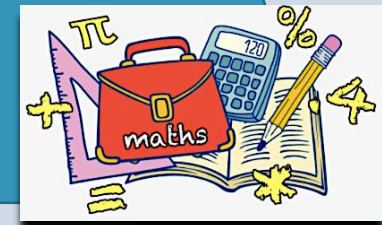


# Calculus and Vectors (MCV4U1)



This course builds on students' 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. In this course students will use higher order thinking to critically and reflectively evaluate situations and solve problems. 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.

## Derivatives and Their Applications

- Make connections between the first and second derivatives of a function
- Solve problems that require the use of the concepts and procedures associated with derivatives
- Sketch curves using the key features of functions and their derivatives

## Rates of Change

- Connect average rate of change and instantaneous rate of change using the slopes of secants and tangents
- Graph the derivatives of functions
- Verify graphically and algebraically the rules for determining derivatives

## Geometry and Algebra of Vectors

- Perform operations on vectors in two and three-space
- Solve real-world problems using the properties of vectors in two and three-space
- Represent lines and planes using scalar, vector, and parametric equations