# Information for Course Syllabus

Name of Course: Algebra 2 Trig Honors

Grade Level: 9-11

School: ORHS

Major Assignments: Unit Exams

Field Trips: None

How can parents access instructional materials? Canvas

# Algebra 2 Trig Honors
# 2021-2022

## Term 1

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| **Equations and Inequalities with Modeling** | **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.<br>**a**. Solve quadratic equations by inspection (e.g., for x2 = 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* ± *bi* for real numbers *a* and *b*. |
| | **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. |

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| **Equations and Inequalities with Modeling** | **A2.N.CN.B.6** Extend polynomial identities to the complex numbers. For example, rewrite x2 + 4 as (x + 2i)(x – 2i). |
| | **A2.A.REI.B.3** Solve quadratic equations and inequalities in one variable. |
| | **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.1** Create equations and inequalities in one variable and use them to solve problems. |
| | **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.BF.A.1** Write a function that describes a relationship between two quantities.<br>**b.** Combine standard function types using arithmetic operations. |

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| **Functions and their Graphs** | **A2.F.BF.A.1** Write a function that describes a relationship between two quantities.<br>**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.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.B.4** Find inverse functions.<br>**a**. Find the inverse of a function when the given function is one-to-one. |
| | **A2.F.IF.B.3** Graph functions expressed symbolically and show key features of the graph, by hand and using technology.<br>**a**. Graph square root, cube root, and piecewise defined functions, including step functions |

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| **Polynomial 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.<br>**b.** Graph polynomial functions, identifying zeros when suitable factorizations are available and showing end behavior. |

# Algebra 2 Trig Honors
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## Term 2

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| **Rational Functions** | **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. |
| | **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.<br>**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. |
| | **P.F.IF.A.7** Graph rational functions, identifying zeros, asymptotes (including slant), and holes (when suitable factorizations are available) and showing end-behavior. |

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| **Exponential and Logarithmic Functions** | **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.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.IF.B.3** Graph functions expressed symbolically and show key features of the graph, by hand and using technology.<br>**c.** Graph exponential and logarithmic functions, showing intercepts and end behavior. |
| | **A2.F.LE.A.2** For exponential models, express as a logarithm the solution to $abct = d$ 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 context. |

# Algebra 2 Trig Honors
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## Term 2

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| **Trigonometric Functions** | **A2.F.TF.A.1** Understand and use radian measure of an angle.<br>**a.** Understand radian measure of an angle as the length of the arc on the unit circle subtended by the angle.<br>**b.** Use the unit circle to find *sin* θ, *cos* θ, and *tan* θ when θ is a commonly recognized angle between 0 and 2π. |
| | **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. |
| | **A2.F.TF.B.3** Know and use trigonometric identities to find values of trig functions.<br>**a.** Given a point on a circle centered at the origin, recognize and use the right triangle ratio definitions of *sin* θ, *cos* θ, and *tan* θ to evaluate the trigonometric functions.<br>**b.** Given the quadrant of the angle, use the identity *sin2* θ + *cos2* θ = 1 to find *sin* θ given *cos* θ, or vice versa. |

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| **Analytic Trigonometry** | **P.G.AT.A.1** Use the definitions of the six trigonometric ratios as ratios of sides in a right triangle to solve problems about lengths of sides and measures of angles. |
| | **P.G.AT.A.2** Derive the formula A = 1/2 ab sin(C) for the area of a triangle by drawing an auxiliary line from a vertex perpendicular to the opposite side |
| | **P.G.AT.A.3** Derive and apply the formulas for the area of sector of a circle. |
| | **P.G.AT.A.4** Calculate the arc length of a circle subtended by a central angle. |
| | **P.G.AT.A.5** Prove the Laws of Sines and Cosines and use them to solve problems. |
| | **P.G.AT.A.6** Understand and apply the Law of Sines (including the ambiguous case) and the Law of Cosines to find unknown measurements in right and non-right triangles |
| | **P.G.TI.A.1** Apply trigonometric identities to verify identities and solve equations. Identities include: Pythagorean, reciprocal, quotient, sum/difference, double-angle, and half-angle. |
| | **P.F.GT.A.3** Graph the six trigonometric functions and identify characteristics such as period, amplitude, phase shift, and asymptotes. |
| | **P.F.GT.A.4** Find values of inverse trigonometric expressions (including A. Model periodic compositions), applying appropriate domain and range restrictions. |

**End Of Course Review**