Desired Results

NJ Standards

NJ: 2016 SLS: Mathematics

NJ: HS: Algebra

Reasoning with Equations & Inequalities

HSA-REI.B. Solve equations and inequalities in one variable.

HSA-REI.B.3. Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.

HSA-REI.D. Represent and solve equations and inequalities graphically.

HSA-REI.D.11. Explain why the x-coordinates of the points where the graphs of the equations $y = f(x)$ and $y = g(x)$ intersect are the solutions of the equation $f(x) = g(x)$; find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where $f(x)$ and/or $g(x)$ are linear, polynomial, rational, absolute value, exponential, and logarithmic functions.

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MP.7. Look for and make use of structure.

MP.8. Look for and express regularity in repeated reasoning.

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Enduring Understandings

To obtain a solution to an equation, no matter how

Essential Questions

What is a solution of an equation?

complex, always involves the process of undoing operations.
 Proportionality involves a relationship in which the ratio of two quantities remains constant as the corresponding values of the quantities change.
 Real world situations can be modeled and solved by using equations and inequalities.

What are key words to look for in a word problem?
 Where in real-life would we need an inequality?
 What does an absolute value represent on a number line?
 Why are some of our intervals going to positive and negative infinity?
 Why are there two equations needed for absolute value equations?
 Why do we change the sign when multiplying or dividing an equation by a negative number?

Content

1. Linear Equations in One Variable
2. Formulas and Percent
3. Applications of Linear Equations
4. Further Applications of Linear Equations
5. Linear Inequalities in One Variable
6. Set Operations and Compound Inequalities
7. Absolute Value Equations and Inequalities

Skills

1. Distinguish between expressions and equations. Identify linear equations, and decide whether a number is a solution.
 Solve linear equations by using the addition and multiplication properties of equality.
 Solve linear equations by using the distributive property.
 Solve linear equations with decimals and fractions
 Identify conditional equations, contradictions, and identities.
2. Solve a formula for a specified variable.
 Solve applied problems by using formulas.
 Solve percent problems.
 Solve problems involving percent increase or decrease.
3. Translate from words to mathematical expressions.
 Write equations from given information.
 Distinguish between simplifying expressions and solving equations.
 Solving applied problems.
 Solve percent, investment, and mixture problems.
4. Solve problems about different denominations of money.
 Solve problems about uniform motion.
 Solve problems about angles.
5. Solve linear inequalities by using the addition property.
 Solve linear inequalities by using the multiplication property.
 Solve linear inequalities with three parts.
 Solve applied problems by using linear inequalities.
6. Find the intersection of two sets.
 Solve compound inequalities with the word and.
 Find the union of two sets.
 Solve compound inequalities with the word or.
7. Solve equations of the form $|ax+b|=k$, for $k>0$
 Solve inequalities of the form $|ax+b|<k$ and of the form $|ax+b|>k$, for $k>0$
 Solve absolute value equations that involve rewriting.
 Solve equations of the form $|ax+b|=|cx+d|$
 Solve special cases of absolute value equations and inequalities.

Stage 2: Assessment Evidence

Assessments

Quizzes and Tests
Summative: Written Test
Midterms/Final Exams
Summative: Written Test
Class Participation Teacher Observation
Formative: Other Visual Assessments
Homework/Projects
Formative: Other written assessments

Stage 3: Learning Plan

Learning Activities

- Lecture
- Class discussions
- Multiple Intelligences Activities
- Cooperative Learning Structures
- Guided Practice
- Performance Assessments
- Projects
- Simulation activities
- Technology infusion

Resources

Textbook: *Algebra for College Student 7th Edition*
Lial, Hornsby, McGinnis, 2012

Supplementary Materials

Websites



Barboza, Janine; Mellina, Nicholas

Stage 1: Desired Results

NJ Standards

NJ: 2016 SLS: Mathematics

NJ: HS: Algebra

Reasoning with Equations & Inequalities

HSA-REI.B. Solve equations and inequalities in one variable.

HSA-REI.B.3. Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.

HSA-REI.C. Solve systems of equations.

HSA-REI.C.6. Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.

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MP.7. Look for and make use of structure.

MP.8. Look for and express regularity in repeated reasoning.

NJ: HS: Functions

Interpreting Functions

HSF-IF.A. Understand the concept of a function and use function notation.

HSF-IF.A.1. Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. If f is a function and x is an element of its

domain, then $f(x)$ denotes the output of f corresponding to the input x . The graph of f is the graph of the equation $y = f(x)$.

