

Information for Course Syllabus

Name of Course: Algebra 2 Trig Advanced

Grade Level: 10-11

School: ORHS

Major Assignments: None

Field Trips: None

How can parents access instructional materials? Canvas

Algebra 2 Trig Advanced

2021-2022

Term 1

Sequences and Functions

A2.F.IF.A.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.

A2.F.IF.A.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.

A2.F.BF.B.3 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.

A2.F.BF.A.1 Write a function that describes a relationship between two quantities.
a. Determine an explicit expression, a recursive process, or steps for calculation from a context.

A2.F.BF.A.2 Write arithmetic and geometric sequences with an explicit formula and use them to model situations.

A2.F.LE.A.1 Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a table, a description of a relationship, or input-output pairs.

A2.F.LE.B.3 Interpret the parameters in a linear or exponential function in terms of a constant.

A2.F.IF.B.3 Graph functions expressed symbolically and show key features of the graph, by hand and using technology.
c. Graph exponential and logarithmic functions, showing intercepts and end behavior.

Algebra 2 Trig Advanced

2021-2022

Term 1

Polynomials and Rational Functions

A2.A.APR.A.1 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 $p(x)$.

A2.A.APR.A.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.

A2.A.APR.B.3 Know and use polynomial identities to describe numerical relationships.

A2.A.SSE.A.1 Use the structure of an expression to identify ways to rewrite it.

A2.F.IF.B.3 Graph functions expressed symbolically and show key features of the graph, by hand and using technology.

b. Graph polynomial functions, identifying zeros when suitable factorizations are available and showing end behavior.

A2.F.BF.B.3 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.

A2.A.REI.A.2 Solve rational and radical equations in one variable, and identify extraneous solutions when they exist.

A2.F.BF.A.1 Write a function that describes a relationship between two quantities.

b. Combine standard function types using arithmetic operations.

A2.A.CED.A.1 Create equations and inequalities in one variable and use them to solve problems.

A2.A.APR.C.4 Rewrite rational expressions in different forms.

A2.N.Q.A.1 Identify, interpret, and justify appropriate quantities for the purpose of descriptive modeling.

Algebra 2 Trig Advanced

2021-2022

Term 1

Complex Numbers and Rational Exponents

A2.N.CN.A.1 Know there is a complex number i such that $i^2 = -1$, and every complex number has the form $a + bi$ with a and b real.

A2.N.CN.A.2 Know and use the relation $i^2 = -1$ and the commutative, associative, and distributive properties to add, subtract, and multiply complex numbers.

A2.N.CN.B.3 Solve quadratic equations with real coefficients that have complex solutions.

A2.A.REI.B.3 Solve quadratic equations and inequalities in one variable.

- a. Solve quadratic equations by inspection (e.g., for $x^2 = 49$), taking square roots, completing the square, knowing and applying 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 $a \pm bi$ for real numbers a and b .

A2.N.RN.A.1 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.

A2.N.RN.A.2 Rewrite expressions involving radicals and rational exponents using the properties of exponents.

Algebra 2 Trig Advanced

2021-2022

Term 1

Exponential Functions and Equations

A2.F.IF.B.3 Graph functions expressed symbolically and show key features of the graph, by hand and using technology.

c. Graph exponential and logarithmic functions, showing intercepts and end behavior.

A2.F.IF.B.4 Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.

A2.F.IF.B.5 Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).

A2.F.LE.A.2 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.

A2.F.LE.B.3 Interpret the parameters in a linear or exponential function in terms of a constant.

A2.N.Q.A.1 Identify, interpret, and justify appropriate quantities for the purpose of descriptive modeling.

A2.A.CED.A.2 Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations.

A2.A.SSE.B.2 Use the properties of exponents to rewrite expressions for exponential functions.

A2.A.REI.A.1 Explain each step in solving an 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.

