

Pequannock Township School District

Curriculum Syllabus

Course Name and level / Grade level and Subject: Algebra 2 Honors

Course Description:

This is a one-year course designed for the accelerated students after completion of Algebra I and Geometry Honors. 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, trigonometry, sequences and series, and conic sections.

Our 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 skill.

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

The Real Number System

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

Quantities

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

The Complex Number System

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

Seeing Structure in Equations

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 (Marking Period 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

The primary goal is to have students solve any system of equations/inequalities by graphing, substitution, elimination and matrices.

Unit 2: Quadratic, Polynomial, Radical Functions and Rational Exponents (Marking Period 1,2,3)

Students will be able to:

A: interpret functions, create equations, understand complex numbering system

B: interpret functions, use arithmetic with polynomials and rational expressions

C: see structure in expressions, interpret functions, reason with equations and inequalities

The primary goal is to expand on students' understandings and skills related to functions, equations, graphs, radical functions and rational expressions.

Unit 3: Exponential, Log and Rational Functions, Sequences and Series (Marking Period 2,3)

Students will be able to:

A: interpret functions, make linear and exponentials models, creating equations that describe numbers

B: use arithmetic with polynomials and rational expressions, building functions, creating equations

C: seeing structure in assessment

The primary goal is to expand on students' understandings and skills related to exponential functions, logarithmic functions, rational functions and equations, sequences and series.

Unit 4: Conic Sections, Trigonometric Functions and Identities (Marking Period 4)

Students will be able to:

A: express geometric properties with equations, interpreting functions

B: use and apply trigonometric functions, interpreting functions

C: analyze trigonometric functions, use similarity, right triangles applied to trigonometry

The primary goal is to expand on students' understandings and skills related to conic sections, quadratic relations, period functions and trigonometry.

Unit 5: Statistics (Marking Period 1)

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.

*Algebra II Honors activities will include more in-depth exploration of each of these topics, including more application of skills.

Assessments

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

- a. In class assessments (quizzes & tests) *Algebra II Honors assessments will include more in-depth application of algebra skills learned
- 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>