

Integrated Math III

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Integrated Mathematics III

Course Overview:

This course provides students with an opportunity to meet the following academic expectations:

- Speak clearly and communicate ideas accurately in a variety of settings
- Employ problem solving skills effectively
- Demonstrate critical thinking skills

This course is designed as a transition from the Integrated Mathematics sequence to a traditional Algebra 2 course. Topics from the Algebraic Reasoning and Geometry and Measurement strands of the Connecticut State Department of Education frameworks are emphasized. These include conditional statements and properties of algebra, inequalities and absolute values and their graphs, functions and linear equations, radicals and right triangles, circles both in synthetic and coordinate geometry, systems of two equations and inequalities, examination of polynomials and solutions to quadratic equations.

Integrated Mathematics III Committee Members : Kathleen Flax, Jennifer Bednarz and Renee O'Farrell

- I. Unit 1-Reasoning and Proof
- II. Unit 2-Inequalities and Absolute Value
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Key to Coding:

In order to assure that this curriculum document is aligned with the most recent Connecticut State Frameworks, we have adopted a coding method to inform the user of this document of the precise connection to the frameworks.

The Connecticut State Frameworks consists of four strands, Geometry and Measurement (GM), Algebraic Reasoning: Patterns and Functions (AR), Numerical and Proportional Reasoning (NPR) and Working with Data: Probability and Statistics (WD). Each content strand is composed of an Essential Question with two to three components. Each component consists of one to two performance standards. Each standard consists of two to four performance expectations.

Each strand of the Frameworks is divided into a set of Core Content Standards and Expected Performances and a set of Extended Content Standards and Expected Performances. The Core is the set of standards the state expects every student to be able to know by the 10th grade and therefore can be tested on the CAPT. The Extended set of standards is the set of standards that not all students will reach by the 10th grade, if at all.

Several examples of coding used in the document follow:

A Focus Question coded as (**ARCore**:1.2a) refers to the core content strand Algebraic Reasoning: Patterns and Functions (**ARCore**), second component of the strand (1.2) and performance standard (a) within this component.

A Benchmark or Required Activity coded as (F2, **GMCore**:3.3a.4) refers to the Unit Focus Question 2 (F2), the core content strand Geometry and Measurement (**GMCore**), third component of the strand (3.3), performance standard (a) and performance expectation (4).

A Benchmark or Required Activity coded as **GMExtended** refers to the extended content standards for Geometry and Measurement.

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Unit 1: Reasoning and Proof

Abstract

Number properties, geometric properties, and other relationships in mathematics are often learned using the process of conjecture making and testing. In this unit students will work with inductive reasoning and deductive reasoning along with authentic proof writing, to make and test the validity of conjectures. Students will use algebraic properties to complete algebraic proofs as well as elementary geometric proofs. Students will also use coordinate geometry to make conjectures and confirm properties of common geometric figures.

Essential Question: How do geometric relationships and measurements help us to solve problems and make sense of our world?

Focus Questions:

1. How can reasoning be used to make conjectures and how can conjectures be modeled and proved with a conditional statement? (**GMExtended:** 3.1a)
2. How can algebraic equations be used to model and prove geometric relationships? (**GMCore:** 3.1b and 3.2a)
3. How can coordinate geometry be used as a form of proof? (**GMCore:** 3.1b and 3.2a)

Benchmarks:

The student will be able to

1. provide original examples of inductive and deductive reasoning in writing. (**GMExtended:** 3.1a.1)
2. write the converse of a given conditional statement. (**GMExtended:** 3.1a.1)
3. write a conjecture in conditional form, determine its truth value and provide a counterexample when the conjecture is false. (**GMCore:** 3.1b.1, **GMExtended:** 3.1a.2)
4. apply properties of algebra to proofs of algebraic statements. (**GMExtended:** 3.1a.3 and **GMCore:** 3.1b.2)
5. complete geometric and algebraic proofs which contain the Segment and Angle Addition Postulates. (**GMCore:** 3.1b.2 and 3.2a.1)

