Teacher: Mr. Caracciolo	Course: Pre-Calculus	Level(s): 12

	Month: September Topic(s): Solving equations, trinomial factoring, factoring squares and cubes, graphing lines, parallel vs. perpendicular lines.
Content/Big Ideas	• Solving basic linear and quadratic equations. • Factoring trinomials. • Factoring squares and cubes. • Graphing lines and using slope and y-intercepts. • Understanding the differences between parallel and perpendicular lines.
Essential Questions	• What is the order of operations to solving equations? • What are the necessary steps to factoring a basic trinomial? • Are the rules slightly different when the lead coefficient is larger than 1? • Are there rules to factor squares and cubes? If so, what are they? • How do we use slopes and y-intercepts to graph lines? • What is true about the slopes of parallel and perpendicular lines?
Concepts	• Order of operations. • Distributive property. • Positive and negative integers. • Factoring trinomials. • Recognizing perfect squares and perfect cubes and using the necessary formulas. • Formula for slope and using the y-intercept in order to graph lines. • Making comparisons with parallel and perpendicular lines. • Writing the equations of lines in slope-intercept form and in standard form.
Competencies	• Students should be able to develop an understanding of this material. The understanding will lead to a mastery of the content as well as the concepts over a period of time. Repetition of the content is used throughout the course.
Standards/Benchmarks	• CC.2.1.HS.F.1 • CC.2.1.HS.F.2 • CC.2.2.HS.D.3 • CC.2.2.HS.D.5 • CC.2.2.HS.D.6 • CC.2.2.HS.D.9
Activities & Assessments	• Lecture on a daily basis • Problems given daily --- many times during class • Homework assigned • Constant review days every week prior to the test • EXAM given once a week (usually on Thursday) • Graded in-class assignment once a week (usually on Friday)

Teacher: Mr. Caracciolo	Course: Pre-Calculus	Level(s): 12
	Month: October **Topic(s):** Completing the square, quadratic formula, imaginary numbers, complex numbers, solving higher order equations using algebra	
Content/Big Ideas	• Completing the Square method to solve quadratic equations. • Quadratic formula to solve quadratic equations. • Imaginary numbers. • Complex Numbers and writing them in standard form. • Solving higher order equations with negative exponents. • Solving higher order equations with fractional exponents.	
Essential Questions	• When do we use the completing the square method? • How do we complete the square when the lead coefficient is greater than 1? • What is the purpose of the quadratic formula? • Can this formula be used to solve any quadratic equation? • What is an imaginary number? • What is a complex number and how do we write it in standard form? • What is a "let" statement? • How are "let" statements used to solve higher order equations? • Is the skill of factoring mandatory when solving higher order equations?	
Concepts	• Factoring. • Fractions and being able to simplify them. • Able to simplify radicals and substitute correctly. • Understanding the order of operations to simplify imaginary numbers. • Conjugates in order to divide imaginary numbers. • Simplifying complex numbers and being able to reduce them. • Recognizing higher order equations. • Using "let" statements in order to convert them to quadratic notation.	
Competencies	• Students should be able to develop an understanding of this material. The understanding will lead to a mastery of the content as well as the concepts over a period of time. Repetition of the content is used throughout the course.	
Standards/Benchmarks	• CC.2.1.HS.F.1 • CC.2.1.HS.F.2 • CC.2.2.HS.D.3 • CC.2.2.HS.D.5 • CC.2.2.HS.D.6 • CC.2.2.HS.D.9	
Activities & Assessments	• Lecture on a daily basis • Problems given daily --- many times during class • Homework assigned • Constant review days every week prior to the test • EXAM given once a week (usually on Thursday) • Graded in-class assignment once a week (usually on Friday)	

