

## Learning Standards and Targets for Honors Algebra II

1. The student will solve equations and inequalities in one variable algebraically or graphically.

I (the student) will be able to:

- identify the symbols of set notation.
- apply the symbols of set notation.
- factor by grouping.
- factor using substitution within prior methods.
- factor sum and difference of 2 cubes.
- solve a literal equation.
- solve real-life applications of linear equations.
- solve and graph compound inequalities.
- solve and graph absolute value equations.
- solve and graph absolute value inequalities.
- solve a quadratic equation by completing the square.
- solve a quadratic equation using the quadratic formula.
- solve real-life applications of quadratic equations.
- determine the nature of the roots by evaluating the discriminant.
- write a quadratic equation from the given roots.
- solve equations that are in quadratic form.
- graph a parabola from a quadratic equation.
- graph a quadratic inequality.

2. The student will analyze equations, inequalities and graphs involving two variables.

I (the student) will be able to:

- write equations of lines from given information.
- solve real-life applications of equations with 2 variables.
- graph absolute value equations.
- graph absolute value inequalities.
- identify the domain and range of a given relation.
- determine whether a relation is a function.
- evaluate a composition of functions.
- simplify expressions involving multiple functions.
- determine whether a relationship is a direct, inverse, or joint variation.
- find the missing value in a direct, inverse, or joint variation.
- solve real-life applications of direct, inverse, or joint variation.

3. The student will solve systems of equations and inequalities in two variables algebraically or graphically.

I (the student) will be able to:

- determine the number of solutions in a  $2 \times 2$  system from the graph.
- solve a  $3 \times 3$  system algebraically.
- evaluate  $2 \times 2$  determinants.
- evaluate  $3 \times 3$  determinants by diagonals and minors.
- solve systems of equations using Cramer's Rule.
- solve real-life applications of systems of equations.
- graph systems of inequalities
- solve a system of non-linear equations graphically.
- solve a system of non-linear equations algebraically.
- solve a system of non-linear inequalities graphically.

4. The student will solve rational equations and graph rational functions.

I (the student) will be able to:

- reduce rational expressions to lowest terms.
- multiply rational expressions.
- divide rational expressions.
- simplify complex rational expressions.
- add/subtract rational expressions.
- use long division to simplify a rational expression.
- use synthetic division to simplify a rational expression.
- solve equations containing rational expressions.
- graph a rational equation using  $x$ - and  $y$ -intercepts and vertical and horizontal asymptotes.
- determine the domain and range of a rational equation.
- solve real-life applications of rational equations.

5. The student will simplify expressions involving rational exponents and radicals.

I (the student) will be able to:

- simplify a radical expression.
- convert between radical and rational exponent notation.
- simplify numerical and variable expressions involving radicals and rational exponents.
- rationalize a denominator containing a radical or a rational power.
- rationalize a denominator using a conjugate.
- solve equations containing radicals and rational powers.
- write any number in complex form.
- simplify a radical expression involving a negative radicand.
- simplify expressions involving complex numbers.
- identify the conjugate of a complex number.

6. The student will solve exponential and logarithmic equations algebraically and graphically.

I (the student) will be able to:

- simplify expressions involving bases with variable powers.
- graph an exponential function.
- evaluate expressions with variable powers.
- find the inverse of a given relation or function.
- write an exponential expressions as a logarithmic expression.
- simplify logarithmic expressions using the Inverse Property, Product Property, Quotient Property and Power Property..
- solve logarithmic equations.
- evaluate expressions involving common logarithms and natural logarithms.
- rewrite logarithmic expressions by changing bases.
- solve exponential equations.
- solve real-life applications of exponential and logarithmic equations.

7. The student will analyze sequences and series.

I (the student) will be able to:

- find the next term from a pattern of numbers.
- identify whether a sequence is arithmetic, geometric or neither.
- find the list of terms in a sequence from an explicit or recursive formula.
- write the terms of an expression using sigma notation.
- determine the value of an expression involving sigma notation.
- find the sum of an arithmetic series.

8. The student will analyze equations and graphs of conic sections.

I (the student) will be able to:

- identify the center and radius of a circle from a given equation.
- write the equation of a circle from given information.
- identify the vertex, axis of symmetry, focus, directrix and length of the latus rectum of a parabola from a given equation.
- write the equation of a parabola from given information.
- identify the center, vertices, endpoints, foci, and lengths of the major and minor axes of an ellipse from a given equation.
- write the equation of an ellipse from given information.
- identify the center, vertices, foci, lengths of transverse and conjugate axes and equations of asymptotes of a hyperbola from a given equation.
- write the equation of a hyperbola from given information.
- identify whether an equation in general form represents a circle, parabola, ellipse or hyperbola.
- convert an equation in general form into standard form by completing the square.

9. The student will understand the relationships between the six basic trigonometric functions.

I (the student) will be able to:

- convert between degrees and radians.
- draw an angle in standard position.
- determine the sine, cosine, tangent, cosecant, secant, and cotangent of a given angle.
- find an angle that corresponds to a given trigonometric function value.
- simplify expressions with trigonometric values.
- find the remaining trigonometric functions when given one of the functions.
- evaluate expressions involving inverse trigonometric functions
- use the reciprocal, quotient, and Pythagorean identities to find the remaining trigonometric functions when given one of the functions.
- complete a trigonometric proof (verify an identity) using the basic identities.
- simplify expressions using the basic trigonometric identities.
- use a sum or difference identity, double angle identity, or half angle identity to evaluate a trigonometric expression.
- solve a trigonometric equation.

10. The student will analyze the graphs of the six trigonometric functions.

I (the student) will be able to:

- draw a basic graph of each of the six trigonometric functions.
- identify amplitude, period, phase shift and vertical shift for a trigonometric equation.
- graph a trigonometric equation involving a change in amplitude, period, phase shift and/or vertical shift.
- write the equation of a trigonometric function given its graph.

11. The student will solve triangles for all missing parts.

I (the student) will be able to:

- solve right triangles for missing parts from given information.
- solve acute and obtuse triangles for missing parts from given information using the Law of Sines and Law of Cosines.
- solve real-life applications that involve finding missing parts of triangles.