Time Interval/ Content	Standards/ Strands	Essential Questions	Skills	Assessment
Unit 1: Accuplacer Mathematics	• Understand that rational expressions form a system analogous to the rational numbers, closed under addition, subtraction, multiplication, and division by a nonzero rational expression; add, subtract, multiply, and divide rational expressions. (A-APR.7) • Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters. (A-REI.3) • Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables. (A-REI.6) • Use the structure of an expression to identify ways to rewrite it. (A-SSE.A.2) • Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression (A-SSE.B.3) • Use the properties of exponents to transform expressions for exponential functions (HSA-SSE.B.3c) • Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction,	• What is the difference between an expression and an equation? • What does it mean to simplify an expression? • What does it mean to solve an equation? • What does it mean to factor an expression?	*Students will understand…* • The elementary algebra topics of simplification, substitution & solving. *Students will know…* • Order of Operations • Combining Like Terms • Distributive Property • Multiplying Polynomials • Solving Equations & Inequalities • Solving Systems of Equations • Exponent Properties • Factoring • Quadratic Equations • Quadratic Formula *Students will be able to…* • Simplify and substitute algebraic expressions • Solve equations & inequalities • Factor • Solve systems of equations • Solve quadratic equations	• Classwork • Homework • Quizzes • Tests • *The Marathon* – This task assesses the student's ability to graph a system of linear equations and to solve the system both graphically and algebraically. • *Scale Factors* – This task assesses the student's ability to factor by using the GCF, to factor trinomials including perfect square trinomials, and to find the scale factor of polygons when the areas are given as algebraic expressions

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	and multiplication; add, subtract, and multiply polynomials. (HSA-APR.A.1) • Explain each step in solving a simple 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. (HSA-REI.A.1) • Factor a quadratic expression to reveal the zeros of the function it defines. (HSA-SSE.B.3a) • Solve quadratic equations in one variable. (HSA-REI.B.4)			

Unit 2: Rational Functions	• Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials. (HSA-APR.A.1)
	• 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. (HSA-APR.B.3)
	• Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise. (HSA-REI.A.2)
	• 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
		• What is a rational expression?
		• How do the rules for operations with fractions apply to simplifying rational expressions?
		• What makes an expression undefined?
		• How do the rules for transforming parent functions apply to graphing rational functions?
			Students will understand…
			  • Simplification of rational expressions.
			  • Addition, subtraction, multiplication and division of rational expressions
			  • Graphing rational functions.
			  • Solving rational equations.
			
			Students will know…
			  • Simplifying Rational Expressions
			  • Solving Rational Equations
			  • Rational Functions
			
			Students will be able to…
			  • Simplify rational expressions
			  • Multiply & divide rational expressions
			  • Add & subtract rational
				• Classwork
				• Homework
				• Quizzes
				• Tests
				• *Construction Daze* – Students will use rational functions to determine the relationship between crew size and total construction time

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	given a verbal description of the relationship. (HSF-IF.B.4) • Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. (HSF-IF.B.5) • Graph rational functions, identifying zeros and asymptotes when suitable factorizations are available and showing end behavior. (F-IF 7d)		expressions • Simplify complex fractions • Graph rational functions • Transform rational functions by changing parameters • Solve rational equations	
Unit 3: Radical Functions	• 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. (N-RN.1) • Rewrite expressions involving radicals and rational exponents using the properties of exponents. (N-RN.2) • Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise. (A-REI.2)	• How do you simplify radical expressions? • How are expressions with rational exponents and radical expressions related? • What steps should you follow to solve radical equations?	*Students will understand…* • How to convert from radical form to exponential form. • Simplification of radical expressions. • Solving of radical equations *Students will know…* • Radical Expressions • Radical Equations • Radical • Radicand *Students will be able to…* • Solve radical equations • Rewrite radical expressions by using rational exponents • Simplify & evaluate radical expressions & expressions containing rational exponents	• Classwork • Practice • Homework • Quizzes • Test • *Eye in the Sky* – Students will use radical functions and equations to calculate time and distances on The London Eye observation wheel.
Unit 4: Accuplacer Algebra	• Apply and extend previous understandings of addition and subtraction to add and subtract	• What are the four basic arithmetic operations?	*Students will understand…* • The arithmetic operations of addition, subtraction,	• Classwork • Homework • Quizzes

