

Barnegat High School

Algebra 2 Honors - Syllabus

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| **Course Information** | **Teacher Information** |
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| Honors Algebra 2 | Name: Dr. Katherine Maxwell |
| Semester Course | Phone: (609) 698-5900 |
| Class Location: Room C201 | Email: KMaxwell@barnegatschools.com |
|  | Teacher Website: [Barnegatschools.com](https://www.barnegatschools.com/Domain/2366) |

**Course Description:**

| This course is designed with intense academic rigor, strong critical thinking skills, and responsible study skills both in and out of the classroom to prepare students that will be pursuing a four-year college degree and/or more advanced degrees.  Effective mathematics education provides students with a balanced instructional program.  In such a program, students become proficient in basic computational skills and procedures, develop conceptual understandings, and become skilled at problem solving.  Standards-based mathematics instruction starts with basic material and increases in academic rigor, critical thinking, scope, and content as the years progress.  The curriculum is aligned to the NJSLS for Mathematics.  Activities outlined in this curriculum infuse the Standards for Mathematical Practice.  In alignment to the content and practice standards, Algebra 2 students will extend their knowledge of mathematics as they learn to represent and compare. |
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**Course Competencies/ Learning Objectives**

Students who successfully complete Honors Algebra 2 will be competent in the following areas:

| * Students will be able to: * Use the mean and standard deviation of a data set to fit it to a normal distribution, estimate population percentages, and recognize that there are data sets for which such a procedure is not appropriate (use calculators, spreadsheets, and tables to estimate areas under the normal curve) S.ID.4 * Understand that statistics is a process for making inferences about population parameters based on a random sample from that population. S-IC.1 * Decide if a specified model is consistent with results from a given data-generating process, e.g., using simulation. S.IC.2 * Recognize the purposes of and differences among sample surveys, experiments and observational studies; explain how randomization relates to each. S.IC.3 * Use data from a sample survey to estimate a population mean or proportion; develop a margin of error through the use of simulation models for random sampling. S-IC.4. * Use data from a randomized experiment to compare two treatments; use simulations to decide if differences between parameters are significant. S.IC.5 * Evaluate reports based on data. S.IC.6   Students will be able to:   * Represent data on two quantitative variables on a scatter plot, and describe how the variables are related. a. Fit a function to the data; use functions fitted to data to solve problems in the context of the data. Use given functions or choose a function suggested by the context. Emphasize linear and exponential models. S.ID.6a * Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables. A.REI.6   Students will be able to:   * Identify the effect on the graph of replacing *f*(*x*) by *f*(*x*) + *k*, *k f*(*x*), *f*(*kx*), and *f*(*x* + *k*) for specific values of *k* (both positive and negative); find the value of *k* given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. F.BF.3 * For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity. F.IF.B.4 * Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). For example, given a graph of one quadratic function and an algebraic expression for another, say which has the larger maximum. F.IF.C.9 * Derive the equation of a parabola given a focus and directrix. G.GPE.2 * Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph. F.IF.B.6   Students will be able to:   * Use the structure of an expression to identify ways to rewrite it. For example, see * as , thus recognizing it as a difference of squares that can be factored as )). A.SSE.A.2 * Solve quadratic equations with real coefficients that have complex solutions. N.CN.C.7 * Know there is a complex number i such that , and every complex number has the form a + bi with a and b real. N.CN.A.1 * Use the relation and the commutative, associative, and distributive properties to add, subtract, and multiply complex numbers. N.CN.A.2 * Solve quadratic equations in one variable. b. Solve quadratic equations by inspection (e.g., for x 2 = 49), taking square roots, completing the square, the quadratic formula and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as a ± bi for real numbers a and b. A.REI.4b * Solve a simple system consisting of a linear equation and a quadratic equation in two variables algebraically and graphically. For example, find the points of intersection between the line y = –3x and the circle . A.REI.7   Students will be able to:   * Graph polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior. F.IF.7.c * Prove Polynomial identities and use them to describe numerical relationships. For example, the polynomial identity (x 2 + y 2 ) 2 = (x 2 – y 2 ) 2 + (2xy) 2 can be used to generate Pythagorean triples. A.APR.4 * Know and apply the Remainder Theorem: For a polynomial p(x) and a number a, the remainder on division by x – a is p(a), so p(a) = 0 if and only if (x – a) is a factor of p(x). A.APR.2 * Identify zeros of polynomials when suitable factorizations are available, and use the zeros to construct a rough graph of the function defined by the polynomial. A.APR.3 I   Students will be able to:   * Explain how the definition of the meaning of rational exponents follows from extending the properties of integer exponents to those values, allowing for a notation for radicals in terms of rational exponents. N.RN.1 * Rewrite expressions involving radicals and rational exponents using the properties of exponents. N.RN.2 * Build new functions from existing functions. Identify the effect on the graph of replacing f(x) by f(x) + k, k f(x), f(kx), and f(x + k) for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them. F.BF.3 * Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions. F.IF.7.b * Understand solving equations as a process of reasoning and explain the reasoning. Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise. A.REI.2 * Interpret functions that arise in applications in terms of the context. For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity. F.IF.4 * Write a function that describes a relationship between two quantities.\* b. Combine standard function types using arithmetic operations. For example, build a function that models the temperature of a cooling body by adding a constant function to a decaying exponential, and relate these functions to the model. F.BF.1 * Find inverse functions. Solve an equation of the form f(x) = c for a simple function f that has an inverse and write an expression for the inverse. For example, f(x) =2 x3 or f(x) = (x+1)/(x–1) for x ≠ 1. F.BF.4a   Student will be able to:   * Use the properties of exponents to interpret expressions for exponential functions. F.IF.8b * Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). F.IF.C.9 * Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. Use the properties of exponents to transform expressions for exponential functions. A.SSE.3 * Construct and compare linear, quadratic, and exponential models and solve problems. For exponential models, express as a logarithm the solution to ab^(ct) = d where a, c, and d are numbers and the base b is 2, 10, or e; evaluate the logarithm using technology. F.LE.4 * Define appropriate quantities for the purpose of descriptive modeling. N.Q.2 * Interpret the parameters in a linear or exponential function in terms of a context. F.LE.5 * Explain why the x-coordinates of the points where the graphs of the equations y = f(x) and y = g(x) intersect are the solutions of the equation f(x) = g(x); find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where f(x) and/or g(x) are linear, polynomial, rational, absolute value, exponential, and logarithmic functions. A.REI.11   Students will be able to:   * Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method. A.REI.1 * For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity. F.IF.B.4 * Rewrite simple rational expressions in different forms; write *a*(*x*)/*b*(*x*) in the form *q*(*x)* + *r*(*x*)/*b*(*x*), where *a*(*x*), *b*(*x*), *q*(*x*), and *r*(*x*) are polynomials with the degree of *r*(*x*) less than the degree of *b*(*x*), using inspection, long division, or, for the more complicated examples, a computer algebra system. A.APR.6 * Understand solving equations as a process of reasoning and explain the reasoning. Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise. A.REI.2   Students will be able to:   * Derive the formula for the sum of a finite geometric series (when the common ratio is not 1), and use the formula to solve problems. A-SSE.4. * Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms. F.BF.2   Students will be able to:   * Understand the radian measure of an angle as the length of the arc on the unit circle subtended by the angle. F-TF-1 * Explain how the unit circle in the coordinate plane enables the extension of trigonometric functions to all real numbers, interpreted as radian measures of angles traversed counterclockwise around the unit circle. F-TF-2 * Choose trigonometric functions to model periodic phenomena with specified amplitude, frequency, and midline. F-TF-5 * Prove the Pythagorean identity sin2(θ) + cos2(θ) = 1 and use it to find sin(θ), cos(θ), or tan(θ) given sin(θ), cos(θ), or tan(θ) and the quadrant of the angle. F-TF-8   Students will be able to:   * Describe events as subsets of a sample space (the set of outcomes) using characteristics (or categories) of the outcomes, or as unions, intersections, or complements of other events (“or,” “and, ”not”). S.CP.1 * Understand that two events A and B are independent if the probability of A and B occurring together is the product of their probabilities, and use this characterization to determine if they are independent. S.CP.2 * Understand the conditional probability of A given B as P(A) and B)/P(B), and interpret independence of A and B as saying that the conditional probability of A given B is the same as the probability of A, and the conditional probability of B given A is the same as the probability of B. S.CP.3 * Construct and interpret two-way frequency tables of data when two categories are associated with each object being classified. Use the two-way table as a sample space to decide if events are independent and to approximate conditional probabilities. S.CP.4 * Recognize and explain the concepts of conditional probability and independence in everyday language and everyday situations. S.CP.5 * Find the conditional probability of A given B as the fraction of B’s outcomes that also belong to A, and interpret the answer in terms of the model. S.CP.6 * Apply the Addition Rule, P(A or B) = P(A) + P(B) – P(A and B), and interpret the answer in terms of the model. S.CP.7 |
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**Course Texts / Online Resources**

This course will follow the [New Jersey Student Learning Standards (NJSLS)](https://www.nj.gov/education/modelcurriculum/math/AlgebraII.pdf) verbatim.