6. confirm polygon properties using coordinate geometry formulas. (**GMCore** : 3.1a.3, 3.1b.2 and 3.2a.1)
7. complete geometric, coordinate and algebraic proofs which contain the definitions of Segment Midpoint and Segment Bisector. (**GMCore**:3.1b.2 and 3.2a.1)

Technology Education Framework Connection:

Content Standards 4, 5, 7

Computer Use: Geometers' Sketchpad

Calculators: graphing utility, TI-30IIX

Required Activities:

1. Using an index card proof activity, students arrange statements and reasons of a deductive proof to create an organized flow of reasoning from the hypothesis to the concluding statement. (**GMExtended**: 3.1a.3 and **GMCore** : 3.1b.2 and 3.2a.1)
2. Students use either Geometer's Sketchpad or Cabri Jr. to construct counterexamples for false conditional statements. (**GMExtended**: 3.1a.2)
3. Students write either a paragraph proof or a two-column proof for the vertical angle and midpoint theorems.
4. Students create word problems that must be solved using geometry facts and algebraic equations. The geometry facts may include, but are not limited to, the segment and angle addition postulates and/or midpoint and angle bisector theorems. The problems may be utilized in a variety of ways, e.g. competitive activity, review problem set.

Suggested Activities:

1. Students use coordinate formulas for slope, distance, and midpoint to create coordinate proofs for the special properties of common geometric figures (isosceles triangles, rectangles, parallelograms, etc) (**GMCore** : 3.1b.2 and 3.2a.1)

Assessment Tasks:

1. Required Activities above.
2. Teacher generated tests and quizzes.

Instructional Resources and Materials:

Geometer's Sketchpad
Cabri Jr.
Graphing Calculators
Rulers
Graph paper
Prentice Hall Geometry, Chapters 1 and 2
Index Cards

Pacing: This unit is expected to take twelve class periods under the block schedule.

Notes to Teacher: There are no formal geometry or algebraic proofs on the SAT.

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Unit 2: Inequalities and Absolute Value

Abstract

Students will solve inequalities in one-variable, compound inequalities and absolute value equations. Equations and inequalities are commonly used to model real-world problems, thus many authentic situations are incorporated into the unit. After a brief review of solving linear inequalities, students extend their basic knowledge to solve compound and absolute value inequalities. Students make connections between solutions to inequalities and their graphical representations on the number line. Students will use “interval notation” to communicate solution sets to inequality problems. Absolute value equations will be introduced and their graphs discussed using the graphing calculator as a tool.

Essential Question: How do patterns and functions help us to describe data and physical phenomena and solve a variety of problems? How are quantitative relationships represented by numbers?

Focus Questions:

1. How are inequalities and absolute value used to solve a variety of problems?
(**ARCore**:1.3a, **NPRCore** :2.2a)
2. How can real-world problems be modeled using inequalities and absolute value?
(**ARCore** :1.3a, **NPRCore** :2.2a)

Benchmarks:

The student will be able to

1. solve linear inequalities involving multiple steps, graph solutions on the number line, and represent solution sets using interval notation. (F1, **ARCore** :1.3a.1, 1.3a.2)
2. solve compound inequalities, graph solutions on the number line, and represent solution sets using interval notation. (F1, **ARCore** :1.3a.1, 1.3a.2)
3. solve absolute value equations. (F1, **ARCore** :1.3a.1, 1.3a.2 and **NPRCore** :2.2a.2)
4. solve absolute value inequalities, graph solutions on the number line, and represent solution sets using interval notation. (F1, **ARCore** :1.3a.1, 1.3a.2 and **NPRCore** :2.2a.2)

5. solve real-world applications by writing and then solving an inequality or absolute value model. (F2, **ARCore**:1.3a.1,1.3a.2 and **NPRCore**:2.2a.2)

Technology Education Framework Connection:

Content Standards 4, 5, 7

Calculators: graphing utility, TI-30XII

Required Activities (Common Experiences):

