Vectors	Learning Goal(s)	Success Criteria
Unit 1 – Vectors and Applications (GA1 & GA2) Chapters 6 & 7	I will be able to: • *Represent vectors in R^2 and R^3 algebraically and geometrically and recognize their applications. (GA1)* • Perform operations on vectors in R^2 and R^3, and use the properties of these operations to solve problems. (GA2)	I can: • *Recognize a vector as a quantity with both magnitude and direction, and identify real life applications of vectors.* • *Represent a vector in R^2 geometrically and algebraically, and recognize equal vectors as those with equal magnitude and direction, regardless of position.* • *Use trigonometric relationships to determine the Cartesian representation of a vector in R^2.* • *Recognize that points and vectors in R^3 can both be represented by Cartesian coordinates, and find the magnitude of a vector using those coordinates.* • Perform addition, subtraction, and scalar multiplication on vectors in R^2 and R^3 given geometric or algebraic representations, and solve problems using these operations. • Determine some properties of these operations on vectors (commutative, associative, etc.). • Perform the dot product on vectors in R^2 and R^3, and describe its applications and solve problems involving these applications. • Determine some properties of the dot product and the cross product (prove them!). • Perform the cross product on two vectors in Cartesian form in R^3 , determine the magnitude and describe applications of the cross product to solve problems.
Unit 2 – Points, Lines, and Planes (GA3 & GA4) Chapters 8 & 9	I will be able to: • *Distinguish between the geometric representations of a single linear equation or a system of linear equations in R^2 and R^3, and determine different configurations of lines and planes in R^3. (GA3)* • Represent lines and planes using scalar, vector, and parametric equations, and solve problems involving distances and intersections. (GA4)	I can: • *Recognize that the solution points of a single linear equations represent a line and that the solution points of a linear system of equations represent the point of intersection of the two lines in R^2.* • *Recognize that the solution points in R^3 of a single linear equation represent a plane, and the solution points of a linear system of equations in three variables represents a line of intersection of two planes.* • *Determine different geometric configurations of combinations of up to three lines and/or planes in R^3 , and organize these based on types of intersections.* • Recognize a scalar equation for a line in R^2, and represent a line using a vector or parametric equation (convert between forms!) • Recognize that a line in R^3 cannot be represented by a scalar equation, and represent these with the scalar equations of two intersecting planes, or vector and parametric equations. • Recognize a normal to plane geometrically and algebraically, and determine properties of the plane. • Determine the intersection of three planes by solving three equations in three unknowns algebraically, and make connections between the solution and the geometric configuration of the planes. • Determine the scalar, vector, and parametric equations of a plane given one of the other forms. • solve problems relating to lines and planes in R^3, and interpret the result geometrically.

Calculus	Learning Goal(s)	Success Criteria
Unit 1 – Introduction to Calculus (RC1) Chapter 1	I will be able to make connections between average rate of change and instantaneous rate of change using the slopes of secants and tangents and the concept of the limit.	I can: • describe real world examples of rates of change. • Make connections between average rate of change and the slope of a secant, and instantaneous rate of change and the slope of a tangent. • Recognize graphical and numeric examples of limits, and explain the reasoning involved. • Make connections between the average rate of change (difference quotient) and the instantaneous rate of change (limit) at a given point.
Unit 2 – Derivatives of Functions (RC2 & RC3) Chapters 2 & 5	I will be able to: • *Graph the derivatives of polynomial, sinusoidal, and exponential functions, and make connections between the representations of a function and its derivative.* • Prove the rules for determining derivatives, and apply these rules to polynomial, sinusoidal, exponential, rational, and radical functions to solve problems.	I can: • *Determine numerically and graphically the intervals over which the instantaneous rate of change is positive, negative, or zero for a function, and describe its behaviour between local maxima and minima.* • *Generate a table of values of instantaneous rate of change of a function (polynomial, sinusoidal, exponential, etc.) and then recognize that the graph produced represents the derivative of the function.* • *Examine the graphs of $y = e^x$ and $y = \ln x$, and realize that the functions are inverses, and then verify that the derivative of a^x is equal to $a^x \ln a$ for a variety of values of a.* • Prove the power and chain rules for a function of the form $f(x) = x^n$ graphically and algebraically. • Understand the proof of the constant, constant multiple, sum and difference rules graphically and algebraically. • Apply rules accurately the determine the derivative of a variety of functions, and solve problems involving these derivatives.
Unit 3 – Curve Sketching (AD1) Chapter 4	I will be able to make graphical and algebraic connections between a function and its first and second derivatives, and use these connections in curve sketching.	I can: • Sketch the graph of the derivative of a function and recognize points of inflection for that function. • Recognize the second derivative as the rate of change of the rate of change and sketch its graph. • Determine the equation of the second derivative algebraically for a polynomial or rational function, and make connections between the features of the graph and equation. • Describe polynomial functions given information about the first or second derivative of the function, and sketch a possible graph of the function. • Sketch the graph of a polynomial function given the equation using a variety of strategies.
Unit 4 - Applications of Derivatives (AD2) Chapter 3	I will be able to solve problems (including optimization problems) that require the use of derivatives and their properties.	I can: • Make connections between the concepts of motion and the derivative in a variety of ways. • Make connections between the graphical or algebraic representations of derivatives and real world applications, and solve problems involving these applications. • Solve problems involving instantaneous rate of change given the equation of a function. • Solve problems involving the optimization of polynomial, rational, and exponential functions.

Your grade will be determined based on these Learning Goals. Test questions will be categorized by learning goals instead of categories. You will still see a variety of question types (knowledge, communication, application, and thinking), but you will be assessed specifically on your ability to meet the goals of the unit. The weighting of each learning goal is listed in the table below.

Learning Goal (% of mark)			
Vectors		**Calculus**	
Geometry & Algebra of Vectors (GA)		**Rate of Change (RC)**	**Derivatives & Their Applications (DA)**
GA1 (12)	GA3 (12)	RC1 (8)	DA1 (12)
GA2 (12)	GA4 (12)	RC2 (8)	DA2 (8)
		RC3 (16)	

These Learning Goals reflect the overall expectations in the curriculum document, so if you can do all of that, you are ready for your next math course!