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	rational numbers. (7-NS.1) • Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers. (7-NS.2) • Understand that rational expressions form a system analogous to the rational numbers, closed under addition, subtraction, multiplication, and division by a nonzero rational expression; add, subtract, multiply, and divide rational expressions. (A – APR.7) • Find a percent of a quantity as a rate per 100; solve problems involving finding the whole, given a part and the percent. (6-RP.3c)	• What are the basic rules for operations with fractions? • What are the basic rules for operations with decimals?	multiplication, and division pertaining to integers, fractions, and decimals. *Students will know…* • Addition/Subtraction • Multiplication/Division • Fractions, Decimals, Percentages • Proportions *Students will be able to…* • Add, subtract, multiply, and divide integers, fractions, and decimals • Convert between fractions, decimals, and percentages. • Solve problems involving percentages.	• Tests
Unit 5: Inverse Functions and Relations	• Combine standard function types using arithmetic operations. (F-BF.1b) • Compose functions. (F-BF.1c) • Find inverse functions. (F-BF.4) • Solve an equation of the form f(x) = c for a simple function f that has an inverse and write an expression for the inverse. (HSF-BF.B.4a) • Verify by composition that one function is the inverse of another. (HSF-BF.B.4b) (+) • Read values of an inverse function from a graph or a table, given that the function has an inverse. (HSF-BF.B.4c) (+)	• What is an inverse function? • How do you find the inverse of a function? • How can you tell from a table or a graph if relations are inverses? • How can you algebraically determine if relations are inverses?	*Students will understand that…* • The inverse of a function can be used to "undo" a function. • Inverses in the real world are used to switch the independent and dependent variables. • If two functions are inverses of each other the result of their composition will be the same. *Students will know…* • Relations • Functions • Arithmetic operations of functions • Composite functions	• Classwork • Practice • Homework • Quizzes • Test • *Properties and Attributes of Functions* – The purpose of the task is to assess student understanding of inverse functions.

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	• Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions. (F-IF.7)		• Piecewise functions *Students will be able to…* • Graph and recognize inverses of relations and functions. • Add, subtract, multiply and divide functions. • Write and evaluate composite functions. • Graph piecewise functions.	
Unit 6: Conic Sections	• Derive the equation of a circle of given center and radius using the Pythagorean Theorem; complete the square to find the center and radius of a circle given by an equation. (HSG-GPE.A.1) • Derive the equation of a parabola given a focus and directrix. (HSG-GPE.A.2) • Derive the equations of ellipses and hyperbolas given the foci, using the fact that the sum or difference of distances from the foci is constant. (HSG-GPE.A.3) (+)	• What are the 4 types of conic sections? • How are conic sections formed? • How can you determine the type of conic each equation represents? • How is distance used to define each type of conic section?	*Students will understand that…* • Conic sections are formed by the intersection of a plane and a cone. *Students will know…* • Conic Section • Circle • Center • Radius • Ellipse • Constant Sum • Vertices • Co-Vertices • Focus • Hyperbola • Constant Difference • Parabola • Directrix *Students will be able to…* • Graph circles, ellipses, hyperbolas, & parabolas given the standard form of each conic section.	• Classwork • Homework • Quizzes • Tests • *Forms of a Conic Section* -- Students will write in standard form, equations for and ellipse, a hyperbola, a parabola, and a circle.

Time Interval/ Content	Standards/ Strands	Essential Questions	Skills	Assessment
			• Write equations in standard form for each conic section given a graph. • Solve real world problems involving conic sections.	
Unit 7: Sequences and Series	• Recognize that sequences are functions whose domain is a subset of the integers (F-IF.3) • Write arithmetic and geometric sequences both recursively and with an explicit formula (F-BF.2) • Derive the formula for the sum of a finite geometric series and use the formula to solve problems. (A-SSE.4) • Determine an explicit expression, a recursive process, or steps for calculation from a context. (HSF-BF.A.1a) • Distinguish between situations that can be modeled with linear functions and with exponential functions. (HSF-LE.A.1) • Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table). (HSF-LE.A.2)	• How do sequences and series differ? • What is the difference between a recursive formula and an explicit formula? • How do arithmetic and geometric sequences differ? • Where are arithmetic and geometric sequences and series seen in the real world?	*Students will understand…* • Sequences and series and the differences between them. • The purpose of the summation notation. • The difference between explicit and recursive formulas • The difference between arithmetic and geometric sequences and series and how to model them. *Students will know…* • Arithmetic Sequences and Series • Geometric Sequences and Series • Summation Notation • Explicit & Recursive Formulas *Students will be able to…* • Use sequences and summation notations to write the terms and sums of sequences. • Recognize, write, and use arithmetic sequences and geometric sequences and series.	• Homework • Classwork • Quizzes • Tests • *Sequences and Series* – This task will assess the student's ability to write rules for sequences, find the terms of a geometric sequence, and find the sums of geometric series and infinite geometric series.

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Unit 8: Using Excel in Mathematics	• 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 solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where f(x) and/or g(x) are linear, polynomial, rational, absolute value, exponential, and logarithmic functions. (A-REI.11) • Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. (F-IF.7) • Compute (using technology) and interpret the correlation coefficient of a linear fit. (S-ID.8) • Mathematically proficient students can apply the mathematics they know to solve problems arising in everyday life, society, and the workplace. (MP.4.A) • Mathematically proficient students consider the available tools when solving a mathematical problem. (MP.5.A)	• How can one use Excel to model, explain, and prove mathematics phenomena? • How can one use Excel to help in everyday life?	*Students will understand…* • That Excel is a robust spreadsheet program which can be used for many different mathematic elements. • Appropriate techniques and skills in the Excel program. *Students will know…* • Spreadsheet • Cell • Cell forumlas • Charts • Graphs *Students will be able to…* • Use Excel to create charts and graphs. • Publish work created in Excel.	• Classwork • Homework • *College Costs* – Students will use Excel to explore the costs of different colleges across the country. • *Home Mortgages* – Students will use Excel to explore the cost of a home. • *Equation of a Circle* – Students will use Excel to practice the effect of the center and radius of a circle on its equation.