Pequannock Township School District Curriculum Syllabus

Course Name and level / Grade level and Subject: <u>Algebra 2 Academic</u>

Course Description:

This is a course designed for students after completion of Algebra I and Geometry. The course content will include all NJSLS Algebra II Standards, building on previous knowledge of Algebra and application of linear, quadratic, exponential, log, radical and rational functions, sequences and series.

The main goal is to present Algebra II in a concise and meaningful way so that students can understand the concepts they are learning and apply it to real-life situations. This will be conducted through a variety of methods:

Focus on Application: Making this course meaningful to students is critical to their success. Application of mathematics will be integrated into the curriculum and text.
Pedagogy to Support Students: Students need careful explanations of the mathematics along with examples presented in a clear and concise manner. Additionally, students and instructors should have the means to assess the basic prerequisite skills.

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:

Number and Quantity
<u>The Real Number System</u>

1. Extend the properties of exponents to rational exponents.
   N.RN.A.1, N.RN.A.2

<u>Quantities</u>

2. Reason quantitatively and use units to solve problems.
   N.Q.A.1

<u>The Complex Number System</u>

3. Perform arithmetic operations with complex numbers.
   N.CN.A.1, N.CN.A.2
4. Use complex numbers in polynomial identities and equations.
   N.CN.C.7

Algebra
<u>Seeing Structure in Equations</u>

5. Interpret the structure of expressions
   A.SSE.A.2,
6. Write expressions in equivalent forms to solve problems.
   A.SSE.B.3a-c, A.SSE.B.4

Arithmetic with Polynomials & Rational Expressions

7. Understand the relationship between zeros and factors of polynomials.
   A.APR.A.2, A.APR.A.3
8. Use polynomial identities to solve problems.
   A.APR.B.4
9. Rewrite rational expressions.
   A.APR.C.6

Creating Equations

10. Create equations that describe numbers or relationships.
    A.CED.A.1

Reasoning with Equations and Inequalities

11. Understand solving equations as a process of reasoning and explain the reasoning.
    A.REI.A.1 A.REI.A.2
12. Solve equations and inequalities in one variable.
    A.REI.B.4a-b
13. Solve systems of equations.
    A.REI.C.6, A.REI.C.7
14. Represent and solve equations and inequalities graphically.
    A.REI.D.11

Functions

Interpreting Functions

15. Interpret functions that arise in applications in terms of the context.
    F.IF.B.4, F.IF.B.6
16. Analyze functions using different representations.
    F.IF.C.7a-e, F.IF.C.8a-b, F.IF.C.9

Building Functions

17. Build a function that models a relationship between two quantities.
    F.BF.A.1a-c, F.BF.A.2

Linear, Quadratic, and Exponential Models

18. Construct and compare linear, quadratic, and exponential models and solve problems.
    F.LE.A.2, F.LE.A.4
19. Interpret expressions for functions in terms of the situation they model.
    F.LE.B.5

Trigonometric Functions

20. Extend the domain of trigonometric functions using the unit circle.
    F.TF.A.1, F.TF.A.2
21. Model periodic phenomena with trigonometric functions.
    F.TF.B.5
22. Prove and apply trigonometric identities.

F.TF.C.8, F.TF.C.9

Geometry

Expressing Geometric Properties with Equations

23. Translate between the geometric description and the equation for a conic section
    G.GPE.A.2

Statistics and Probability

Interpreting Categorical and Quantitative Data

24. Summarize, represent, and interpret data on a single count or measurement variable
    S.ID.A.4
25. Summarize, represent, and interpret data on two categorical and quantitative variables
    S.ID.B.6a-c

Making Inferences and Justifying Conclusions

26. Understand and evaluate random processes underlying statistical experiments
    S.IC.A.1, S.IC.A.2
27. Make inferences and justify conclusions from sample surveys, experiments, and observational studies
    S.IC.B.3, S.IC.B.4, S.IC.B.5, S.IC.B.6

Conditional Probability and the Rules of Probability

28. Understand independence and conditional probability and use them to interpret data
    S.CP.A.1, S.CP.A.2, S.CP.A.3, S.CP.A.4, S.CP.A.5
29. Use the rules of probability to compute probabilities of compound events.
    S.CP.B.6, S.CP.B.7

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: Linear Functions, Equations, Systems and Matrices (MP 1)

Students will be able to:

A: see structure in expressions, create equations **B:** interpret and build functions, create equations, see structure in expressions, **C:** create equations, reason with equations and inequalities, understand and use matrix operations
Unit 2: Quadratic and Polynomial Functions (MP 2) Students will be able to: **A:** interpret functions, create equations, understand complex numbering system **B:** interpret functions, use arithmetic with polynomials and rational expressions The primary goal is to expand on students' understandings and skills related to functions, equations and graphs.
Unit 3: Radical Functions and Rational Exponents, Exponential and Log Functions (MP 2-3) Students will be able to: **A:** see structure in expression, interpret functions, reason with equations and inequalities **B:** interpret functions, make linear and exponentials models, creating equations that describe numbers The primary goal is to expand on students' understandings and skills related to exponential functions, logarithmic functions, radical functions and equations.
Unit 4: Rational Functions, Sequences and Series (MP 3-4) Students will be able to: **A:** use arithmetic with polynomials and rational expressions, building functions, creating equations **B:** seeing structure in assessment The primary goal is to expand on students' understandings and skills related to rational functions, sequences and series.
Unit 5: Statistics (MP 4) Students will be able to: **A:** Use simple and compound probabilities to find the chance one or more events will occur. **B:** Apply the normal distribution to data and use its features to interpret data. **C:** Collect, organize, and interpret data. The primary goal is to expand on students' understanding of probability, data collection, and data interpretation.

* For students taking a 2-year Algebra 2 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 2 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. In class assessments (quizzes & tests)
b. Online assessments
c. Classwork

Curriculum Resources

Instructional Resources:

Pearson Algebra 2 Textbook
www.pearsonsuccessnet.com (online component)

Technology Resources:

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:

- https://www.mathhelp.com/algebra-2-help/
- https://www.desmos.com/
- https://www.khanacademy.org/math/algebra2
- https://www.mathplanet.com/education/algebra-2