



TITLE: Regents Prep: Algebra I Expanded Lessons

DESCRIPTION:

With the expanded lessons for Regents Prep in Algebra I, students spend more time working with functions, solving linear equations and systems of equations and inequalities, and working with polynomials. These expanded lessons continue to use the graphing calculator, but also provide the paper-and-pencil practice of students solving problems algebraically.

Lessons 7-10 have a tight focus on the test-taking skills and strategies specific to the Algebra I Regents Exam. These test-taking strategies have a strong emphasis on utilizing the graphing calculator.

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Curriculum writing experience: Developed math curriculum for use by ELL students with the National PASS program. Author of *Math 6*, *Math on the Move*, and *TAKS (Texas) Exit-Level Math Review*.

REGENTS PREP SERIES: The NYS-MEP continues to build a series of Regents Prep materials, available in the Resource Library on the www.nysmigrant.org website.

FACILITATOR GUIDE

Student Handouts

Each lesson has its own Student Handout. The author uses the student handouts to provide step-by-step instructions to the student, as well as opportunities for independent practice.

Educator Key Handouts

Each lesson has its own Educator Key handout. This is a copy of the Student's handout, with additional explanations, plus answers to the independent work.

Graphing Calculator – TI-84 Plus

These lessons use the TI-84 Plus graphing calculator. This is the calculator in use by most schools in New York State. Older or newer models have the same features, but the buttons are arranged in a different order and use different color-coding. **Note:** if

using a different graphing calculator, plan to spend time for students to orient to the different layout.

Lesson 1 – Functions

(Approximate time 1 hour)

Lesson 1 introduces the concept of **functions** for Algebra I. A function is a rule that tells you what to do with an “ x ” in order to get a y -value. This lesson also provides instructions for using the TABLE and GRAPH features on the graphing calculator, TI-84 Plus, to solve problems.

Supplies:

- Lesson 1 Handouts
 - Student Handout per student
 - Educator Key
- Graphing Calculator
- Handout-Introduction to Using the TI-84 Plus Graphing Calculator

Lesson 2 – Linear and Exponential Functions

(Approximate time 1 hour)

Algebra I focuses on four of the important “families” of functions: linear, exponential, quadratic, and absolute value. This lesson aims to deepen the student’s understanding of the characteristics of **linear** and **exponential function “families.”**

Students will also learn a technique, called regression, which will allow students to write a function rule using a set of coordinates.

Supplies: Lesson 2 Student Handout, Educator Key, and Graphing Calculator

Lesson 3 – Piecing it Together

(Approximate time will take more than one hour. Plan to complete over two or more sessions.)

Lesson 3 continues with the important “families” of functions. This lesson introduces the **quadratic** and **absolute value functions**. Students will also learn about Domain and Graphing Inequalities, along with a technique called piecewise functions.

Supplies: Lesson 3 Student Handout, Educator Key, and Graphing Calculator

Lesson 4 – Solving Linear Equations

(Approximate time 1 hour)

In Lesson 4, students will solve linear equations algebraically by doing operations on both sides of the equation until the variable is by itself and a number is on the other side of the equal sign.

Students will also solve linear equations using TABLE and GRAPH features on the graphing calculator.

Supplies: Lesson 4 Student Handout, Educator Key, and Graphing Calculator

Lesson 5 – Systems of Equations & Inequalities

(Approximate time will take more than one hour. Plan to complete over two or more sessions.)

Lesson 5 focuses on **systems of two equations**. The solution to a system of equations are the numbers for each variable that make all equations true at once. The lesson will go over three methods to solve a system of equations: the substitution method, the elimination method, and graphically.

In addition, Lesson 5 has students practice solving systems of inequalities, graphically.

Supplies: Lesson 5 Student Handout, Educator Key, and Graphing Calculator

Lesson 6 – An Overview of Polynomials

(Approximate time 1 hour)

Polynomials are an important family of functions that include two types of functions studied in earlier lessons. Linear and quadratic functions are part of the polynomial function family. Polynomial rules can be written in standard and factored form. Students will work with a polynomial's leading coefficient and degree.

Supplies: Lesson 6 Student Handout, Educator Key, and Graphing Calculator

TEST-TAKING STRATEGIES

Facilitator Note: The next four sessions are the test-taking topics from the shorter, *Regents Prep for Algebra I in Four Sessions*. These four topics focus on leveraging the use of the graphic calculator for a passing strategy to taking the Algebra I Regents Exam. Combined with understanding the content from the expanded lessons above, students can enter the exam with greater confidence.

RESOURCES NEEDED

1. For each Topic:
 - Student Handout
 - Educator Key
 - Graphing Calculator

2. June 2017 Algebra I Regents Exam to practice breaking down the exam during the lesson. (If extended time is available, students use the same exam to answer the multiple-choice questions.)
 - Exam in English
 - Exam in Spanish
 - Answer Key
 - Models for scoring student work for questions 25-37.

TOPIC 1 – THE ALGEBRA I TEST AND STRATEGIES TO BEAT IT

(Approximate time: 1 hour)

Topic 1 explains how to be strategic about passing the Algebra Regents Exam. Students learn strategies to identify ten to fourteen multiple-choice questions they can get right when using the graphing calculator.

TOPIC 2 – ANALYZING FUNCTIONS USING TABLES AND GRAPHS

(Approximate time: 1 hour)

Topic 2 explains functions and how they can be represented. Students learn how to view function tables in the calculator and how to adjust the start value and how much “x” changes by. Students learn how to view graphs in the calculator, to change the window to get a better picture, and to trace an input “x” to determine and output “y.”

TOPIC 3 – FUNCTION FAMILIES

(Approximate time: 2 hours)

Topic 3 groups algebraic functions into three families. Students learn about three main families: linear, exponential, and quadratic. Topic 3 emphasizes students working to identify key similar characteristics of each function family’s rule, table, and graph.

TOPIC 4 – SOME FINAL THOUGHTS

(Approximate time for the lesson: 1 hour. Additional time to answer the multiple-choice questions: 1 hours)

Students learn how to adjust the viewing window on the calculator and discuss last minute ideas that are nice to know for the exam. Students will take a blank, past Algebra I Regents Exam to decide which questions they must complete. If the extended time is available, students can practice answering the multiple-choice questions.

OPTIONAL RESOURCES

WEBSITE RESOURCES

www.jmap.org free resources to integrate the Common Core State Standards and Regents exam questions

www.desmos.com for exploring graphs and function

<http://wabbitemu.org/> for graphing calculator (select the Select the TI-plus

PHONE APP RESOURCES

Find the **wabbitemu** app for phones in the **android** store.

In Google Play:

- Search for **wabbitemu**
- During installment, you can “skip” the choice to enter debit/credit card information.
- This has **TI-84** as one of the free choices.
 - This has the same buttons as the **TI-84 Plus**.
 - **However**, the buttons are arranged differently than the “Plus” version, and it uses different colors for the “2nd” and “alpha” modes.

(The **wabbitemu** app does not seem to be in the Apple store at the time this is written.)