Larson R. Boswell L. & Big Ideas Learning LLC. (2015). *Big ideas math. algebra 2 : a common core curriculum*. Big Ideas Learning.

Google Classroom ID = To be distributed in person or via email on the first day of class.

**Required Materials**

Every class period, students will be **required** to bring their school issued student computer, notebook/binder, and calculator to complete assignments and tasks. It is highly recommended that students planning to advance in the honors program invest in a TI-84 Plus CE calculator. (Learning the graphing calculator early will assist when SAT and AP testing approaches).

**Attendance Policy**

Regular and prompt class attendance is an essential part of the educational experience. The Barnegat Township School District expects students to be responsible and exercise good judgment regarding attendance and absences. Students accept full responsibility for ensuring that they complete any/all work missed due to absences.

**Course Topic Outline**

Please find a list of the units for this course:

| **Content Area: Math** | |
| --- | --- |
| **Course Title: Honors Algebra 2** | **Grade Level: 10th** |
| Unit 1: Statistics | 8-10 days |
| Unit 2: Linear Functions | 4-6 days |
| Unit 3: Quadratic Functions | 4-6 days |
| Unit 4: Quadratic Equations & Complex Numbers | 4-6 days |
| Unit 5: Polynomial Functions | 8-10 days |
| Unit 6: Rational Exponents & Radical Functions | 8-10 days |
| Unit 7: Exponential & Logarithmic Functions | 8-10 days |
| Unit 8: Rational Functions | 4-6 days |
| Unit 9: Series & Sequences | 4-6 days |
| Unit 10: Trigonometric Ratios & Functions | 2-4 days |
| Unit 11: Probability | 6-8 days |

**Student Grades**

The grading system for this course is based on the category weights listed in each department’s policy. For this course, those weights are listed below. Each marking period, students will have a minimum of three (3) Major Assessments and five (5) Minor Assessments (explained below). Homework is graded for completion, and Class Participation is assessed using the district rubric.

| **Major Assessments** | - | 55% of marking period grade |
| --- | --- | --- |
| **Minor Assessments** | - | 30% of marking period grade |
| **Course Participation** | - | 10% of marking period grade |
| **Benchmark** | - | 5% of marking period grade |

Please note: the above areas are used as the basis for 80% of your grade for the course; the midterm and/or final exam will constitute the remaining 20% of your grade.

* Examples of Major Assessments include items that are summative in nature, such as: tests, projects, or any other type of assessment used to capture evidence of learning at the culmination of a unit of study.
* Examples of Minor Assessments include items that are formative in nature, such as: quizzes, exit tickets, in class worksheets, or any other type of assessment that is diagnostic in nature and used to guide instruction and provide ongoing feedback to students.
* Note: grades for individual assignments are entered into Genesis for the marking period in which the assignment is assigned and collected, and not a subsequent marking period.
* In this course, it is expected that students will submit only their best work, and teachers reserve the right not to accept work that is substantially below what a student is capable of producing.
* ***Opportunities for Second chances on certain Major Assessments will be available and will be discussed.***

