

Teacher: Mr. Caracciolo	Course: Calculus	Grade Level(s): 12
	Month: September Topic(s): Factoring, Graphing, Linear/quadratic equations, linear/quadratic inequalities, quadratic formula, radical equations, parabolas	
Content/Big Ideas	<ul style="list-style-type: none"> • Factoring trinomials • Factoring Sum and difference of cubes • Graphing linear equations (working with slope) • Graphing linear/quadratic inequalities • Quadratic Formula (derive the formula) • Solving radical equations • Soling and graphing Parabolas 	
Essential Questions	<ul style="list-style-type: none"> • What is the structure of factoring “cubes”? • How do we shade properly an inequality? • When do we use interval notation for graphing? • When do we use brackets or parentheses on our graph? • What is the discriminant and what is its significance? • Is it mandatory we check solutions for radical equations? • What is the meaning of the vertex of a Parabola? • What is the axis of symmetry? 	
Concepts	<ul style="list-style-type: none"> • Integers • Recognition of perfect squares and perfect cubes • Understanding inequality symbols • Understanding interval notation • Using the quadratic formula • Substitution of values into the formula • Simplifying radical answers • Understanding plotting points to graph a parabola 	
Competencies	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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: Calculus	Level(s): 12
	Month: October Topic(s): Exponential equations, exponential graphs, logarithmic equations, long division, synthetic division, imaginary numbers, complex numbers, trigonometric functions: sine, cosine, tangent, cosecant, secant, and cotangent	
Content/Big Ideas	<ul style="list-style-type: none"> • Exponential equations, exponential graphs • Logarithmic equations • Being able to change from exponential to logarithmic form • Long division and synthetic division • Imaginary numbers and complex numbers • Trig. Functions: sine, cosine, and tangent • Reciprocal trig. Functions: cosecant, secant, and cotangent 	
Essential Questions	<ul style="list-style-type: none"> • Explain how “same” bases are used to solve exponential equations? • What does the word logarithm mean? • How do you convert from exponential to logarithmic? • Are only coefficients used in synthetic division? • What is an imaginary number? • What is a complex number? • What is the procedure to dividing imaginary numbers? • When do we use the trig. Functions? • What are the necessary ratios used when evaluating trig. Expressions? 	
Concepts	<ul style="list-style-type: none"> • Using calculators to determine exact answers. • Checking solutions by substitution. • Able to change exponential to logarithmic form. • Understanding an imaginary number. • Simplifying a complex number and writing it in standard form. • Conjugates used to simplify division of imaginary numbers. • Understanding the ratios of all 6 trig. Functions. 	
Competencies	<ul style="list-style-type: none"> • 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. 	
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Activities & Assessments	<ul style="list-style-type: none"> • 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: Calculus	Level(s): 12
	Month: November	
	Topic(s): Trigonometric Identities, graphs of trig. Functions, Law of Sines, Law of Cosines, review of the difference quotient, limits	
Content/Big Ideas	<ul style="list-style-type: none"> • Trig. Identities (memorizing several identities) • Graphing the sine, cosine and the tangent trig. Functions. • Law of Sines and using the formulas • Law of Cosines and using the formulas • Difference quotient formula • Limits (numerical and with infinity) 	
Essential Questions	<ul style="list-style-type: none"> • How are the identities used? • Do these trig. Identities resemble concepts with Algebra? • How can we use the Law of Sines and when do we use it? • When do we use the Law of Cosines? • Is the difference quotient necessary in order to find the derivative? • What is the purpose of putting a limit on "h"? 	
Concepts	<ul style="list-style-type: none"> • Algebra skills necessary for trig. Identities. • Rearranging equations to find the necessary term. • Understanding proportions and using cross multiplication. • Using calculators to find exact values. • Utilizing formulas to find missing values of triangles. • Distributive property is used for the difference quotient. • Understanding limits on specific variables in order to solve correctly. 	
Competencies	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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: Calculus	Level(s): 12
	Month: December	
	Topic(s): Understanding limits, limits with numbers, limits with infinity, Introduction to the derivative, power rule, integer exponents, fractional exponents.	
Content/Big Ideas	<ul style="list-style-type: none"> • Limits with numbers • Limits with infinity • Learning the definition of a derivative • Power Rule with integer exponents • Power Rule with fractional exponents • Simplifying algebraic terms with derivatives 	
Essential Questions	<ul style="list-style-type: none"> • What is a limit? • How does a limit work? • Could we think of a derivative as an asymptote? Why? • Can the power rule be used with all integer and fractional exponents? 	
Concepts	<ul style="list-style-type: none"> • Basic factoring skills are needed to work with limits. • Understanding fractions as they approach zero. • Graphing asymptotes to understand limits. • Recalling exponents in Algebra and simplifying answers. 	