Teacher: Mr. Caracciolo	Course: Pre-Calculus	Level(s): 12
	Month: November **Topic(s):** Functions, domain, range, one-to-one functions, vertical line test, graphs of functions, x and y tables, evaluating functions, composition of functions	
Content/Big Ideas	- Functions and being able to recognize them. - Domain and range of a function. - Understanding one-to-one functions. - Vertical line test. - Graphs of functions and being able to sketch them. - Evaluating functions with numerical values and variables. - Evaluating the composition of functions.	
Essential Questions	- What is a function? - What is the domain and the range of a function? - Is a one-to-one function an example of a circle or a line? - How does the vertical line test determine if the graph is a function? - Is the order of operations important when evaluating functions with actual numerical values? - How does a composition of a function actually work? - What symbol is used to symbolize a composition of a function?	
Concepts	- Ordered pairs. - Recognizing the shape of a function. - Realizing what one-to-one actually means in regards to graphing. - Understanding the vertical line test and how it helps to determine a function. - Being able to use the order of operations correctly in order to simplify functions. - Recognizing what a composition of functions looks like and the procedure needed to evaluate them.	
Competencies	Students should be able to develop an understanding of this material. The understanding will lead to a mastery of the content as well as the concepts over a period of time. Repetition of the content is used throughout the course.	
Standards/Benchmarks	- CC.2.1.HS.F.1 - CC.2.1.HS.F.2 - CC.2.2.HS.D.3 - CC.2.2.HS.D.5 - CC.2.2.HS.D.6 - CC.2.2.HS.D.9	
Activities & Assessments	- Lecture on a daily basis - Problems given daily --- many times during class - Homework assigned - Constant review days every week prior to the test - EXAM given once a week (usually on Thursday) - Graded in-class assignment once a week (usually on Friday)	

Teacher: Mr. Caracciolo	Course: Pre-Calculus	Level(s): 12
	Month: December Topic(s): Trigonometry functions: sine, cosine, tangent; reciprocal trig. Functions: cosecant, secant, and cotangent; radian measure, converting degrees to radians, Trigonometric identities	
Content/Big Ideas	• Trig. Functions: sine, cosine, and tangent. • Reciprocal trig. Functions: cosecant, secant, and cotangent. • Radian measure. • Converting degrees to radians. • Trigonometric identities.	
Essential Questions	• What are the ratios for the sine, cosine, and tangent and their respective reciprocal functions? • What is a radian? • How do we convert radians to degrees? • How do we convert degrees to radians? • What is the purpose of trig. Identities? • Is it helpful to possess algebra skills in order to simplify trig. Identities?	
Concepts	• Trigonometry ratios. • Understanding reciprocals. • Converting between degrees and radians. • Having algebra skills in order to simplify trig. Identities.	
Competencies	• Students should be able to develop an understanding of this material. The understanding will lead to a mastery of the content as well as the concepts over a period of time. Repetition of the content is used throughout the course.	
Standards/Benchmarks	• CC.2.1.HS.F.1 • CC.2.1.HS.F.2 • CC.2.2.HS.D.3 • CC.2.2.HS.D.5 • CC.2.2.HS.D.6 • CC.2.2.HS.D.9	
Activities & Assessments	• Lecture on a daily basis • Problems given daily --- many times during class • Homework assigned • Constant review days every week prior to the test • EXAM given once a week (usually on Thursday) • Graded in-class assignment once a week (usually on Friday)	

Teacher: Mr. Caracciolo	Course: Pre-Calculus	Level(s): 12
	Month: January Topic(s): Difference quotient, derivatives, power rule	
Content/Big Ideas	• The difference quotient. • The derivative. • The power rule.	
Essential Questions	• What is the significance of the difference quotient? • How can we use limits to help simplify the difference quotient? • Does the difference quotient help us to understand the derivative? • What is a derivative? • How does the power rules help us find derivatives? • Does this formula need to be memorized?	
Concepts	• Fractions and simplifying fractions. • Distributive property. • Combining similar terms. • Learning (memorizing) the power rule. • Understanding exponents. • Understanding fractional exponents. • Utilizing positive and negative integer exponents.	
Competencies	• Students should be able to develop an understanding of this material. The understanding will lead to a mastery of the content as well as the concepts over a period of time. Repetition of the content is used throughout the course.	
Standards/Benchmarks	• CC.2.1.HS.F.1 • CC.2.1.HS.F.2 • CC.2.2.HS.D.3 • CC.2.2.HS.D.5 • CC.2.2.HS.D.6 • CC.2.2.HS.D.9	
Activities & Assessments	• Lecture on a daily basis • Problems given daily --- many times during class • Homework assigned • Constant review days every week prior to the test • EXAM given once a week (usually on Thursday) • Graded in-class assignment once a week (usually on Friday)	

