College Algebra CIS

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Content	Skills	Learning Targets	Standards	Assessment	Resources & Technology
CEQs: ● **WHAT RELATIONSHIPS EXIST BETWEEN VARIOUS FUNCTIONS, THEIR GRAPHS, AND THEIR SOLUTION(S)?** ● **HOW DO WE SIMPLIFY &/or SOLVE VARIOUS FUNCTIONS?** ● **HOW CAN TECHNOLOGY (like a graphing calculator) HELP TO SOLVE AND COMPARE FUNCTIONS?**					Text: College Algebra Tenth Edition Ron Larson Cengage Learning

UEQ: Chapter 1 **Equations and Inequalities**	*AA* Review. **Equations and Inequalities**	AA Review. Equations and Inequalities	Chapter 1	CA=Chapter 1 Test	
How do variables help us model real-world situations? *How do we solve linear equations?* *How do we solve linear inequalities?* *How do we solve absolute value equations?* *How do we solve absolute value inequalities?* *How do we use complex numbers to solve quadratic equations?* **AA Review. Equations and Inequalities** *AA1.. Solving Equations* *AA2. Solving Inequalities* *AA3. Absolute value equations and inequalities* *AA4. Complex numbers*	*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. Use the properties of complex numbers to solve quadratic equations.	**LT:** I can solve linear equations. **LT:** I can solve problems by writing equations. **LT:** I can solve linear inequalities. **LT:** I can graph linear inequalities. **LT:** I can write and solve compound inequalities. **LT:** I can write and solve equations using absolute value. **LT:** I can write and solve inequalities using absolute value. **LT:** I can use the properties of complex numbers to solve quadratic equations.	MN State Standards 8.2.3.1 8.2.4.1 8.2.4.2 8.2.4.4 8.2.4.5 8.2.4.6 9.2.3.6 9.2.3.7 9.2.4.3		

UEQ: **Chapter 2 Functions and their Graphs**	**A: Functions and their Graphs**	**A: Functions and their Graphs**	**Chapter 2**	**CA=Chapter 2 Test A1-A6**	
How do we graph and identify functions? *How do we graph and write linear and piecewise functions?* *How do we graph absolute value functions?* *How do we analyze translations, stretches, shrinks, and reflections?* *How do we graph linear and absolute value inequalities?* *How do we combine functions with the basic four operations and compositions.* **A. Functions and their Graphs** *A1. Relations and functions* *A2. Linear equations* *A3. Absolute value functions and graphs* *A4. Families of functions* *A5. Two-variable inequalities*	*A1.* Relations and functions *A2.* Graph linear equations. Write equations of lines. Graph piecewise functions & write equations. *A3.* Absolute value functions and graphs Graph absolute value functions *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	**LT1:** I can determine if a relation of function. **LT2:** I can determine the domain and range of a function or a relation. **LT3:** I can graph linear equations by using slope-intercept form or using the intercepts. **LT4:** I can graph and write a piecewise function. **LT5:** I can evaluate a piecewise function. **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.	MN State Standards 9.2.1.1 9.2.1.3 9.2.1.8 9.2.2.3 9.2.4.6 9.4.1.3		

A6. Simplifying functions using the basic four operations and compositions	and composite functions.	**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.			

