Algebra 2 Year-Long *(Master)*

September 2020

Content	Skills	Learning Targets	Assessment	Standards Reference	Resources & Technology
CEQs: ● WHAT RELATIONSHIPS EXIST BETWEEN VARIOUS FUNCTIONS, THEIR GRAPHS, AND THEIR SOLUTION(S)? ● HOW DO WE SIMPLIFY &/or SOLVE VARIOUS FUNCTIONS? ● HOW WOULD THE KNOWLEDGE OF PROBABILITY BE OF BENEFIT IN YOUR LIFE? ● WHAT ARE THE TRIGONOMETRIC				<u>Chapter 1/Chapter 2</u> MN State Standard 9.3.4.6 MN State Standard 9.2.1.1-9.2.1.5 MN State Standard 9.2.1.8 MN State Standard 9.2.1.9 MN State Standard 9.2.2.1 MN State Standard 9.2.2.3	

FUNCTIONS AND HOW ARE THEY USED? ● HOW CAN TECHNOLOGY (like a graphing calculator) HELP TO SOLVE AND COMPARE FUNCTIONS?				MN State Standard 9.2.2.6 MN State Standard 9.2.3.1 MN State Standard 9.2.3.7 MN State Standard 9.2.4.4 MN State Standard 9.2.4.5 MN State Standard 9.2.4.6 MN State Standard 9.3.3.1 MN State Standard 9.3.4.4

				MN State Standard 9.3.4.6 Chapter 4 MN State Standard 9.2.1.3-9.2.1.6 MN State Standard 9.2.1.9 MN State Standard 9.2.2.1 MN State Standard 9.2.2.3 MN State Standard 9.2.2.6 MN State Standard 9.2.3.1 MN State Standard 9.2.3.3

				MN State Standard 9.2.3.5 MN State Standard 9.2.3.6 MN State Standard 9.2.4.1 MN State Standard 9.2.4.3 MN State Standard 9.2.4.8 MN State Standard 9.3.4.6 Chapter 5 MN State Standard 9.2.1.3 MN State Standard 9.2.1.4

				MN State Standard 9.2.1.6 MN State Standard 9.2.2.3 MN State Standard 9.2.2.6 MN State Standard 9.2.3.1 MN State Standard 9.2.3.2 MN State Standard 9.2.3.3 MN State Standard 9.2.3.5 MN State Standard 9.2.4.1

				MN State Standard 9.4.1.3 MN State Standard 9.4.2.2 Probability MN State Standard 9.4.3.1-9.4.3.8 MN State Standard 9.4.1.1 MN State Standard 9.4.1.2 MN State Standard 9.4.1.4 MN State Standard 9.4.3.2-9.4.3.9 Chapter 6 MN State Standard 9.2.1.3-9.2.1.4

				MN State Standard 9.2.1.9 MN State Standard 9.2.2.6 MN State Standard 9.2.3.1 MN State Standard 9.2.3.6 MN State Standard 9.2.3.7 MN State Standard 9.2.4.7 MN State Standard 9.3.4.6 Chapter 7 MN State Standard 9.2.1.3

				MN State Standard 9.2.1.4 MN State Standard 9.2.1.7-9.2.1.9 MN State Standard 9.2.2.2 MN State Standard 9.2.2.3 MN State Standard 9.2.4.2 MN State Standard 9.3.4.6 Chapter 8 MN State Standard 9.2.1.3 MN State Standard 9.2.3.3

				MN State Standard 9.2.3.4 MN State Standard 9.2.3.7 MN State Standard 9.2.1.7 MN State Standard 9.2.2.6 <u>Trigonometry</u> MN State Standard 9.3.3.4 MN State Standard 9.3.3.5 MN State Standard 9.3.4.1-9.3.4.3 MN State Standard 9.3.4.5

September 2020

Content	Skills	Learning Targets	Assessment	Resources & Technology
	AA* Review. Equations and Inequalities** ***AA1. Solve linear equations and solve problems by writing equations ***AA2.*** Solve and graph linear inequalities. Write and solve compound inequalities. ***AA3. Write and solve equations and inequalities involving absolute value.*** AA4. Solve linear systems by graphing, substitution, and elimination. 9.3.4.6***A. Functions, Relations, and Graphs Graph relations. Write and identify functions.*** ***A1.*** Relations and functions ***A2.*** Graph linear equations. Write equations of lines. ***A3.*** Absolute value functions and graphs Graph absolute value functions	**LT1:** I can solve linear equations. **LT2:** I can solve problems by writing equations. **LT3:** I can solve linear inequalities. **LT4:** I can graph linear inequalities. **LT5:** I can write and solve compound inequalities. **LT6:** I can write and solve equations using absolute value. **LT7:** I can write and solve inequalities using absolute value. **LT8:** I can solve linear systems by graphing, substitution, and elimination. **LT1:** I can determine if a relation of function. **LT2:** I can determine the domain and range of a	**CA=Chapter 1 Test AA1-AA3** **Quiz 2.1, 2.3, 2.4, and Piecewise** **CA=Chapter 2 Test A1-A5**	