1. Students will collect data and use inequalities to investigate how one's target pulse rate varies with age and physical condition. Prentice Hall, Algebra, p. 200 (F2, **ARCore**:1.3a.1,1.3a.2 and **NPRCore**:2.2a.2)
2. Students will use graphing calculators to solve absolute value equations. (F1, **ARCore**:1.3a.1, 1.3a.2 and **NPRCore**:2.2a.2)
3. Students will select an appropriate absolute value inequality to model and solve a real-world application. Referenced problems involve pumpkin weights and spring water bottling company. SAT Study Guide, 2006, p. 400 #19; p. 312 #16. (F2, **ARCore**:1.3a.1,1.3a.2 and **NPRCore**:2.2a.2)

Suggested Activities:

1. Students determine possible values for the coordinates of a point (a, b) located in a shaded region of the coordinate plane. Inequalities are used to describe solution sets for a and b . SAT Study Guide, 2006, p. 400 #18. (F1, **ARCore**:1.3a.1, 1.3a.2)

Assessment Tasks:

1. Required activities above.
2. Teacher generated tests and quizzes that align to unit benchmarks, focus questions and the essential question.

Instructional Resources and Materials:

Calculator (TI-30XIIS)

Graphing Calculator (TI-83 or TI-84)

Prentice Hall Algebra – Tools for a Changing World, Chapter 4

CollegeBoard SAT, The Official SAT Study Guide, 2006

Colored Pencils

Connections:

Health

Apply formulas to investigate one's health

Physical Education

Apply formulas to investigate physical fitness

Science

Permissible error – range of values

Pacing: This unit is expected to take approximately eight class periods under the block schedule.

Notes to Teachers:

SAT Study Guide, Absolute Value reference, pg. 247-248

SAT Study Guide, Inequalities reference, pg. 248-249

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Unit 3: Functions

Abstract

Functions are a symbolic way to model real world relationships. Students will be introduced to function notation and will use it to express relationships between the independent and dependent variables. Students will use function notation to construct a table of values then represent the function graphically. Families of common function models will be investigated and characteristics of their graphs formalized. Students will demonstrate the depth of their understanding of linear functions by writing linear models for real word data sets, interpreting the models' significance, and using the model to make a meaningful prediction.

Essential Question: How do patterns and functions help us describe data and physical phenomena and solve a variety of problems?

Focus Questions:

1. What is a function and its characteristics, and how can real world phenomena be represented with function notation? (**ARCore** :1.1a, 1.2a)
2. How can different classes of functions be described and compared, and how can they be represented with tables and graphs? (**ARCore** :1.1a, 1.2a)
3. How can linear functions be used to generalize relationships and make predictions? (**ARCore** :1.1a)

Benchmarks:

The student will be able to

1. evaluate a given function for a value of x using function notation.
(F1, **ARCore** :1.1a.3)
2. construct a graph of a function by creating a table of values.
(F2, **ARCore**:1.1a.1,1.2a.1)
3. determine whether a relation is a function and describe characteristics of functions, such as domain, range, independent and dependent variables, in writing using appropriate mathematics terminology and language.
(F1, **ARCore** :1.1a.3)

4. describe and compare properties and classes of linear, absolute value, quadratic and exponential functions in writing using appropriate mathematics terminology and language. (F2 , **ARCore**:1.1a.4, 1.2a.4)
5. write a rule relating dependent and independent variables from tables, graphs and verbal representations using function notation.(F1, **ARCore** :1.2a.2)
6. write a linear function relating two points on a coordinate plane. (F3, **ARCore** :1.1a.1)
7. write a linear rule given two pieces of real-world data, then use the rule to interpolate and/or extrapolate.(F3, **ARCore** :1.1a.2)

Technology Education Framework Connection:

Content Standards 4, 5, 6, 7

Computer Use: on-line research

Calculator: graphing utility, TI-30XII

Required Activities:

1. Students will conduct an experiment in which they will collect data then create a linear model to make predictions. Such as “Ringaround” in Algebra Experiments I, 1993, p. 22. (F3, **ARCore** :1.1a.2)
2. Students will conduct an experiment in which they will collect data then create an exponential model to make predictions. Such as “Investigation 7.7.1: Radioactive Decay” in Discovering Algebra Volume II, 2000, p. 99. (F2, **ARCore** :1.1a.4, 1.2a.4)
3. Students determine the values of two unknown output variables located in a linear function’s table of values. SAT Study Guide, 2006, p. 398 #12. (F1, **ARCore** :1.2a.2)
4. Students use the graph of one function, g , and a function rule of another, h , to evaluate h at a specific value of x . SAT Study Guide, 2006, p. 411 #13. (F1, **ARCore** :1.1a.3, 1.2a.2)

Suggested Activities:

1. Students will conduct an experiment in which they will collect data for the purpose of using a quadratic model to make predictions. Such as “Flat, Black and Circular” in Algebra Experiments II, 1993, p.58. (F2, **ARCore** :1.1a.4, 1.2a.4)

Assessment Tasks:

1. Required Activities above.
2. Teacher generated tests and quizzes.

Instructional Resources and Materials:Algebra Experiments IAlgebra Experiments IIDiscovering Algebra Volume II

Graphing Calculators

Protractors

Rulers

Circular Food(Cheerios, Fruit Loops, M&Ms)

Graph paper

Prentice Hall Algebra – Tools for a Changing World, Chapters 2 and 5CollegeBoard SAT, The Official SAT Study Guide, 2006.Connections:**Science**Pacing: This unit is expected to take twelve class periods under the block schedule.Notes to Teacher: CollegeBoard SAT, The Official SAT Study Guide, 2006 includes a section dedicated to the review of function vocabulary, notation and graphing.
See pages 256-262.

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Unit 4: Radicals and Special Right Triangles

Abstract

Students will work with irrational numbers in radical form. They will perform the four basic operations (add, subtract, multiply and divide) with radical numbers and use these operations to solve problems using the Pythagorean Theorem. Using radicals students will make conjectures for formulas of special right triangles.

Essential Question: How do geometric relationships and measurements help us to solve problems and make sense of our world? How are quantitative relationships represented by numbers?

Focus Questions :

1. How are radicals used to model and solve problems?
(**NPRCore**:2.1, **GMCore**:3.3)
2. How can the formulas for special right triangles be used to find missing lengths?
(**GMCore**:3.1, 3.2 and 3.3)

Benchmarks:

The student will be able to

1. perform operations with radical expressions and write the answer in simplest form.(F1, **NPRCore**:2.1a2)
2. solve real-world problems involving radicals including those that utilize the Pythagorean Theorem. (F1, **GMCore** :3.3a.2)
3. derive the formulas for special right triangles using the Pythagorean Theorem and inductive reasoning.(F2, **GMCore** :3.1a.1 and 3.2a.1)
4. apply the formulas for special right triangles to find missing lengths.
(F2, **GMCore** :3.3a.2)

Technology Education Framework Connection:

Content Standards 4, 5, 7

Computer Use: Geometers' Sketchpad

Calculator: TI-30XII

Required Activities:

1. Construct an isosceles right triangle whose legs have lengths that are a whole number of centimeters. Use a ruler to measure the hypotenuse. Calculate the hypotenuse length using the Pythagorean Theorem. Simplify all radicals and compare the ruler measurement to the calculated length. See the Heath geometry book p. 448. (F2, **GMCore**:3.1a.1, 3.2a.1, 3.3a.1)
2. Construct an equilateral triangle whose sides have lengths that are a whole number of centimeters. Construct the altitude from one of the vertices. Use a ruler to measure the length of the altitude. Calculate the length of the altitude using the Pythagorean Theorem. Simplify all radicals and compare the ruler measurement to the calculated length. See Heath geometry book p. 449. (F2, **GMCore** :3.1a.1, 3.2a.1, 3.3a.1)
3. Students use an authentic situation involving right triangles, a staircase, to model unknown measurements. SAT Study Guide, 2006, p. 368 #7.
4. Given a diagram of right triangles with selected side measurements, students use special right triangle relationships to solve for unknown angle measurements. SAT Study Guide, 2006, p. 425 #9.