HSF-IF.A.2. Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.

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

HSF-IF.B.5. Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes.

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Enduring Understandings

Ratios can be used to show a relationship between changing quantities, such as vertical and horizontal change.

A line on a graph can be represented by a linear equation.

The relationship between two lines can be determined by comparing their slopes and y -intercepts.

Relations and functions can be represented numerically, graphically, algebraically, and/or verbally.

The properties of functions and function operations are used to model and analyze real-world applications and quantitative relationships.

Essential Questions

Where do we see linear functions in the real world?

Which form of a line is the most beneficial when trying to graph?

Describe the difference between an undefined slope and a zero slope?

How can a line have no slope?

Where do we see linear inequalities in the real world?

What makes a function?

Content

1./2. The Rectangle Coordinate System and Slope of a Line

3. Linear Equations in Two Variables

4. Linear Inequalities in Two Variables

5. Introduction to Relations and Functions

6. Function Notation and Linear Functions

Skills

1.

Find ordered pairs that satisfy a given equation.

Find x and y intercepts.

Recognize equations of horizontal and vertical lines.

Recognize lines passing through the origin.

Use the midpoint formula.

Find the slope of a line, given two points on a line and given an equation.

Use slopes to determine parallel and perpendicular lines.

2.

Write an equation and graph a line, given its slope and y -intercept.

Write an equation of a line, given its slope and a point on the line.

Write an equation of a line, given two points on the line.

Write an equation of a line parallel or perpendicular to a given line.

3.

Translate from words to mathematical expressions.

Write equations from given information.

Distinguish between simplifying expressions and solving equations.

Solving applied problems.

Solve percent, investment, and mixture problems.

4.

Graph linear inequalities in two variables.

Graph the intersection of two linear inequalities.

Graph the union of two linear inequalities.

5.

Define and identify relations and functions.

Find the domain and range.

Identify functions defined by graphs and equations.

6.
Use function notation.
Evaluate functions.

Stage 2: Assessment Evidence

Assessments

Quizzes and Tests

Summative: Written Test

Midterms/Final Exams

Summative: Written Test

Class Participation Teacher Observation

Formative: Other Visual Assessments

Homework/Projects

Formative: Other written assessments

Stage 3: Learning Plan

Learning Activities

- Lecture
- Class discussions
- Multiple Intelligences Activities
- Cooperative Learning Structures
- Guided Practice
- Performance Assessments
- Projects
- Simulation activities
- Technology infusion

Resources

Textbook: *Algebra for College Student 7th Edition*
Lial, Hornsby, McGinnis, 2012

Supplementary Materials

Websites



Unit Planner: Systems of Linear Equations College Math

Tuesday, September 6, 2016, 10:23AM



Cedar Grove High School > 2016-2017 > High School > Mathematics > College Math (D) > Week 16 - Week 19

Barboza, Janine; Mellina, Nicholas

Stage 1: Desired Results

NJ Standards

NJ: 2016 SLS: Mathematics

NJ: HS: Algebra

Reasoning with Equations & Inequalities

HSA-REI.C. Solve systems of equations.

HSA-REI.C.5. Prove that, given a system of two equations in two variables, replacing one equation by the sum of that equation and a multiple of the other produces a system with the same solutions.

HSA-REI.C.6. Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.

HSA-REI.C.8. (+) Represent a system of linear equations as a single matrix equation in a vector variable.

HSA-REI.D. Represent and solve equations and inequalities graphically.

HSA-REI.D.10. Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line).

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MP.6. Attend to precision.

MP.7. Look for and make use of structure.

MP.8. Look for and express regularity in repeated reasoning.

