

Pequannock Township School District

Curriculum Syllabus

Course Name and level / Grade level and Subject: Algebra I Grade 9 /
Algebra I Grade 8

Course Description:

Many of the concepts presented in Algebra I are progressions of the concepts that were started in grades 6 through 8; the content presented in this course is intended to extend and deepen the previous understandings.

Unit 1 begins with setting the stage for work with expressions and equations through understanding quantities and the relationships between them. The work in unit 2 will build on the grade 8 concepts for linear and exponential relationships. Success in unit 2 will lay the groundwork for later units where the students will extend this knowledge to quadratic and exponential functions.

The standards included in unit 3 blend the conceptual understandings of expressions and equations with procedural fluency and problem solving. The students will not encounter solutions of quadratic equations that are complex.

The standards presented in unit 4 involve functions and extending the concepts of integer exponents to concepts of rational exponents. The understandings will be applied to other types of equations in future courses. Unit 5 will build on previous work with descriptive statistics. Linear models will be used to assess how a model fits data.

Course Standards:

The following is a list of NJSLS that describe what students are expected to know and be able to do as a result of successfully completing this course. The following NJSLS are the basis of the assessment of student achievement. The learner will demonstrate mastery of:

1. Interpret the structure of expressions.

A.SSE.A.1 1a 1b 2

2. Write expressions in equivalent forms to solve problems.

A.SSE.B.3 A B C 4

3. Perform arithmetic operations on polynomials.

A.APR.A.1

4. Understand the relationship between zeros and factors of polynomials.
A.APR.B.2 3
5. Use polynomial identities to solve problems.
A.APR.C.4 5
6. Rewrite rational expressions.
A.APR.D.6 7
7. Create equations that describe numbers or relationships.
A.CED.A.1 2 3 4
8. Understand solving equations as a process of reasoning and explain the reasoning.
A.REI.A.1 2
9. Solve equations and inequalities in one variable.
A.REI.B.3 4 4A 4B
10. Solve systems of equations.
A.REI.C.5 6 7 8 9
11. Represent and solve equations and inequalities graphically.
A.REI.D.10 11 12

Standards for Mathematical Practice

1. Make sense of problems and persevere in solving them. *SMP1*
2. Reason abstractly and quantitatively. *SMP2*
3. Construct viable arguments and critique the reasoning of others. *SMP3*
4. Model with mathematics. *SMP4*
5. Use appropriate tools strategically. *SMP5*
6. Attend to precision. *SMP6*
7. Look for and make use of structure. *SMP7*
8. Look for and express regularity in repeated reasoning. *SMP8*

Scope and Sequence*

Unit 1 (Marking Period 1) (PV Trimester 1)

This unit will focus on students being able to solve linear equations and inequalities. Students will build on previously learned skills to be able to solve multiple-step equations and inequalities represented in various forms. Students will need to identify the various parts of these equations and inequalities. Students will develop fluency in writing, interpreting, and translating between various forms of linear equations and inequalities and using them to solve problems in real-life context. Students will also be able to identify the steps needed and explain their solution process.

Unit 2 (Marking Periods 1-2) (PV Trimester 1 & 2)

This unit focuses on linear relationships. Students must be able to identify function notations and develop the concept of domain and range through various representations. The students will explore many examples of functions including sequences such as geometrically and recursively. Functions will be interpreted given graphically, symbolically, and verbally, and translated between representations and knowing the limitations of these various representations. This unit will also have students graph various functions and even include systems of equations and systems of inequalities. Students will be able to make predictions as they analyze the data of functions and see where the graphs and solution sets lie on the graph. Students will describe relationships between quantities arising from a context and reason with unit in which the quantities are measured. Students will also explore systems of equations and inequalities to interpret their solutions.

Unit 3 (Marking Periods 2-3) (PV Trimester 2 & 3)

Expressions and Equations

This unit will focus on expanding the students' knowledge on expressions and equations. Students will explore equations containing square and cube roots. Students will also begin factoring equations looking for zeros, minimums, and maximums. Students will learn what quadratic equations look like and different solution methods, such as completing the square, graphing, factoring, and the quadratic formula. Students will also solve equations by performing addition, subtraction, division, and multiplication of polynomials. Students will apply these new understandings to see structure in and create quadratic and exponential expressions. Students will also create and solve quadratic expressions and equations based of real-life situations.

Unit 4 (Marking Period 3-4) (PV Trimester 3)

Functions and Modeling

This unit will have students explore distinctions between rational and irrational numbers in preparation for quadratic relationships. Quadratic functions will be compared to linear and exponential functions. Students will be able to anticipate the graph of quadratic functions by interpreting the various forms of quadratic expressions. Students will identify the real solutions of a quadratic equation as the zeros of a related quadratic function. Students will identify that when quadratic equations do not have real solutions the number system and must be extended so that solutions exist. Students will be able to represent data in a way to show the relationship between two variables such as growth or decay.

Unit 5 (Marking Period 4 if time permits) (PV Trimester 3 if time permits)

Descriptive Statistics

This unit's focus has students represent data and analyze data. Students will use statistics to compare and interpret data. Students will use this data to recognize associations and determine trends. Students will be able to recognize the difference of correlation and causation. Students will determine rate of change and lines of best fit through various graphs such as scatter plots.

* For students taking a 2-year Algebra 1 course, approximately half of the curriculum would be taught in the first year and the remaining curriculum would be taught in the second year. Pacing for 2-part Algebra 1 courses is dependent on the needs of the students in the class.

Assessments

Evaluation of student achievement in this course will be based on the following:

- a. Observational data collected by teachers as students are learning
- b. Formative assessments given by teachers to gauge progress toward each standard
- c. Districtwide Final Exam math assessments

Curriculum Resources

Instructional Resources:

Pearson Algebra 1 Common Core
Prentice Hall Mathematics Algebra 1

Technology Resources:

BrainPOP video:

<http://www.brainpop.com/math/numbersandoperations/rationalandirrationalnumbers/preview.weml>

Khan Academy: <http://www.khanacademy.org/>

Desmos: <https://www.desmos.com/calculator>

Illustrative Mathematics: <https://www.illustrativemathematics.org/>

Home and School Connection

The following are suggestions and/or resources that will help parents support their children:

- Use the class website (PV Algebra 1):
<https://sites.google.com/pequannock.org/algebra1honors/home>
The site has resources attached
- Use the class Google Classroom
- Tutorials
 - <https://www.khanacademy.org/>
- IXL Math
 - <https://www.ixl.com/math/algebra-1>