Cameron Heights Collegiate Institute
301 Charles Street E., Kitchener, Ontario N2G 2P8 (519)-578-8330 www.chci.wrdsb.on.ca

Subject	Grade	Level	Code	Prerequisite
Calculus & Vectors	12	University	MCV4UI	12 Advanced Functions

Course Description

This course builds on student's previous experience with functions and their developing understanding of rates of change. Students will solve problems involving geometric and algebraic representations of vectors and representations of lines and planes in three-dimensional space; broaden their understanding of rates of change to include the derivatives of polynomial, sinusoidal, exponential, rational and radical functions; and apply these concepts and skills to the modelling of real-world relationships. Students will also refine their use of the mathematical processes necessary for success in senior mathematics. This course is intended for students who choose to pursue careers in fields such as science, engineering, economics, and some areas of business, including those students who will be required to take a university-level calculus, linear algebra, or physics course.

Ministry Website

http://www.edu.gov.on.ca/eng/curriculum/secondary/math1112currb.pdf

	Unit of Study	Overall Expectations (essential understandings)	Assessment
70%	**Limits**	• demonstrate an understanding of rate of change by making connections between average rate of change over an interval and instantaneous rate of change at a point, using the slopes of secants and tangents and the concept of the limit	• Variety of formative assessments in the form of quizzes and assignments (1-2%) • Summative unit test (~8%)
	Derivatives	• verify graphically and algebraically the rules for determining derivatives; apply these rules to determine the derivatives of polynomial, rational, and radical functions, and simple combinations of functions; and solve related problems • make connections, graphically and algebraically, between the key features of a function and its first and second derivatives, and use the connections in curve sketching	• Variety of formative assessments in the form of quizzes and assignments (1-2%) • Summative unit test (~8%)
	Sketching	• graph the derivatives of polynomials, and make connections between the numeric, graphical, and algebraic representations of a function and its derivative	• Variety of formative assessments in the form of quizzes and assignments (1-2%) • Summative unit test (~8%)
	Applications of Derivatives	• solve problems, including optimization problems, that require the use of the concepts and procedures associated with the derivative, including problems arising from real-world applications and involving the development of mathematical models	• Variety of formative assessments in the form of quizzes and assignments (1-2%) • Summative unit test (~8%)
	Trigonometric Derivatives	• graph the derivatives of sinusoidal functions, and make connections between the numeric, graphical, and algebraic representations of a function and its derivative • verify graphically and algebraically the rules for determining derivatives; apply these rules to determine the derivatives of sinusoidal functions, and solve related problems	• Variety of formative assessments in the form of quizzes and assignments(1-2%) • Summative unit test (~8%)
	Exponential and Logarithmic Derivatives	• graph the derivatives of exponential functions, and make connections between the numeric, graphical, and algebraic representations of a function and its derivative • verify graphically and algebraically the rules for determining derivatives; apply these rules to determine the derivatives of exponential functions, and solve related problems	• Variety of formative assessments in the form of quizzes and assignments (1-2%) • Summative unit test (~8%)

	Geometric Vectors	• demonstrate an understanding of vectors in two-space and three-space by representing them algebraically and geometrically and by recognizing their applications	• Variety of formative assessments in the form of quizzes and assignments(1-2%) • Summative unit test (~8%)
	Algebraic Vectors	• perform operations on vectors in two-space and three-space, and use the properties of these operations to solve problems, including those arising from real-world applications	• Variety of formative assessments in the form of quizzes and assignments(1-2%) • Summative unit test (~8%)
	Lines and Planes	• distinguish between the geometric representations of a single linear equation or a system of two linear equations in two-space and three-space, and determine different geometric configurations of lines and planes in three-space • represent lines and planes using scalar, vector, and parametric equations, and solve problems involving distances and intersections	• Variety of formative assessments in the form of quizzes and assignments (1-2%) • Summative unit test (~8%)
30%	**Final Exam**	• Will include all of the overall expectations listed within the units of study	• Summative Final Exam (30%)