Suggested Activities:

1. Reinforce Special Right Triangle relationships using Geometer Sketchpad. See Exploring Geometry, p. 159 - 162.(F2, **GMCore** :3.1a.1 and 3.2a.1)

Assessment Tasks:

1. Required Activities above.
2. Teacher generated tests and quizzes.

Instructional Resources and Materials:

Geometer's Sketchpad software

Exploring Geometry 2002

Calculator (TI-30XIIS)

Prentice Hall Algebra – Tools for a Changing World, Chapter 9Prentice Hall Mathematics Geometry, Chapter 7CollegeBoard SAT, The Official SAT Study Guide, 2006

Pacing: This unit is expected to take eight class periods under the block schedule.

Notes to Teacher: CollegeBoard SAT, The Official SAT Study Guide, 2006 offers a review of triangles, including special triangle formulas and Pythagorean theorem. See pages 268-272.

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Unit 5: Circles

Abstract

Previous knowledge of circle properties is extended using coordinate geometry, right triangle geometry, and constructions. After reviewing basic circle terminology, the concept of tangency will be discussed, together with the relationships among tangents, radii and diameters. Students will learn how central angles determine the measure of arcs and how central angles are applied in constructing circle graphs for data analysis. Students will study how inscribed angles determine the measure of arcs. Finally, coordinate geometry is used to extend understanding of circle properties.

Essential Question: How do geometric relationships and measurements help us to solve problems and make sense of our world? How do patterns and functions help us describe data and physical phenomena and solve a variety of problems?

Focus Questions:

1. How are the properties of circles used to solve geometric problems? (**GMCore** :3.1a, 3.2a, 3.3a)
2. How is coordinate geometry used to find the equation of a circle? (**ARExtended**:1.1a and 1.2a)

Benchmarks:

The student will be able to

1. use appropriate mathematical terminology associated with circles. (F1, **GMCore** :3.1a.2)
2. apply the Pythagorean Theorem, special right triangle formulas, and properties of tangents to solve problems in circle geometry.(F1, **GMCore** :3.1a.2, 3.2a.1, 3.3a.2)
3. apply the relationship between central angles and arcs of circles to solve problems.(F1, **GMCore** :3.1a.2, 3.2a.1)
4. apply the relationship between a circle's central angles and arcs to construct a circle graph, using a protractor and compass. (F1, **GMCore** :3.1a.2, 3.2a.1, 3.3a.1)
5. apply the relationship between inscribed angles and arcs of circles to solve problems. (F1, **GMCore** :3.1a.2, 3.2a.1)

6. derive the standard form of the equation of a circle using the Pythagorean Theorem. (F2, **ARExtended**:1.1a.3)
7. write the equation of a circle in standard form given information about the circle. (F2, **ARExtended**:1.1a.3 and 1.2a.2)

Technology Education Framework Connection:

Content Standards 4, 5, 7

Computer Use: Geometers' Sketchpad

Calculator: TI-30XI

Required Activities:

1. Students find the area of a circle inscribed in a rectangle using properties of tangents. See SAT Study Guide, 2006, p. 408 #4. (F1, **GMCore** :3.1a.2, 3.2a.1, 3.3a.2)
2. Conjecture the relationship between arcs and angles in writing using a Geometers' Sketchpad Activity, such as Exploring Geometry, p. 125. (F1, **GMCore** :3.1a.2, 3.2a.1)
3. Students will collect data using a topic of their choice, and construct a circle graph. Students must determine how percentages from a set of data relate to the degree measure of circle sector. (F1, **GMCore**:3.1a.2, 3.2a.1, 3.3a.1)
4. Given a diagram of a circle with a triangle with vertex angle at the center of the circle, students find the value of missing angle measures. See SAT Study Guide, 2006, p. 360 #5. (F1, **GMCore** :3.1a.2, 3.2a.1)