Teacher: Mr. Caracciolo	Course: Pre-Calculus	Level(s): 12

	Month: February Topic(s): Inverse functions, synthetic division, long division, Remainder theorem, higher order derivatives
Content/Big Ideas	• Inverse functions. • Long division with polynomials. • Synthetic division with polynomials. • Remainder theorem. • Higher order derivatives. • Knowing the value of "e". (e = 2.718)
Essential Questions	• What is an inverse function and how is it compared to a regular function? • Do we "flip" the x and y variable when working with inverse functions? • Is "long" division a tedious approach to dividing polynomials? • Is synthetic division a much easier approach to dividing polynomials? • Is it necessary to know the mathematical value of "e"? • Do we need to correctly know how to use the calculator when working with higher order derivatives?
Concepts	• Inverse functions. • Reciprocals. • Cross-multiplication and simplifying fractions. • Positive and negative integers and adding/subtracting terms for division. • The mathematical value of "e". • Using a calculator to correctly solve higher order derivatives.
Competencies	• Students should be able to develop an understanding of this material. The understanding will lead to a mastery of the content as well as the concepts over a period of time. Repetition of the content is used throughout the course.
Standards/Benchmarks	• CC.2.1.HS.F.1 • CC.2.1.HS.F.2 • CC.2.2.HS.D.3 • CC.2.2.HS.D.5 • CC.2.2.HS.D.6 • CC.2.2.HS.D.9
Activities & Assessments	• Lecture on a daily basis • Problems given daily --- many times during class • Homework assigned • Constant review days every week prior to the test • EXAM given once a week (usually on Thursday) • Graded in-class assignment once a week (usually on Friday)

Teacher: Mr. Caracciolo	Course: Pre-Calculus	Level(s): 12
	Month: March **Topic(s):** Law of Sines, Law of Cosines, trigonometric equations, solving exponential and logarithmic equations, equation of a tangent line.	
Content/Big Ideas	- Law of Sines. - Law of Cosines. - Trigonometric equations. - Solving exponential equations. - Solving logarithmic equations. - Equation of a tangent line.	
Essential Questions	- When do we use the Law of Sines? - Do we use proportions when working with the Law of Sines? - When do we use the Law of Cosines? - Do we use proportions when working with the Law of Cosines? - Do we use a specific formula when working with the Law of Cosines? - Do we need algebra skills when solving trig. Equations? - Does solving exponential equations involve similar bases? - Does logarithmic equations involve specific properties in order to solve them correctly? - Is it necessary to know how to interchange between exponential and logarithmic form to solve logarithmic equations? - What does a tangent line actually mean?	
Concepts	- Fractions and proportions. - Working with formulas and exponents. - Recognizing specific triangles in order to use Law of Sines or Law of Cosines. - Working with "same" bases to solve exponential equations. - Being able to change between exponential and logarithmic form. - Slope of a line. - Using derivatives in order to calculate the slope of a tangent line.	
Competencies	Students should be able to develop an understanding of this material. The understanding will lead to a mastery of the content as well as the concepts over a period of time. Repetition of the content is used throughout the course.	
Standards/Benchmarks	- CC.2.1.HS.F.1 - CC.2.1.HS.F.2 - CC.2.2.HS.D.3 - CC.2.2.HS.D.5 - CC.2.2.HS.D.6 - CC.2.2.HS.D.9	
Activities & Assessments	- Lecture on a daily basis - Problems given daily --- many times during class - Homework assigned - Constant review days every week prior to the test - EXAM given once a week (usually on Thursday) - Graded in-class assignment once a week (usually on Friday)	