	A4. Families of functions Analyze translations ***A5.*** Two variable inequalities Graph linear inequalities and absolute value inequalities. **A6.** Use the four basic operations to combine functions and composite functions. 9.2.1.1-9.2.1.5 9.2.1.8 9.2.1.9 9.2.2.1 9.2.2.3 9.2.2.6 9.2.3.1 9.2.3.7 9.2.4.4 9.2.4.5 9.2.4.6 9.3.3.1 9.3.4.4 9.3.4.6	function or a relation. **LT3:** I can graph linear equations by using slope-intercept form or using the intercepts. **LT 4-5 do not apply to Year-long** **LT6:** I can write an equation of a line given two point in slope-intercept form, point-slope form, and standard form. **LT7:** I can use perpendicular and parallel lines to find equations of lines. **LT8:** I can convert between all forms of a line (slope-intercept form, point-slope form, and standard form.) **LT9:** I can evaluate and simplify using function notation. **LT10:** I can graph absolute value functions.		

		LT11: I can identify the vertex of an absolute value function. **LT12:** I can translate an absolute value function and describe the translation in words. **LT13:** I can graph linear and absolute value inequalities. **LT14:** I can use the four basic operations to combine functions and composite functions.		

October 2020

Content	Skills	Learning Targets	Assessment	Resources & Technology
UEQ: Chapter 4 Quadratics Functions and Equations (4.1, 4.2, 4.4-4.8) ● *What does the graph of a quadratic function look like?*	**B. Graphing a quadratic function** **B1.** Sketch quadratic functions and identify maximum and minimum values **B2.** Distinguish transformations of stretching, shrinking or reflections **B3.** Interpret and use the vertex form **Solving a quadratic function**	**LT1:** I can graph a quadratic function from standard form. **LT2:** I can graph a quadratic function from vertex form. **LT3:** I can solve a quadratic equation using	**Quiz on 4.1, 4.2 and 4.4** **CA= Chapter 4 Test**	graphing calculator PHSchool.com PH teacher resources for Alg 2

• *How do transformations change the parabola and its function forms?* • *Which method is best to solve various quadratic functions?* • *What is a complex number & how does it relate to the graph of a quadratic?* ***B.*** **Graphing a quadratic function** B1. Graphing quadratic functions and finding maximum and minimum values B2. Transformations of stretching, shrinking or reflections B3. Vertex form **Solving a quadratic function** B4. Greatest common factor(s), binomial factors, or factoring special quadratic expression(s) B5. Solving quadratics	**B4.** Find greatest common factor(s), binomial factors, or factor special quadratic expression(s) **B5.** Solve quadratics by finding the square roots or graphing **B6.** Identify, graph, add, subtract and multiply complex numbers **B8.** Apply the quadratic formula to solve solve and determine the type(s) of solution(s) by using the discriminant  9.2.1.3-9.2.1.6 9.2.1.9 9.2.2.1 9.2.2.3 9.2.2.6 9.2.3.1 9.2.3.3 9.2.3.5 9.2.3.6 9.2.4.1 9.2.4.3 9.2.4.8 9.3.4.6	square roots. **LT4:** I can solve a quadratic equation by factoring. **LT5:** I can solve a quadratic equation using the quadratic formula. **LT6:** I can solve a quadratic equation by graphing. **LT7:** I can describe transformation of a graph using the terms vertical stretch/shrink, reflect, translate. **LT8:** I can add, subtract, multiply, divide, and simplify using complex numbers. **LT9:** I can solve and interpret quadratic equations with complex solutions. **LT10:** I can identify the discriminant and use it to determine the number and types of solutions.		

with square roots or graphing B6. Complex numbers B8. Quadratic formula		**LT11:** I can use and find the vertex and intercepts in real-life application problems. **LT12:** I can write an equation in vertex form, given the vertex and an additional point. **LT13:** I can switch from standard form to vertex form and vice versa.		