<p>Enduring Understandings</p> <p>A variety of representations of linear systems of equations, including matrices, are used to model and solve real-world problems.</p> <p>Systems of linear equations can be used to model problems. Systems of equations can be solved by graphing, substitution, or eliminating a variable.</p> <p>Some problems can be modeled by systems of linear equations.</p>	<p>Essential Questions</p> <p>What does the solution of a linear system represent algebraically and graphically?</p> <p>What does no solution of a linear system represent algebraically and graphically?</p> <p>What does an infinite solution of a linear system represent algebraically and graphically?</p> <p>How can you identify reduced row echelon form?</p> <p>How can you identify a matrix in rref that has no or infinite solutions?</p>
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<p>Content</p> <ol style="list-style-type: none"> 1. Systems of Linear Equations in Two Variables 2. Systems of Linear Equations in Three Variables 3. Applications of Systems of Linear Equations 4. Solving Systems of Linear Equations by Matrix Methods 	<p>Skills</p> <ol style="list-style-type: none"> 1. <ul style="list-style-type: none"> Decide whether an ordered pair is a solution of a linear system. Solve linear systems by graphing. Solve linear systems (with two equations and two variables by substitution). Solve linear systems (with two equations and two variables by elimination). Solve special systems. 2. <ul style="list-style-type: none"> Understanding the geometry of systems of 3 equations in 3 variables. Solve linear systems of 3 equations in 3 variables. Solve special cases. 3. <ul style="list-style-type: none"> Solve application problems with systems of equations with 2 variables. Solve application problems with systems of equations with 3 variables. 4. <ul style="list-style-type: none"> Identify dimensions of matrices. Write augmented matrices. Solve systems using reduced echelon form in the calculator.
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Stage 2: Assessment Evidence

<p>Assessments</p> <p>Quizzes and Tests</p> <p>Summative: Written Test</p> <p>Midterms/Final Exams</p> <p>Summative: Written Test</p> <p>Class Participation Teacher Observation</p> <p>Formative: Other Visual Assessments</p> <p>Homework/Projects</p> <p>Formative: Other written assessments</p>

Stage 3: Learning Plan

<p>Learning Activities</p> <ul style="list-style-type: none"> • Lecture • Class discussions • Multiple Intelligences Activities • Cooperative Learning Structures • Guided Practice • Performance Assessments • Projects 	<p>Resources</p> <p>Textbook: Algebra for College Student 7th Edition Lial, Hornsby, McGinnis, 2012</p> <p>Supplementary Materials</p> <p>Websites</p>
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|---|--|
| <ul style="list-style-type: none">• Simulation activities• Technology infusion | |
|---|--|



Unit Planner: Exponents, Polynomials, and Polynomial Functions

College Math

Tuesday, September 6, 2016, 10:23AM



Cedar Grove High School > 2016-2017 > High School > Mathematics > College Math (D) > Week 20 - Week 23

Barboza, Janine; Mellina, Nicholas

Stage 1: Desired Results

NJ Standards

NJ: 2016 SLS: Mathematics

NJ: Grade 8

Expressions & Equations

8.EE.A. Work with radicals and integer exponents.

8.EE.A.1. Know and apply the properties of integer exponents to generate equivalent numerical expressions.

8.EE.A.2. Use square root and cube root symbols to represent solutions to equations of the form $x^2 = p$ and $x^3 = p$, where p is a positive rational number. Evaluate square roots of small perfect squares and cube roots of small

perfect cubes. Know that $\sqrt{2}$ is irrational.

8.EE.A.4. Perform operations with numbers expressed in scientific notation, including problems where both decimal and scientific notation are used. Use scientific notation and choose units of appropriate size for measurements of very large or very small quantities (e.g., use millimeters per year for seafloor spreading). Interpret scientific notation that has been generated by technology.

NJ: HS: Algebra

Arithmetic with Polynomials & Rational Functions

HSA-APR.A. Perform arithmetic operations on polynomials.

HSA-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.

Mathematical Practice

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MP.3. Construct viable arguments and critique the reasoning of others.

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MP.8. Look for and express regularity in repeated reasoning.

NJ: HS: Functions

Building Functions

HSF-BF.A. Build a function that models a relationship between two quantities.

HSF-BF.A.1. Write a function that describes a relationship between two quantities.

HSF-BF.A.1b. Combine standard function types using arithmetic operations.

HSF-BF.A.1c. (+) Compose functions.

Linear, Quadratic, and Exponential Models

HSF-LE.A. Construct and compare linear and exponential models and solve problems.

HSF-LE.A.3. Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function.

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Enduring Understandings

Equivalent forms of algebraic expressions provide different information for solving problems.
The properties of integers apply to polynomials.
To simplify algebraic expressions with exponents.
Recognize and graph exponential functions with a table of values.
Real world situations involving exponential relationships can be solved using multiple representations.

Essential Questions

Why do we use scientific notation?
What is the purpose of exponents?
When dealing with polynomials, what makes a term "like" with another?
What does the degree of a function tell you?
How do we classify polynomials?

Content

1. Integer Exponents and Scientific Notation.
2. Adding and Subtracting Polynomials.
3. Polynomial Functions, Graphs, and Composition.
4. Multiplying Polynomials.
5. Dividing Polynomials.