Teacher: Mr. Caracciolo	Course: Pre-Calculus	Level(s): 12
	Month: April Topic(s): Continuation of the topics from March, Law of Sines, Law of Cosines, trigonometric equations, solving exponential and logarithmic equations, equation of a tangent line.	
Content/Big Ideas	• Law of Sines. • Law of Cosines. • Trigonometric equations. • Solving exponential equations. • Solving logarithmic equations. • Equation of a tangent line.	
Essential Questions	• When do we use the Law of Sines? • Do we use proportions when working with the Law of Sines? • When do we use the Law of Cosines? • Do we use proportions when working with the Law of Cosines? • Do we use a specific formula when working with the Law of Cosines? • Do we need algebra skills when solving trig. Equations? • Does solving exponential equations involve similar bases? • Does logarithmic equations involve specific properties in order to solve them correctly? • Is it necessary to know how to interchange between exponential and logarithmic form to solve logarithmic equations? • What does a tangent line actually mean?	
Concepts	• Fractions and proportions. • Working with formulas and exponents. • Recognizing specific triangles in order to use Law of Sines or Law of Cosines. • Working with "same" bases to solve exponential equations. • Being able to change between exponential and logarithmic form. • Slope of a line. • Using derivatives in order to calculate the slope of a tangent line.	
Competencies	• Students should be able to develop an understanding of this material. The understanding will lead to a mastery of the content as well as the concepts over a period of time. Repetition of the content is used throughout the course.	
Standards/Benchmarks	• CC.2.1.HS.F.1 • CC.2.1.HS.F.2 • CC.2.2.HS.D.3 • CC.2.2.HS.D.5 • CC.2.2.HS.D.6 • CC.2.2.HS.D.9	

Activities & Assessments	- Lecture on a daily basis - Problems given daily --- many times during class - Homework assigned - Constant review days every week prior to the test - EXAM given once a week (usually on Thursday) - Graded in-class assignment once a week (usually on Friday)

Teacher: Mr. Caracciolo	Course: Pre-Calculus	Level(s): 12
	Month: May **Topic(s):** College placement style questions (these vary with the students), review of derivatives, higher order derivatives, the Product Rule, the quotient rule	
Content/Big Ideas	- College placement style questions. - Derivatives with integer and fractional exponents. - Higher order derivatives. - The product rule. - The quotient rule. - Review of some algebra and trigonometry topics as the school year ends.	
Essential Questions	- Placement questions vary from the student problems given to me. - How do we find derivatives with fractional exponents? - How do we evaluate derivatives with negative exponents? - When do we use the calculator with higher order derivatives? - Is it mandatory to use a calculator with higher order derivatives when the value for "x" is 1? - Is the mathematical value for "e" = 2.718? - Does the Product Rule involve addition or subtraction? - Does the Quotient Rule involve addition or subtraction? - Is there an easy way to work with the quotient rule compared to the sophisticated formula? - Algebra and trigonometry review questions vary year to year depending on which topics need more coverage.	
Concepts	- Many different algebra, geometry, trigonometry and calculus concepts depending on the questions and problems brought to me by the students. - Working with fractional and integer exponents in order to find derivatives of algebraic terms. - Computing multiple derivatives and working with "e" and using the calculator in order to obtain values for higher order derivatives. - Making sure you use the proper formula in order to compute the product rule or the quotient rule. - Major (algebra and trigonometry) concepts learned in the course are reviewed at this time for the "last" time since we are arriving towards the end of the school year.	

Competencies	• Students should be able to develop an understanding of this material. The understanding will lead to a mastery of the content as well as the concepts over a period of time. Repetition of the content is used throughout the course.
Standards/Benchmarks	• CC.2.1.HS.F.1 • CC.2.1.HS.F.2 • CC.2.2.HS.D.3 • CC.2.2.HS.D.5 • CC.2.2.HS.D.6 • CC.2.2.HS.D.9
Activities & Assessments	• Lecture on a daily basis • Problems given daily --- many times during class • Homework assigned • Constant review days every week prior to the test • EXAM given once a week (usually on Thursday) • Graded in-class assignment once a week (usually on Friday)