Algebra II RCHS

RCAS Policies/Procedures

Students will be required to follow all RCAS policies and procedures. To view the RCAS High School Student Handbook, click handbook.

Course Description

The purpose of Algebra II is to develop and connect learning from Algebra I. Students will apply methods and extend learning in topics such as set theory; operations with rational and irrational expressions; factoring of rational expressions; linear equations and inequalities; quadratic equations; solving systems of linear and quadratic equations; graphing quadratic equations; properties of higher-degree equations ana rational exponents.

Course Learning Outcomes

- The key features of a graph – including the domain, range, and intercepts – reveal the relationship between two quantities
- A function of the form $f(x)=a\cdot f[b(x-h)]+kfx=a\cdot fbx-h+k$ is transformed by changing the values of *a, b, h, or k*
- A piecewise-defined function is used to model situations in which there are different rules for different parts of the domain of the function
- To solve an equation or inequality by graphing, set each expression equal to y and graph the two equations on the same grid. Their intersection represents the solution
- The solution of a system of linear equations or inequalities is the set of ordered pairs that satisfy all the equations or inequalities in the system. Systems of equations or inequalities can also be represented by a matrix.

- All quadratic functions are transformations of the parent function $f(x)=x2fx=x2$. The vertex form of a quadratic function highlights the key features of the function's graph and shows how the graph of the parent function can be transformed.
- A quadratic function in vertex form can be rewritten in standard form to high light different features of the function's graph. The key features are used to interpret values in context.
- The factored form of a quadratic function is used to find the zeros of the function by identifying the values that make one or both of the factors equal zero.
- A complex number contains both real and imaginary parts. The four basic operations can be applied to complex numbers.
- Many real-world problem situations can be represented with a mathematical model, but hat model might not represent the real-world situation exactly.
- A quadratic equation can be solved by completing the square to transform the equation to an equivalent equation,

$$(x-p)2=q.(x-p)2=q.$$

- The Quadratic Formula can be used to solve any quadratic equation, including those with complex solutions.
- A linear-quadratic system consists of a linear equation and a quadratic equation. The points of intersection are the solutions.

- A polynomial function is a function whose rule is either a monomial or a sum of monomials. The key features of the graph of a polynomial function – such as its end behavior, intercepts, and turning points – can be used to sketch a graph of the function.
- Just as with real numbers, the properties of operations can be used to add, subtract, and multiply polynomials. Polynomial functions can be used to represent and compare real-world situations.
- Polynomial identities and the Binomial Theorem are helpful tools for efficiently rewriting expressions and describing mathematical relationships.
- Polynomial expressions can be divided by linear factors using long division or synthetic division. The Remainder Theorem is used to determine the remainder of a division problem.
- The zeros of a polynomial function can be determined using factoring or synthetic division. The zeros of a function can b used to sketch its graph.

- Theorems such as the Rational Root Theorem, the Fundamental Theorem of Algebra, and the Conjugate Root Theorems are helpful tools for determining the roots of a polynomial function.
- Polynomial functions are categorized as even, odd, or neither. Even functions are symmetric about the y-axis, and for all x in the domain, $f(x)=f(-x)$.fx=f−x.
  Odd functions are symmetric about the origin, and for all x in the domain, $f(x)=-f(x)$.fx=−fx.

- The reciprocal function is used to model inverse variation, which is a proportional relationship between two variables such that when one variable increases, the other decreases.
- A rational function is any function
  $$R(x)=P(x)Q(x)Rx=P(x)Q(x)$$
  where
  $$P(x) \text{ and } Q(x)Px \text{ and } Q(x)$$
  are polynomial functions. The domain of a rational function is all real numbers except any x-values for which
  $$Q(x)Qx$$
  equals zero. The graph of a rational function has one or more asymptotes, which guide the end behavior of the graph.
- Rational expressions form a system similar to the system of rational numbers and can be multiplied and divided by applying the properties of operations as they apply to rational expressions.
- The properties of operations used to add and subtract rational numbers can be applied to adding and subtracting rational expressions.
- Rational equations contain a rational expression and can be solved by multiplying each side of the equation by a common denominator to eliminate the fractions. Any solution that is excluded from the domain of the original equation is extraneous.

- Rational exponents and radicals represent the number of roots a polynomial has. The roots of a polynomial are used to simplify expressions and solve equations.
- The properties of integer exponents can be applied to terms with rational exponents, as well as to radials. The properties of exponents and radicals can be used to rewrite radical expressions. When rewriting radical expressions, like radicals, which have the same index, can be added and subtracted.
- The function
  $$g(x)=ax-h-----\sqrt{n}+kgx=ax-hn+k$$
  represents the transformation of the parent radical function
  $$g(x)=x--\sqrt{n}gx=xn$$
  where a stretches or compresses the graph vertically, ha translates the graph horizontally, and k translates the graph vertically.
- Solving equation that include radicals or rational exponents is similar to solving rational equations.
- Functions can be combined by operations
  $$(+, -, \times, \div)(+, -, \times, \div)$$
  and by composition. The result of the operation or composition can be described as a single function. The domain of the result may be different from the domains of the original functions.
- The inverse of a function is found by exchanging the roles of the independent and dependent variables. Composition can be used to verify that two functions are inverses.

- The rate of exponential growth or decay is the ratio between two consecutive output values in an exponential function.
- Exponential models are useful for representing situations in which the rate increases by the same percent for each period of time and for interpreting problems that involve compound interest. Exponential regression can be used to generate exponential models for real-world contexts.
- A logarithmic function is the inverse of an exponential function. Logarithms are found by determining the exponent that must be applied to a base to yield a given result.
- The inverse relationship between exponential and logarithmic functions reveals key features of the graphs of both functions. Logarithmic functions can be used to model several real-world situations.
- Properties of Logarithms can be used to rewrite logarithmic expressions and to evaluate logarithms by changing the base.
- Some exponential equations can be solved by rewriting both sides with a common base. For others, rewriting the equation using logarithms and applying properties of logarithms, is a more efficient method.
- A geometric sequence is a sequence of numbers in which terms are related to the previous term by a common ration, r. A geometric series is the sum of a certain number of terms in a geometric sequence.

Classroom Expectations

It is the expectation that all students will be present and participating in the classroom discussion as well as complete assignments in class every day. On days when the students are not present, they will be responsible to find out what work was missed and complete it if possible. All efforts will be made to have the course content online, either through Canvas or Savvas (accessed through clever.com). Missing work will need to be on their own time outside of the regular class time.

Grading

Grades will be compromised of three categories, Assignments (25%), Quizzes (25%), and Tests (50%). All graded material will be done on paper and handed in to receive a grade. Quizzes and Tests must be completed in my classroom, unless prior arrangements have been made. Students may use 2nd period (Advisory), before school, or after school to finish any quizzes or tests not completed in class.

The grading scale we will be using is the one approved by the school board: A 100% - 90%, B 89% - 80%, C 79% - 70%, D 69% - 60%, F below 60%.

Textbook

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Reading

There may be content related articles found and implemented. These will be available for student/parent viewing through Canvas or upon parent/student request for a paper copy.

Optional Reading

There will be optional (ungraded) work found online in Canvas (or Savvas) that is there to help struggling students.

Instructional Resources

In addition to the textbook mentioned above, the students will have access to online content from the publisher as well that can be found in the Canvas course or on Savvas through clever.com.