**Course Participation Rubric**

|  | **Academic Social Skills** | **Readiness to Learn / Study Skills** | **Class**  **Discussions** | **Classwork** | **21st Century College and Career Readiness** |
| --- | --- | --- | --- | --- | --- |
|  | **20 points**   * Takes initiative in completing tasks in the online classroom. * Communicates needs to the teacher in an appropriate manner. * A role model for others in the online classroom. * Appropriately seeks support and/or assistance from the teacher. | **20 points**   * Produces notes and other materials that demonstrate effort and insight. * Is motivated and takes ownership of his/her learning. * Takes steps to better himself/herself through Google Meets, emailing, etc. | **20 points**   * Consistently completes the assigned discussion questions and rarely misses a question, if at all. * Responses consistently reflect high levels of care and pride in work. * Replies and interacts with peers in a meaningful manner. | **20 points**   * Consistently completes assigned tasks in a timely manner. * Actively participates in classroom activities on a daily basis. * Contributes to class discussions in a meaningful way (asking questions or adding to class discussion). | **20 points**  **Student consistently shows the following:**   * Responsible and contributes to our online community. * Clearly and appropriately communicates with the teacher via email. * Understands the consequences of actions. * Responsibly uses technology. |
|  | **15 Points**   * Completes tasks in the online classroom. * Sometimes communicates needs to the teacher. * Frequently on-task, but may need some redirection from the teacher. | **15 Points**   * Often produces notes and other materials that demonstrate effort, but may also require direction. * Is mostly motivated and takes ownership of his/her learning. * Often takes steps to better himself/herself through Google Meets, emailing, etc. | **15 Points**   * Frequently completes the assigned discussion questions, but may have missed a few. * Responses sometimes reflect high levels of care and pride in work, but not always. * Replies and interacts with peers. | **15 Points**   * Usually completes assigned classwork tasks. * Frequently participates in classroom activities but sometimes requires re-direction. * Usually contributes by responding, and/or asking questions. | **15 Points**  **Student frequently demonstrates the following**:   * Responsible and contributes to our online community. * Clearly and appropriately communicates with the teacher via email. * Understands the consequences of actions. * Responsibly uses technology. |
|  | **10 Points**   * Rarely completes tasks in the online classroom. * Does not communicate needs to the teacher. * Frequently needs redirection from the teacher. | **10 Points**   * Produces notes and other materials that lack effort to learn. * Unmotivated and does not take ownership of his/her learning. * Does not take appropriate steps to better himself/herself. | **10 Points**   * Rarely completes the assigned discussion questions. * Responses do not reflect care and pride in work. * Little to no replies and interactions with peers. | **10 Points**   * Rarely completes assigned tasks and does not produce his/her best work. * Usually does not participate in classroom activities and often requires teacher redirection * Usually does not contribute by responding and/or asking questions. | **10 Points**  **Student rarely demonstrates the following**:   * Responsible and contributes to our online community. * Clearly and appropriately communicates with the teacher via email. * Understands the consequences of actions. * Responsibly uses technology. |

**Plagiarism, Cheating, and Academic Integrity**

The Barnegat Township School District places a strong emphasis on students’ integrity, and the district will not tolerate instances of academic dishonesty. Plagiarism is the practice of copying words, sentences, images, or ideas for use in written or oral assessments without giving proper credit to the source. Cheating is defined as the giving or receiving of illegal help on anything that has been determined by the teacher to be an individual effort. Both are considered serious offenses and are subject to consequences described in the Student Handbook and Board Policy #5701.

**Honor Code**

The purpose of this Honor Code is to communicate the meaning and importance of academic honesty & integrity to all members of the school community and to articulate and support the interest of the community in maintaining the highest standards of conduct in student learning. Barnegat High School embodies a spirit of mutual trust and intellectual honesty that is central to the very nature of learning, and represents the highest possible expression of shared values among the members of the school community. The core values underlying and reflected in the Honor Code are:

**Academic honesty** is demonstrated by students when the ideas and the writing of others are properly cited; *students submit their own work for tests and assignments without unauthorized assistance; students do not provide unauthorized assistance to others; and students report their research or accomplishments accurately.*

**Classroom Expectations** All school rules and policies apply to this class.

The expectations for classroom behavior are reflected in **BHS P.R.I.D.E.**

1. **P**rofessional - Treat school like it is your job. Show up on time and focus on your work.
2. **R**espectful - Treat others the way you want to be treated.
3. **I**ntegrity - Give an honest effort in class; you will get out of it what you put in. Be accountable for your own learning.
4. **D**etermination - Stay positive and keep trying even if it gets difficult. Do not allow the attitudes or behaviors of others distract you from your goals.
5. **E**xcellence - Do your best work. Push yourself to achieve more. Don’t settle for just getting by.
6. Cell phones, smart watches, or any other personal electronic devices are prohibited in class at any time. This is particularly important during assessments. **This is your warning.**

**Extra Help and Support**

If you need additional help, there are a variety of options for you, including:

* After school help sessions with me – by appointment.
* Bengal Bootcamp
* Free online tutoring with Brainfuse (available from the Barnegat Library website)

**Absences:**

Following school policy, when you miss school you will have **two** days for every day that you are absent to make up your work with all work due within a maximum of ten days from your return to school. These are calendar days, not according to when we have class. If you are absent, it is your responsibility to get the work and complete it in a timely manner.

**If you are absent on the day of a test/quiz, it is your responsibility to speak to Dr. Maxwell about when you are going to make it up.**

As your teacher, my goal is to work with you to achieve academic success. Please reach out if there is anything I can do for you! ;-)

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I have read and understand the syllabus for Honors Algebra 2.

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Student Signature Print Name

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Parent/Guardian Signature Print Name