November 2020

Content	Skills	Learning Targets	Assessment	Resources & Technology
UEQ: Chapter 5 Polynomials and Polynomial Functions *(5.1-5.6, 5.8)* • *What does the degree of a polynomial tell us about the shape of its graph and the number of zeros of the related polynomial function?*	**C. Polynomial Functions** **C1.** Classify polynomials by degree and by number of terms. **C1.** Use a graphing calculator to model data using LinReg, QuadReg, CubicReg options and determine the best-fitting model. **C1, C2, C3.** Simplify polynomials using addition, subtraction, multiplication, polynomial long-division and synthetic division.	**LT1:** I can classify polynomials by degree and number of terms. **LT2:** I can use a graphing calculator to model data using LinReg, QuadReg, CubicReg **LT3:** I can use the correlation coefficient (r-value) to determine the best-fitting model. **LT4:** I can differentiate between interpolation and extrapolation.	**Quiz 5.1-5.3** **CA = Chapter 5 Test C1-C5**	

• *What are standard form and factored form of a polynomial function and how do we go from one form to the other?* • *How do we find the solutions or zeros for different types of polynomial functions?* **C. Polynomial Functions** C1. Polynomial Functions C2. Polynomial and Linear Factors C3. Dividing Polynomials C4. Solving Polynomial Equations	**C2, C4, C5.** Factor polynomials of higher degree using the GCF, pattern for quadratic expressions, difference of squares, sum/difference of cubes and synthetic division. **C2.** Write a polynomial function from its zeros and find the relative minimum and relative maximum of a polynomial function. **C2, C4, C5.** Solve polynomial equations by graphing, factoring and the quadratic formula. 9.2.1.3 9.2.1.4 9.2.1.6 9.2.2.3 9.2.2.6 9.2.3.1 9.2.3.2 9.2.3.3 9.2.3.5 9.2.4.1 9.4.1.3 9.4.2.2	**LT5:** I can simplify polynomials by adding, subtracting, multiplying, and dividing. **LT6:** I can divide polynomials using long division. **LT7:** I can divide polynomials using synthetic division. **LT8:** I can factor polynomials of higher degree using the GCF, quadratic pattern, difference of perfect square, sum/difference of cubes, and synthetic division. **LT9:** I can write a polynomial function from its zeros. **LT10:** I can find and state the multiplicity of zeros of a polynomial. **LT11:** I can graph a polynomial and find the relative maximum and		

		minimum and use them in real-life problems. **LT12:** I can determine a realistic domain of a function. **LT13:** Not covered in Year-long **LT14:** I can solve polynomial equations by graphing, factoring, and using the quadratic formula.		

December 2020

Content	Skills	Learning Targets	Assessment	Resources & Technology
UEQ: Introduction to Probability (11.1-11.3) • *How do we find experimental and theoretical probabilities?* • *How do we count permutations and combinations?*	**H. Introduction to Probability** **H1. Probability** **H2. Permutations and combinations** **H3. Probability of multiple events** 9.4.3.1-9.4.3.8	**LT1:** I can find the probability of a single event. **LT2:** I can find the probability of a geometric scenario. **LT3:** I can create a simulation of a real-life event and use it to collect data probabilities. **LT4:** I can identify and calculate permutations,	**CA = Introduction to Probability Test H1-H3** **End of First Trimester Final Exam**	

• *How do we find the probability of multiple events?* ***H. Introduction to Probability*** *H1. Probability* *H2. Permutations and combinations* *H3. Probability of multiple events*		combination, and the multiplication counting principle. **LT5:** I can determine if events are independent or dependent and use these concepts to determine probabilities of compound events. **LT6:** I can determine if an event is overlapping or mutually exclusive and use these concepts to determine probabilities of an event.		

January 2021

Content	Skills	Learning Targets	Assessment	Resources & Technology
UEQ: Chapter 6 Radical Functions and Rational Exponents 6.1-6.5, 6.8) • *How do we simplify radical and rational exponent expressions?* • *How do we solve equations involving*	**Simplifying &/or solving radical functions** **F1.** Find all real roots and simplifying basic radical expressions **F2 - F3.** Simplifying radical expressions by adding, subtracting, multiplying (include binomial expressions and conjugates), and dividing (include rationalizing the denominator). **F4.** Apply rules to simplify expressions and numbers with rational exponents and	**LT1:** I can graph square root functions and their transformations and compare their translations without using a calculator. **LT2:** I can graph cube root functions and their transformations and compare their translations without using a calculator. **LT3:** I can determine the	**Quiz on 6.1-6.3** **Quiz on 6.4 and 6.5 (No calculator)** **CA = Chapter 6 Test**	graphing calculator PHSchool.com PH teacher resources for Alg 2