Competencies	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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: Calculus	Level(s): 12
	Month: January Topic(s): Product Rule, Quotient Rule, Differentiation by substitution, Chain Rule, higher order derivatives, equations of a tangent line	
Content/Big Ideas	<ul style="list-style-type: none"> • Product Rule • Quotient Rule • Differentiation by substitution • The Chain Rule • Higher Order derivatives • Equations of a tangent line 	
Essential Questions	<ul style="list-style-type: none"> • What is the formula for the Product Rule? • Can we use the Product Rule with trig. Functions? • What is the “easy” way to remember the Quotient Rule? • Can we use the Quotient rule with trig. Functions? • What is a higher order derivative? • What is the significance of finding tangent lines? • Do we use the formula: $y=mx+b$ for these problems? 	
Concepts	<ul style="list-style-type: none"> • Distributive property for the Product Rule. • Simplifying expressions when using the Quotient Rule. • Simplifying terms and exponents when working with both rules. • Using a calculator to arrive at a specific value on higher order derivatives. • Slope, substituting points and knowing when to find a derivative in order to find equations of tangent lines. 	
Competencies	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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: Calculus	Level(s): 12
	Month: February Topic(s): Applications with derivatives, velocity word problems, higher order derivatives, more Chain Rule problems	
Content/Big Ideas	<ul style="list-style-type: none"> • Applications with derivatives • Velocity word problems that involve derivatives • Higher order derivatives that involve fractional exponents and e^x. • Chain Rule problems 	
Essential Questions	<ul style="list-style-type: none"> • When do we use the derivative in everyday practical problems? • Do engineers use derivatives to work with speed and velocity? • Will Algebra factoring skills be necessary when working with the given equations in the problem? • What are the necessary steps to enter numbers and symbols in the calculator correctly in order to solve the problem? • What is one main characteristic that signifies that we will use the Chain Rule in Calculus? 	
Concepts	<ul style="list-style-type: none"> • Skills in factoring. • Being able to actually solve equations. • Finding derivatives of terms. • Making sure to apply the proper units to your answer. • Entering data into the calculator correctly in order to solve problem. • Recognizing certain criteria in order to use the Chain Rule. 	
Competencies	<ul style="list-style-type: none"> • 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. 	
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Activities & Assessments	<ul style="list-style-type: none"> • 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: Calculus	Level(s): 12
	Month: March	
	Topic(s): Implicit differentiation, differentiation with substitution, introduction to the Integral (Integration)	
Content/Big Ideas	<ul style="list-style-type: none"> • Implicit differentiation • Differentiation with substitution • Introduction to the Integral 	
Essential Questions	<ul style="list-style-type: none"> • What is the MAIN difference between explicit vs. implicit differentiation? • What is the structure of the notation when working with these problems? • Is dy/dx the same meaning as y'? • Is differentiation by substitution the same as implicit differentiation? • What is Integration? • When do we use this in Calculus? • Is integration the opposite of differentiation? 	
Concepts	<ul style="list-style-type: none"> • Finding derivatives of terms. • Recalling derivatives with the power rule and the exponents. • Making sure to use the proper notation for each of the terms. • Making sure to use the proper "let" statements when using substitution. • Learning how to write the integral symbol. • Making sure to use formula correctly in order to evaluate integrals. 	
Competencies	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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: Calculus	Level(s): 12
	Month: April Topic(s): Integration, Area under a curve, placement test questions, more problems with the Product Rule, Quotient Rule and Chain Rule	
Content/Big Ideas	<ul style="list-style-type: none"> • Integration with algebraic terms and basic trig. Functions. • Finding the area under the curve. • Definite integration. • Fundamental theorem of Calculus: $F(b) - F(a)$. • College placement questions on exams. • More practice with Product Rule, Quotient Rule and Chain Rule. 	
Essential Questions	<ul style="list-style-type: none"> • How does integration work with the sine and cosine function? • What does area under the curve actually mean? • Is there a formula or procedure to follow in order to find the area under the curve? • What is the fundamental theorem of Calculus and when do we use it? • Who discovered the fundamental theorem of Calculus? • When do we use the Product Rule, Quotient Rule, and the Chain Rule? 	
Concepts	<ul style="list-style-type: none"> • Integrals. • Formulas and using substitution. • Understanding graphs and their curves in order to find the area under the curves. • Placement test style questions. • Reviewing many Calculus as well as pre-calculus style questions in order to do well on college placement exams. • Being able to use and distinguish between the Product Rule, the Quotient Rule, and the Chain Rule. 	
Competencies	<ul style="list-style-type: none"> • 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. 	
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Activities & Assessments	<ul style="list-style-type: none"> • 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: Calculus	Level(s): 12
	Month: May	
	Topic(s): Review of the entire course material. Review and practice problems learned throughout the year.	
Content/Big Ideas	<ul style="list-style-type: none"> All main content from previous 8 months of this course. 	
Essential Questions	<ul style="list-style-type: none"> Questions have already been shown and discussed in previous 8 months. 	
Concepts	<ul style="list-style-type: none"> Concepts have already been shown and discussed in previous 8 months. 	
Competencies	<ul style="list-style-type: none"> 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. 	
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Activities & Assessments	<ul style="list-style-type: none"> 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) 	