Skills

1. Use the product rule for exponents.
Define 0 and negative exponents.
Use the quotient rule for exponents.
Use the power rules for exponents.
Simplify exponential expressions.
Use the rules for the exponents with scientific notation.
2. Know the basic definitions for polynomials.
Add and subtract polynomials.
3. Evaluate polynomial functions.
Add and subtract polynomial functions.
Find the composition of functions.
Graph basic polynomial functions.
4. Multiply terms.
Multiply any two polynomials.
Multiply binomials.
Find the product of the sum and difference of two terms.
Find the square of a binomial.
Multiply polynomial functions.

5.
 Divide a polynomial by a monomial.
 Divide a polynomial by a polynomial of two or more terms.
 Divide polynomial functions.

Stage 2: Assessment Evidence

Assessments

- Quizzes and Tests**
- Summative: Written Test**
- Midterms/Final Exams**
- Summative: Written Test**
- Class Participation Teacher Observation**
- Formative: Other Visual Assessments**
- Homework/Projects**
- Formative: Other written assessments**

Stage 3: Learning Plan

Learning Activities

- Lecture
- Class discussions
- Multiple Intelligences Activities
- Cooperative Learning Structures
- Guided Practice
- Performance Assessments
- Projects
- Simulation activities
- Technology infusion

Resources

Textbook: *Algebra for College Student 7th Edition*
 Lial, Hornsby, McGinnis, 2012

Supplementary Materials

Websites



Barboza, Janine; Mellina, Nicholas

Stage 1: Desired Results

NJ Standards

NJ: 2016 SLS: Mathematics

NJ: HS: Algebra

Seeing Structure in Expressions

HSA-SSE.B. Write expressions in equivalent forms to solve problems.

HSA-SSE.B.3a. Factor a quadratic expression to reveal the zeros of the function it defines.

Reasoning with Equations & Inequalities

HSA-REI.B. Solve equations and inequalities in one variable.

HSA-REI.B.4. Solve quadratic equations in one variable.

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NJ: HS: Functions

Interpreting Functions

HSF-IF.C. Analyze functions using different representations.

HSF-IF.C.8a. 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.

Enduring Understandings

The properties of integers apply to polynomials.
Factors are a subset of a product and with the distributive property allow options in solving polynomials.
Multiplying and factoring polynomials are related.
Solving polynomials involves the reversal of operations, the distributive property and rules of exponents.
Solving quadratic equations could give two solutions.

Essential Questions

How do you find a greatest common factor?
What are the benefits of factoring by grouping?
How do you identify a special pattern?
What do the solutions of a quadratic equation represent graphically?

Content

1. Greatest Common Factors and Factoring by Grouping.
2. Factoring Trinomials.
3. Special Factoring.
5. Solving Equations by Factoring.

Skills

1. Factor out the greatest common factor.
Factor by grouping.
2. Factor trinomials when the coefficient of the quadratic term is 1.
Factor trinomials when the coefficient of the quadratic term is not 1.
Use an alternative method method for factoring trinomials.
Factor by substitution.
3. Factor a difference of squares.
Factor a perfect square trinomial.
Factor a difference of cubes.
Factor a sum of cubes.
5. Learn and use the zero-factor property.
Solve applied problems that require the zero-factor property.
Solve a formula for a specified variable, where factoring is necessary.

Stage 2: Assessment Evidence

Assessments

Quizzes and Tests

Summative: Written Test

Midterms/Final Exams

Summative: Written Test

Class Participation Teacher Observation

Formative: Other Visual Assessments

Homework/Projects

Formative: Other written assessments

Stage 3: Learning Plan

Learning Activities

- Lecture
- Class discussions
- Multiple Intelligences Activities
- Cooperative Learning Structures
- Guided Practice
- Performance Assessments
- Projects
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Resources

Textbook: Algebra for College Student 7th Edition
Lial, Hornsby, McGinnis, 2012

Supplementary Materials

Websites

- Technology infusion



Unit Planner: Rational Expressions and Functions

College Math

Tuesday, September 6, 2016, 10 23AM



Cedar Grove High School > 2016-2017 > High School > Mathematics > College Math (D) > Week 28 - Week 31

Barboza, Janine; Mellina, Nicholas

Stage 1: Desired Results

NJ Standards

NJ: 2016 SLS: Mathematics

NJ: HS: Num/Quantity

The Real Number System

HSN-RN.A. Extend the properties of exponents to rational exponents.

HSN-RN.A.2. Rewrite expressions involving radicals and rational exponents using the properties of exponents.