radicals and rational exponents? • *What do the graphs of a square root and cube functions look like?* • *How do transformations change the radical function graphs & their equations?* **F. Simplifying &/or solving radical functions** **F1**. Simplify & find n^{th} roots of radical expressions **F2.** Multiply & divide radical expressions; including binomial radical expressions **F3.** Add & subtract radical expressions **F4.** Simplify expressions with rational exponents **F5.** Solving square root and other radical equations **F6.** Graphing square root and cube root functions	convert to & from radical form. **F5.** Solve equations with square root and other radicals (like rational exponents) and check for extraneous solutions. **F6.** Sketch graphs of square and cube root functions. Compare how they translate vertically and horizontally with changes in the equation. 9.2.1.3-9.2.1.4 9.2.1.9 9.2.2.6 9.2.3.1 9.2.3.6 9.2.3.7 9.2.4.7 9.3.4.6	domain and range of square root and cube root functions. **LT4:** I can simplify radical expression using addition, subtraction, multiplication and division. **LT5:** I can put radical expressions in simplest radical form, as well as use absolute value for variables when needed. **LT6:** I can rationalize denominators. **LT7:** I can switch between radical and exponent form. **LT8:** I can solve equations with square root and other radicals and check for extraneous solutions. **LT9:** I can solve equations with square root and other radicals and check for extraneous solutions in real life applications.		

Content	Skills	Learning Targets	Assessment	Resources & Technology
UEQ: Chapter 8 Exponential Functions (7.1 and 7.2) ● *How do we model exponential growth and decay?* ● *How do the constants in an exponential function translate its graph?* ***D. Exponential and Logarithmic Functions*** *D1. Exploring exponential models* *D2. Properties of exponential functions*	**D. Exponential Functions** **D1. Exploring exponential models** **Model exponential growth, model exponential decay, fit exponential curves to data with a graphing calculator and find the exponential function.** **D2. Properties of exponential functions** **Identify the role of constants in exponential functions, translate exponential functions and use *e* as a base in exponential functions.** **9.2.1.3** **9.2.1.4** **9.2.1.7-9.2.1.9** **9.2.2.2** **9.2.2.3**	**LT1:** I can graph a parent exponential function and its translations. **LT2:** I can determine the domain, range, y-intercept, and asymptotes of exponential functions. **LT3:** I can determine if an exponential function is growth or decay. **LT4:** I can use data to write an exponential function. **LT5:** I can apply growth and decay models to real-life situations. **LT6:** I can use the $A=Pe^{rt}$ formula. **LT7:** I can apply the half-life formula.	**CA = Chapter 7 quiz**	

	9.2.4.2 **9.3.4.6**			

March 2021

Content	Skills	Learning Targets	Assessment	Resources & Technology
UEQ: Chapter 8 Rational Functions (8.4-8.6) ● *How do we simplify, add, subtract, multiply and divide rational expressions?* ● *How do we solve rational expressions?* ● *How are rational expressions used in problem solving?* ***G. Rational Functions*** *G1. Rational Expressions* *G2. Adding and Subtracting Rational Expressions* *G3. Solving Rational Equations*	**G. Rational Functions** **G1.** Simplify rational expressions by factoring. Multiply and divide rational expressions **G2.** Add and subtract rational expressions and simplify complex fractions. **G3.** Solve rational equations by multiplying by the LCD and by cross multiplying. Identify extraneous solutions. 9.2.1.3 9.2.3.3 9.2.3.4 9.2.3.7 9.2.1.7 9.2.2.6	**LT1:** I can simplify, add, subtract, multiply and divide rational expression by factoring. **LT2:** I can add, subtract, and simplify complex fractions. **LT3:** I can solve rational equations by multiplying by the LCD. **LT4:** I can solve rational equations by using cross multiplication. **LT5:** I can identify extraneous solutions. **LT6:** I can set up and solve rational equations of rate problems.	**Quiz 8.4-8.5** **CA = Chapter 8 Test**	