A2.A.REI.A.2 Solve rational and radical equations in one variable, and identify extraneous solutions when they exist.

A2.A.REI.B.3 Solve quadratic equations and inequalities in one variable.

a. Solve quadratic equations by inspection (e.g., for $x^2 = 49$), taking square roots, completing the square, knowing and applying 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 $a \pm bi$ for real numbers a and b .

Algebra 2 Trig Advanced

2021-2022

Term 2

Exponential Functions and Equations cont.	A2.A.REI.C.4 Write and solve a system of linear equations in context.
	A2.A.REI.C.5 Solve a system consisting of a linear equation and a quadratic equation in two variables algebraically and graphically.
	A2.A.REI.D.6 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 approximate solutions using technology.
	A2.A.CED.A.2 Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations.
	A2.A.CED.A.1 Create equations and inequalities in one variable and use them to solve problems.

Transformations of Functions	A2.F.BF.A.1 Write a function that describes a relationship between two quantities. b. Combine standard function types using arithmetic operations.
	A2.A.SSE.A.1 Use the structure of an expression to identify ways to rewrite it.
	A2.A.SSE.B.2 Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. a. Use the properties of exponents to rewrite expressions for exponential functions.
	A2.F.IF.A.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.
	A2.F.IF.B.3 Graph functions expressed symbolically and show key features of the graph, by hand and using technology. b. Graph polynomial functions, identifying zeros when suitable factorizations are available and showing end behavior.
	A2.F.LE.A.1 Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a table, a description of a relationship, or input-output pairs.
	A2.F.BF.B.4 Find inverse functions. a. Find the inverse of a function when the given function is one-to-one.

Algebra 2 Trig Advanced

2021-2022

Term 2

Trigonometric Functions	<p>A2.F.TF.A.1 Understand and use radian measure of an angle.</p> <p>a. Understand radian measure of an angle as the length of the arc on the unit circle subtended by the angle.</p> <p>b. Use the unit circle to find $\sin \theta$, $\cos \theta$, and $\tan \theta$ when θ is a commonly recognized angle between 0 and 2π.</p>
	<p>A2.F.TF.A.2 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.</p>
	<p>A2.F.TF.B.3 Know and use trigonometric identities to find values of trig functions.</p> <p>a. Given a point on a circle centered at the origin, recognize and use the right triangle ratio definitions of $\sin \theta$, $\cos \theta$, and $\tan \theta$ to evaluate the trigonometric functions.</p> <p>b. Given the quadrant of the angle, use the identity $\sin^2 \theta + \cos^2 \theta = 1$ to find $\sin \theta$ given $\cos \theta$, or vice versa.</p>

Statistical Inference	<p>A2.S.ID.A.1 Use the mean and standard deviation of a data set to fit it to a normal distribution and to estimate population percentages using the Empirical Rule.</p>
	<p>A2.S.ID.B.2 Represent data on two quantitative variables on a scatter plot, and describe how the variables are related.</p> <p>a. Fit a function to the data; use functions fitted to data to solve problems in the context of the data.</p>
	<p>A2.S.IC.A.1 Recognize the purposes of and differences among sample surveys, experiments, and observational studies; explain how randomization relates to each.</p>
	<p>A2.S.IC.A.2 Use data from a sample survey to estimate a population mean or proportion; use a given margin of error to solve a problem in context.</p>
	<p>A2.S.CP.A.1 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”).</p>

Algebra 2 Trig Advanced

2021-2022

Term 2

Statistical Inference cont.	A2.S.CP.A.2 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.
	A2.S.CP.A.3 Know and understand the conditional probability of A given B as $P(A \text{ and } B)/P(B)$, 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 .
	A2.S.CP.A.4 Recognize and explain the concepts of conditional probability and independence in everyday language and everyday situations.
	A2.S.CP.B.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.
	A2.S.CP.B.6 Know and apply the Addition Rule, $P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$, and interpret the answer in terms of the model.