NJ: HS: Algebra

Arithmetic with Polynomials & Rational Functions

HSA-APR.D. Rewrite rational expressions.

HSA-APR.D.7. (+) Understand that rational expressions form a system analogous to the rational numbers, closed under addition, subtraction, multiplication, and division by a nonzero rational expression; add, subtract, multiply, and divide rational expressions.

Reasoning with Equations & Inequalities

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

HSA-REI.A.2. Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.

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Enduring Understandings

A rational function is a ratio of polynomial functions. If a rational function is in simplified form and the polynomial in the denominator is not a constant, the graph of the rational function features asymptotic behavior. You can use much of what you know about multiplying and dividing fractions to multiply and divide rational expressions. To operate with rational expressions, you can use much of what you know about operating with fractions. When solving an equation involving rational expressions multiplying by the common denominator can result in extraneous solutions.

Essential Questions

What restrictions must we take into consideration when working with rational expressions or rational equations? What is the difference between a least common multiple and a greatest common factor? How is a least common multiple useful when adding and subtracting rational expressions, or solving a rational equation?

Content

1. Rational Expressions and Functions; Multiplying and Dividing
2. Adding and Subtracting Rational Expressions.
3. Complex Fractions

Skills

1. Define rational expressions. Define rational functions and describe their domains. Write rational expressions in lowest terms. Multiply rational expressions. Find reciprocals of rational expressions. Divide rational expressions.
2. Add or subtract with like denominators. Find a least common multiple. Add with unlike denominators. Subtract with unlike denominators.
3. Determine the domain of the variable in a rational equation. Solve rational equations.

Stage 2: Assessment Evidence

Assessments

Quizzes and Tests

Summative: Written Test

Midterms/Final Exams

Summative: Written Test

Class Participation Teacher Observation

Formative: Other Visual Assessments

Homework/Projects

Formative: Other written assessments

Stage 3: Learning Plan

Learning Activities

- Lecture
- Class discussions
- Multiple Intelligences Activities
- Cooperative Learning Structures
- Guided Practice
- Performance Assessments
- Projects
- Simulation activities

Resources

Textbook: *Algebra for College Student 7th Edition*
Lial, Hornsby, McGinnis, 2012

Supplementary Materials

Websites

- Technology infusion



Unit Planner: Roots, Radicals, and Root Functions College Math

Tuesday, September 6, 2016, 10:28AM



Cedar Grove High School > 2016-2017 > High School > Mathematics > College Math (D) > Week 32 - Week 35

Barboza, Janine; Mellina, Nicholas

Stage 1: Desired Results

NJ Standards

NJ: 2016 SLS: Mathematics

NJ: HS: Num/Quantity

The Real Number System

HSN-RN.A. Extend the properties of exponents to rational exponents.

HSN-RN.A.2. Rewrite expressions involving radicals and rational exponents using the properties of exponents.

The Complex Number System

HSN-CN.A. Perform arithmetic operations with complex numbers.

HSN-CN.A.1. 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.

HSN-CN.A.2. Use the relation $i^2 = -1$ and the commutative, associative, and distributive properties to add, subtract, and multiply complex numbers.

HSN-CN.A.3. (+) Find the conjugate of a complex number; use conjugates to find moduli and quotients of complex numbers.

NJ: HS: Algebra

Reasoning with Equations & Inequalities

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

HSA-REI.A.2. Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.

Mathematical Practice

MP. The Standards for Mathematical Practice describe varieties of expertise that mathematics educators at all levels should seek to develop in their students.

MP.1. Make sense of problems and persevere in solving them.

MP.2. Reason abstractly and quantitatively.

MP.3. Construct viable arguments and critique the reasoning of others.

MP.4. Model with mathematics.

MP.5. Use appropriate tools strategically.

MP.6. Attend to precision.

MP.7. Look for and make use of structure.

MP.8. Look for and express regularity in repeated reasoning.

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Enduring Understandings

Corresponding to every power there is a root.
You can combine like radicals using properties of real numbers.
You can write a radical expression in an equivalent form using a fractional (rational) exponent instead of a radical sign.
Solving a square root equation may require that you square each side of the equation.
This process can introduce extraneous solutions.

Essential Questions

Why is the index important in a radical?
How are the index of a radical and the exponent of the radicand related?
How are multiplying radical expressions and adding radical expressions different?
What does it mean to rationalize?
What restrictions must be taken into consideration when solving an equation that deals with square roots or higher index radicals?