UEQ: Chapter 3 Polynomial Functions	B. Polynomial Functions	B. Polynomial Functions	Chapter 3	CA=Chapter 3 Test B1-B7	
Quadratics Functions and Models *What does the graph of a quadratic function look like?* *How do transformations change the parabola and its function forms?* *Which method is best to solve various quadratic functions?*	**B1.** Sketch quadratic functions and identify maximum and minimum values	**LT1:** I can graph a quadratic function from standard form.	MN State Standards		
		LT2: I can graph a quadratic function from vertex form.	9.2.1.1		
	B2. Distinguish transformations of stretching, shrinking or reflections	**LT3:** I can solve a quadratic equation using square roots.	9.2.1.5 9.2.1.9 9.2.2.1		
B. **Graphing a quadratic function**		**LT4:** I can solve a quadratic equation by factoring.	9.2.2.3 9.2.2.6		
B1. Graphing quadratic functions and finding maximum and minimum values	**B3.** Interpret and use the vertex form		9.2.3.3		
B2. Transformations of stretching, shrinking or reflections	**B4.** Find greatest common factor(s), binomial factors, or factor special quadratic expression(s)	**LT5:** I can solve a quadratic equation using the quadratic formula.	9.2.3.4 9.2.3.5		
B3. Vertex form		**LT6:** I can solve a quadratic equation by graphing.	9.2.3.6 9.2.4.1		
B4. Greatest common factor(s), binomial factors, or factoring special quadratic expression(s)	**B5.** Solve quadratics by finding the square roots or graphing	**LT7:** I can describe transformation of a graph using the terms vertical stretch/shrink, reflect, translate.	9.3.4.6		
B5. Solving quadratics with square roots or	**B6.** Identify, graph, add, subtract	**LT8:** I can add, subtract,			

graphing B6. Complex numbers B8. Quadratic formula	and multiply complex numbers **B7.** Apply the quadratic formula to solve solve and determine the type(s) of solution(s) by using the discriminant.	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. **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.			

UEQ: Chapter 4 Polynomial Functions and Conics	C. Polynomial Functions and Conics	C. Polynomial Functions and Conics	Chapter 4	CA= Chapter 4 Test C1-C5	
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? *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 C5. The Fundamental Theorem of Algebra C6. The four basic Conics:	**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. **C2, C4, C5.** Factor polynomials of higher degree using the GCF, pattern for	**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. **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.	MN State Standards 9.2.1.3 9.2.1.4 9.2.1.6 9.2.1.7 9.2.2.3 9.2.2.6 9.2.3.1 9.2.3.2 9.2.3.3 9.2.3.5 9.2.3.6 9.2.4.1 9.3.4.5 9.4.1.3 9.4.2.2		

circle, ellipse, parabola, hyperbola.	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. **C5.** Use the Fundamental Theorem of Algebra to find all solutions (real and imaginary) of polynomial equations of higher	**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:** I can use the Fundamental Theorem of Algebra to find all zeros (real and imaginary).			

degree.	**LT14:** I can solve polynomial equations by graphing, factoring, and using the quadratic formula.				

UEQ: Chapter 5 Exponential And Logarithmic Functions	D. Exponential Functions	D-E. Exponential and Logarithmic Functions	Chapter 5	CA= Chapter 5 Test D1-D4, E1-7	
What is an exponential function and how are they evaluated and graphed? What is a logarithmic function and how are they evaluated and graphed? How are exponential and logarithmic functions used to model and solve real-life problems?	**D1**. Exponential Functions	**LT1:** I can recognize and evaluate exponential functions with base a and base e.	9.2.1.3 9.2.1.4		
	D2. Recognize and evaluate exponential functions with base a and base e	**LT2:** I can graph exponential functions and apply the one-to-one property.	9.2.1.7-9.2.1.9 9.2.2.2		
D. Exponential Functions	**D3.** Graph exponential functions and apply the one-to-one property	**LT3:** I can solve exponential equations.	9.2.2.3		
D1. Exponential Functions D1. Characteristics and Evaluation D3. Graphs D4. D1Equations		**LT4:** I can recognize and evaluate logarithmic functions with base a, base 10 (common log) and base e (natural log).	9.2.4.2 9.3.4.6		
E. Logarithmic Functions	**D4.** Solve exponential equations	**LT5:** I can graph logarithmic functions.			
E1. Logarithmic Functions E2. Characteristics and Evaluation E3. Graphs E4. Properties E5. Change-of-Base	**E. Logarithmic Functions** **E1.** Logarithmic Functions	**LT6:** I can apply the properties of logarithms to evaluate, rewrite, expand, or condense logarithmic expressions.			
	E2. Recognize and	**LT7:** I can use the change-of-base formula to			