Suggested Activities:

1. Reinforce the terminology associated with circles through a Geometers' Sketchpad Activity, such as Exploring Geometry, p. 119.(F1, **GMCore**:3.1a.2)
2. Conjecture the properties of tangents through a Geometers' Sketchpad Activity, such as Exploring Geometry, p. 123 –124.(F1, **GMCore**:3.1a.2, 3.2a.1, 3.3a.2)
3. Given a diagram of a circle with inscribed triangles, use properties of a circle and inscribed angles, along with prior knowledge involving triangle area, to determine which of the triangles has the least area. See SAT Study Guide, 2006, pg 337 #6 (F1, **GMCore** :3.1a.2, 3.2a.1)

Assessment Tasks:

1. Required Activities above.
2. Teacher generated tests and quizzes.

Instructional Resources and Materials:

Geometer's Sketchpad software

Exploring Geometry with the Geometer Sketchpad, 2002

Calculators (TI-30XII)

Graph paper

Protractors

Compasses

Colored Pencils

Rulers

Prentice Hall Mathematics Geometry, Chapters 7 and 11

CollegeBoard SAT, The Official SAT Study Guide, 2006

Pacing: This unit is expected to take nine class periods under the block schedule.

Notes to Teacher: In the CollegeBoard SAT, The Official SAT Study Guide, 2006 an extensive review of circles, including terminology, tangents, area and circumference can be found on pages 278-280.

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Unit 6: Systems of Equations and Inequalities

Abstract

Students will solve systems of linear equations and inequalities. Students will learn and apply three methods for solving a system of linear equations; graphing, substitution and elimination. Students will relate the algebraic solution of a system to its graphical representation. Students will also solve real-life problems that are easily modeled by a system of linear equations. Finally, students will learn how to solve a system of linear inequalities and relate its solution set to its graphical representation.

Essential Question: How do patterns and functions help us describe data and physical phenomena and solve a variety of problems?

Focus Questions:

1. How can a system of two linear equations be solved using graphical and algebraic methods? (**ARCore**:1.3a)
2. What is the connection between the solution(s) to a system of linear equations or inequalities and its graphical representation? (**ARCore** :1.2a)
3. How can real world problems be modeled and solved using a system of two linear equations? (**ARCore** :1.3a)
4. How can real world problems be modeled and solved using linear inequalities in two variables? (**ARCore** :1.3a)

Benchmarks:

The student will be able to

1. interpret the graph of a system of linear equations to determine the number of solutions.(F2, **ARCore**:1.2a.4)
2. graph a system of two linear equations and write its solution in coordinate form. (F1, **ARCore** :1.3a.3 and F2, **ARCore** :1.2a.4)
3. solve a system of linear equations applying the substitution method. (**ARCore**:1.3a.3)
4. solve a system of linear equations applying the elimination method. (**ARCore**:1.3a.3)

5. write a system of two linear equations to model a real world problem and solve it by graphing. (F3, **ARCore**:1.3a.1 and **ARCore**:1.3a.3)
6. interpret the graph of a system of linear inequalities to determine possible solutions. (F2, **ARCore**:1.2a.4)
7. graph a system of linear inequalities to determine the solution set. (F4, **ARCore**:1.3a.2)

Technology Education Framework Connection:

Content Standards 4, 5, 7

Computer Use: Geometers' Sketchpad

Calculator: graphing utility, TI-30XII

Required Activities:

1. Students will use Texas Instrument 84 graphing calculators to solve a system of two equations or inequalities (using Inequalz Applications). (F2, **ARCore**:1.2a.4)
2. Students will collect two sets of data on a topic of interest using a resource such as the World Almanac, construct a graph and find and interpret the solution to the system they created. (F3, **ARCore**:1.3a.1 and **ARCore**:1.3a.3)
3. Students write and solve a system of equations to model a rate-time-distance problem. See SAT Study Guide, 2006, p. 412 #18. (F3, **ARCore**:1.3a.1 and **ARCore**:1.3a.3)