Content

3. Simplifying Radical Expressions.
4. Adding and Subtracting Radical Expressions.
5. Multiplying and Dividing Radical Expressions.
6. Solving Equations with Radicals.
7. Complex Numbers

Skills

3.
Use the product rule for radicals.
Use the quotient rule for radicals.
Simplify radicals.
Simplify products and quotients of radicals with different indexes.
4.
Simplify radical expressions involving addition and subtraction.
5.
Multiply radical expressions.
Rationalize denominators with one radical term.
Rationalize denominators with binomial involving radicals.
Write radical quotients in lowest terms.
6.
Solve radical equations by using the power rule.
Solve radical equations that require additional steps.
Solve radical equations with indexes greater than 2.
7.
Simplify numbers of the form $\sqrt{-b}$, where $b > 0$
Add and subtract complex numbers.
Multiply complex numbers.
Divide complex numbers.
Find powers of i .

Stage 2: Assessment Evidence

Assessments

Quizzes and Tests

Summative: Written Test

Midterms/Final Exams

Summative: Written Test

Class Participation Teacher Observation

Formative: Other Visual Assessments

Homework/Projects

Formative: Other written assessments

Stage 3: Learning Plan

Learning Activities

- Lecture
- Class discussions
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- Guided Practice
- Performance Assessments
- Projects
- Simulation activities
- Technology infusion

Resources

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Lial, Hornsby, McGinnis, 2012

Supplementary Materials

Websites



Unit Planner: App. A/B/C: Matrices, Matrix Inverses, Determinant College Math

Tuesday, September 6, 2016, 10 28AM



Cedar Grove High School > 2016-2017 > High School > Mathematics > College Math (D) > Week 36 - Week 38

Barboza, Janine; Mellina, Nicholas

Stage 1: Desired Results

NJ Standards

NJ: 2016 SLS: Mathematics

NJ: HS: Num/Quantity

Vector & Matrix Quantities

HSN-VM.C. Perform operations on matrices and use matrices in applications.

HSN-VM.C.6. (+) Use matrices to represent and manipulate data, e.g., to represent payoffs or incidence relationships in a network.

HSN-VM.C.7. (+) Multiply matrices by scalars to produce new matrices, e.g., as when all of the payoffs in a game are doubled.

HSN-VM.C.8. (+) Add, subtract, and multiply matrices of appropriate dimensions.

HSN-VM.C.9. (+) Understand that, unlike multiplication of numbers, matrix multiplication for square matrices is not a commutative operation, but still satisfies the associative and distributive properties.

HSN-VM.C.10. (+) Understand that the zero and identity matrices play a role in matrix addition and multiplication similar to the role of 0 and 1 in the real numbers. The determinant of a square matrix is nonzero if and only if the matrix has a multiplicative inverse.

HSN-VM.C.11. (+) Multiply a vector (regarded as a matrix with one column) by a matrix of suitable dimensions to produce another vector. Work with matrices as transformations of vectors.

HSN-VM.C.12. (+) Work with 2×2 matrices as a transformations of the plane, and interpret the absolute value of the determinant in terms of area.

NJ: HS: Algebra

Mathematical Practice

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MP.7. Look for and make use of structure.

MP.8. Look for and express regularity in repeated reasoning.

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Enduring Understandings

Matrices are used to store and operate with data.
Properties of matrices are used when operating with data.
Matrices are used to represent and solve problems.

Essential Questions

Why do we use Matrices?
How can we use Matrices to solve systems?
How do matrix operations differ from each other?

Content

- A. Properties of Matrices
- B. Matrix Inverses
- C. Determinants and Cramer's Rule

Skills

- A.
Know the basic definitions for matrices.
Zero Matrix.
Additive Inverse Matrices.
Add and Subtract matrices.
Multiply a matrix by a scalar.
Multiply matrices.
Use matrices in applications.
- B.
Understand and write identify matrices.
Find multiplicative inverse matrices.
Use inverse matrices to solve systems of linear equations.
- C.
Evaluate 2x2 determinants.
Use expansion by minors to evaluate 3x3 determinants.
Apply Cramer's Rule to solve linear systems.

Stage 2: Assessment Evidence

Assessments

Quizzes and Tests

Summative: Written Test

Midterms/Final Exams

Summative: Written Test

Class Participation Teacher Observation

Formative: Other Visual Assessments

Homework/Projects

Formative: Other written assessments

Stage 3: Learning Plan

Learning Activities

- Lecture
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Resources

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Websites