Formula E6. Equations E7. Real-Life Applications	evaluate logarithmic functions with base a, base 10 (common log) and base e (natural log) **E3.** Graph logarithmic functions **E4.** Apply the properties of logarithms to evaluate, rewrite, expand, or condense logarithmic expressions **E5.** Use the change-of-base formula to rewrite and evaluate logarithmic expressions **E6.** Solve	rewrite and evaluate logarithmic expressions. **LT8:** I can solve logarithmic equations. **LT9:** I can model and solve real-life problems using the exponential growth and decay functions, and logarithmic functions.			

	logarithmic equations **E7.** Model and solve real-life problems using the exponential growth and decay functions, logistic growth functions, and logarithmic functions			

UEQ: Chapter 6 Systems of Equations and Inequalities	**F. Systems of Equations in Two Variables**	**F-H. Systems of Equations in Two Variables**	**Chapter 6**	**CA=Chapter 6 Test F1-F3, G1-G3, H1-H3**	
How are systems of equations and inequalities in two or more variables solved? *How are systems of equations and inequalities used to model and solve real-life problems?*	**F1.** Solve linear and nonlinear systems in two variables by the substitution method	**LT1:** I can solve linear and nonlinear systems in two variables by the substitution method.	MN State Standards 9.2.4.3		
F. Solving Systems of Equations in Two Variables	**F2.** Use graphing to solve and interpret the solutions in a system of equations	**LT2:** I can use graphing to solve and interpret the solutions in a system of equations.	9.2.4.4 9.2.4.5 9.2.4.8		
F1. Substitution F2. Graphing F3. Elimination	**F3.** Solve linear systems in two variables by the elimination method	**LT3:** I can solve linear systems in two variables by the elimination method.			
G. Multivariable Systems	**G. Multivariable Systems**	**LT4:** I can use back-substitution to solve linear systems in row-echelon form.			
G1. Back-Substitution G2. Gaussian Elimination G3. Nonsquare Systems	**G1.** Use back-substitution to solve linear systems in row-echelon form	**LT5:** I can use gaussian elimination to solve systems of linear equations.			
H. Inequalities		**LT6:** I can solve nonsquare systems of linear equations.			
H1. Graphing H2. Systems of Inequalities	**G2.** Use gaussian	**LT7:** I can graph			

| H3. Linear Programming | elimination to solve systems of linear equations

G3. Solve nonsquare systems of linear equations

H. Inequalities

H1. Graph inequalities in two variables

H2. Solve systems of inequalities

H3. Solve linear programming problems | inequalities in two variables.

LT8: I can solve systems of inequalities.

LT9: I can solve linear programming problems. | | | |

UEQ: Chapter 8 Sequences, Series, and Probability	I. Sequences, Series, and Probability	I. Sequences, Series, and Probability	**Chapter 8**	**CA=Chapter 8 Test I1- I7**	
What is a sequences or series? *What is the difference between a geometric and arithmetic sequence and series?* *How is the binomial theorem used?* *How are counting principles and probability used in real life?* **I. Sequences, Series, and Probability** I1. Sequences and Series I2. Arithmetic Sequences and Partial Sums I3. Geometric Sequences and Series I4. Mathematical Induction I5. Binomial Theorem I6. Counting Principles I7. Probability	**I1.** Recognize Sequences and series **I2.** Find arithmetic sequences and partial sums **I3.** Find geometric sequences and series **I4.** Use math induction **I5.** Use the Binomial Theorem to write binomial expansions **I6.** Solve counting problems **I7.** Find probabilities of events.	**LT1:** I can use sequence notation to write terms of a sequence. **LT2:** I can find sums of series. **LT3:** I can use summation notation to write sums. **LT4:** I can recognize, write, and find the nth terms of arithmetic sequences. **LT5:** I find the nth partial sum of arithmetic sequences. **LT6:** I can recognize, write, and find the nth terms of geometric sequences. **LT7:** I can find the sum of finite and infinite geometric sequences and series.	MN State Standards 9.2.2.4 9.2.2.5 9.4.3.1 9.4.3.5 9.4.3.7		

		LT8: I can use math induction to prove statements. **LT9:** I can use the Binomial Theorem write binomial expansions. **LT10:** I can solve simple counting problems using counting principles, permutations, and combinations. **LT11:** I can find probabilities of events.			

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