April 2021

Content	Skills	Learning Targets	Assessment	Resources & Technology
UEQ: Probability Unit *(11.4, 5.7, 11.8, 11.9)* • *In what ways can a data set be represented?* • *How do we calculate conditional probabilities from formulas & other strategies?* • *When can we use a binomial distribution, normal distribution or standard normal curve to find the probability?* • *How do we use Pascal's Triangle and the Binomial Theorem?* **I1.** Make frequency tables and bar graphs for probability distributions of	**Representing and solving probability problems** **I1.** Draw frequency tables and bar graphs for experimental data sets **I2.** Calculate probability from the formula P(B **I** A) = P(A and B) / P(A) and tree diagrams. **Creating & using distribution graphs** **I3.** Find binomial probabilities, use binomial distributions (include pascal's triangle) and design a binomial experiment **I4.** Use a normal distribution and normal curve to calculate probability & areas under the curve **I5.** Pascal's Triangle and the Binomial Theorem **I6.** Create box and whisker plots by hand and using a graphing calculator	**LT1:** I can calculate basic probabilities. **LT2:** I can create frequency tables and bar graphs from data. **LT3:** I can calculate conditional probabilities and use the notation P(BIA). **LT4:** I can calculate compound probabilities. **LT5:** I can create and use a tree diagram for probabilities. **LT6:** I can design and conduct a simulation to determine probabilities. **LT7:** I can calculate a binomial probability using the binomial theorem. **LT8:** I can draw and label a normal distribution	**Quiz on probability distribution and 11.4** **CA= Probability Test**	graphing calculator PHSchool.com PH teacher resources for Alg 2

an simulation or experimental probability problem **I2.** Find conditional probability by using formulas and tree diagrams **I3.** Find the binomial distributions and probabilities of various problems and a conducted experiment **I4.** Use normal distributions and the standard normal curve to calculate probabilities **I5.** Binomial Theorem **I6**. Box and whisker plots	 9.4.1.1 9.4.1.2 9.4.1.4 9.4.3.2-9.4.3.9	curve. **LT9:** I can use a normal distribution to calculate standard deviations and percentages of data in the intervals. **LT10:** I can create and use a box and whisker plot by hand and using the graphing calculator. **LT11:** I can calculate the mean, median, mode of data. **LT12:** I can expand binomials using Pascal's Triangle and the binomial theorem.		

May 2021

Content	Skills	Learning Targets	Assessment	Resources & Technology
UEQ: Trigonometry (p.827, 13.2-13.3 14.2-14.5) ● *What are the strategies for solving triangles?*	**J1.** Use patterns of special right triangles to find side lengths in 30-60-90 and 45-45-90 triangles. **J2.** Measure and sketch angles and coterminal angles in standard position	**LT1:** I can find lengths of sides of right triangles using the Pythagorean Theorem. **LT2:** I can find lengths of sides of right triangles using the 30-60-90 and	**Quiz special right triangles, 13.2, 13.3** **CA = Trigonometry Test**	

• *What are trigonometric ratios?* • *How do we use degrees and radians to measure angles?* **J. Trigonometry** J1. Special Right Triangles J2. Angles and the Unit Circle J3. Radian Measure J4. Finding the Cosine and Sine of an Angle J5. Right Triangles and Trigonometric Ratios J6. Area and the Law of Sines J7. Law of Cosines	on the unit circle. **J3.** Convert between degrees and radians. Find the exact values of Sine and Cosine of an angle in radians. Find the length of an intercepted arc. **J4.** Use special right triangles to find exact values of Cosine and Sine of an angle on the unit circle. **J5.** Use trig ratios and inverse trig ratios to find missing sides and angles of a right triangle. **J6.** Find the area of any triangle. Use the Law of sines to find the missing sides and angles of any triangle when you know ASA, AAS or SSA. **J7.** Use the Law of Cosines to find the sides and angles of any triangle when you know SAS or SSS.  9.3.3.4	45-45-90 patterns. **LT3:** I can construct the unit circle using degrees and radians. **LT4:** I can calculate coterminal angles. **LT5:** I can convert between degrees and radians and revolutions. **LT6:** I can calculate exact values of sine and cosine using the unit circle and without the use of a calculator. I can calculate values of sine and cosine with a calculator. **LT7:** I can solve a triangle (find the missing lengths and angle measures) using trig ratios (SOH CAH TOA.) **LT8:** I can use the arc length formula. **LT9:** I can find the area of a non-right triangle. **LT10:** I can use the Law	**End of Trimester Final Exam part 2**	

	9.3.3.5 9.3.4.1-9.3.4.3	of Sines and Law of Cosines to solve angles and lengths of non-right triangles. **LT11:** I can identify angle of elevation and angle of depression. **LT12:** I can use trig to model and solve application problems.		

June 2021

Content	Skills	Learning Targets	Assessment	Resources & Technology
UEQ: *Chapter 10 (10.3)* • How do we graph a circle & interpret information about the graph from its equation? *****Graphing a circle (ADD 10.3)*** *E1. Graphs and equation of a circle* *E2. Center and radius of a circle*	****Graphing a circle (ADD 10.3)** *E1. Write an equation and graph the circle* *E2. Identify the center and radius of a circle to create the graph* *9.3.4.5*		Quiz on graphing a circle 10.3 E1- E2	