Suggested Activities:

1. Reinforce the meaning of solving a system of linear equations through a Geometers' Sketchpad Activity, such as Exploring Algebra, p. 57. (F1, **ARCore**:1.3a.3 and F2, **ARCore**:1.2a.4)
2. Reinforce the meaning of solving a system of linear equations through a "break-even" type of problem, such as chapter 6 project, "Let's Dance", Prentice Hall, Algebra I, p. 266. (F1, **ARCore**:1.3a.3 and F2, **ARCore**:1.2a.4)

Assessment Tasks:

1. Required Activities above.
2. Teacher generated tests and quizzes.

Instructional Resources and Materials:

Geometer's Sketchpad software

Exploring Algebra with the Geometer Sketchpad, 2002

TI-84 Calculators

Graph paper

Colored Pencils

Rulers

Prentice Hall Algebra, Chapter 6

CollegeBoard SAT, The Official SAT Study Guide, 2006

Pacing: This unit is expected to take twelve class periods under the block schedule.

Notes to Teacher:

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Unit 7: Polynomials and Factoring

Abstract

Students will apply algebraic skills to solve real-world problems modeled with quadratic functions. Although quadratic functions are the focus, students will learn how to classify and perform basic operations on polynomials of various degrees. Students will factor polynomial expressions in order to solve higher order equations.

Essential Question: How do patterns and functions help us describe data and physical phenomena and solve a variety of problems?

Focus Questions:

1. What are polynomials and how can the four basic operations be performed on them? (**ARCore** :1.1a, 1.3a)
2. What does it mean to factor a polynomial and how can factoring be used to solve an equation of degree greater than one? (**ARCore** :1.3a)
3. How does the graphical representation of solutions to a polynomial function relate to a real-life application? (**ARCore** :1.2a, 1.3a)

Benchmarks:

The student will be able to

1. classify a polynomial based on its terms and degree.(F1, **ARCore**:1.1a.4)
2. apply integer rules and combining like terms to add and subtract polynomials. (F1, **ARCore** :1.3a.2)
3. multiply two polynomials using the distributive property and/or FOIL method. (F1, **ARCore** :1.3a.2)
4. factor polynomials into a product of prime polynomials. (F2, **ARCore** :1.3a.2)
5. solve a polynomial function by factoring and using the zero product property. (F2, **ARCore** :1.3a.1)
6. relate the algebraic solution to a polynomial function and its graphical representation. (F3, **ARCore** :1.2a.3)

7. solve authentic problems involving polynomial functions using factoring.
(F3, **ARCore** :1.3a.1)

Technology Education Framework Connection:

Content Standards 4, 5, 7

Computer Use: Geometers' Sketchpad

Calculator: graphing utility, TI-30XII

Required Activities:

1. Students will simulate a situation that is modeled by a quadratic function to discover the relationship between the solutions and the graphical representation, such as Real-World Math with the CBL System, Activity 8. (F3, **ARCore** :1.3a.1)
2. Students will complete a projectile motion problem, such as a fireworks application or package drop application. Students will solve the problem both algebraically using factoring and graphically using the graphing calculator. Students will explain how their algebraic solution relates to their graphical representation in writing.
(F3, **ARCore** :1.2a.3)

Suggested Activities:

1. Students use sketchpad algebra tiles to model multiplying two binomials, such as Exploring Algebra, p. 27. (F1, **ARCore** :1.3a.2)
2. Students use sketchpad algebra tiles to model factoring two binomials, such as Exploring Algebra, p. 29. (F2, **ARCore** :1.3a.2)

Assessment Tasks:

1. Required Activities above.
2. Teacher generated tests and quizzes.

Instructional Resources and Materials :

Geometer's Sketchpad software
Exploring Algebra with the Geometer Sketchpad, 2002
Graphing Calculators
Graph paper
Algebra Tiles
Prentice Hall Algebra, Chapter 10

Connections:

Science

Punnett Squares

Pacing: This unit is expected to take twelve class periods under the block schedule.

Notes to Teacher: