



# PATTISON HIGH SCHOOL

*We don't teach a class, we teach individual students in a class*

## Calculus 12

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### Basic Information

Email: timothy.chan@pattisonhighschool.ca  
Location: Room 109  
Session: 10:25 am - 11:55 am (Short: 10:10 am - 11:25 am)  
Office Hour: 8:15 am - 4:15 pm

### Course Description

This Calculus 12 course fully meets the learning outcomes of the BC Curriculum. It is designed to prepare students to take calculus at the post-secondary level. Students will get a basic understanding of calculus which covers limits, derivatives, integrals, and their applications.

### Big Ideas

- The concept of a limit is foundational to calculus
- Differential calculus develops the concept of instantaneous rate of change
- Integral calculus develops the concept of determining a product involving a continuously changing quantity over an interval
- Derivatives and integrals are inversely related

### Resources

Textbook: CALCULUS 12 (The Infinite Challenge Workbook Series)

## Topics

Chapter	Content
1. Precalculus Review	Geometry Polynomials / Rational Expressions Functions Graphs of Polynomial Functions Transformations / Rational Functions Circles and Parabolas
2. Limits and Continuity	Limits Limits Involving Infinity Continuity Average Rate of Change and Instantaneous Rate of Change
3. Derivatives, Part I	Definition of the Derivative Differentiability Power Rule Product Rule Quotient Rule Chain Rule Implicit Differentiation Higher Order Derivatives
4. Derivatives, Part II	Review of Trigonometric Functions Limits of Trigonometric Functions Derivatives of Trigonometric Functions Inverse Trigonometric Functions Derivatives of Inverse Trigonometric Functions Review of Exponential and Logarithmic Functions Limits of Exponential and Logarithmic Functions Derivatives of Exponential Functions Derivatives of Logarithmic Functions
5. Applications of Derivatives	Critical Points Extrema: Maximum & Minimum Value Concavity Curve Sketching Relation of $f'(x)$ , $f''(x)$ to the Graph of $f(x)$ Motion Along a Line (1-Dimension) Modeling and Optimization

	Related Rates Local Linear Approximation Newton's Method *L'Hôpital's Rule (The Basic)
6. Integration	Indefinite Integrals Integration by Substitution ( $u$ -Substitution) Integration by Parts Rectangular Approximation Method (RAM): Riemann Sums Trapezoidal Approximation Summation Technique Definition of Area as a Limit: Limit of Riemann Sum Definite Integrals Fundamental Theorem of Calculus, Part I Substitution for Definite Integrals Integration by Parts for Definite In- tegrals Area between a Curve and the $x$ -axis Even and Odd Functions
7. Applications of Definite Integrals	Average Value of a Function Area Between Curves Volume of Solids of Revolution: Disks, Washers and Cylindrical Shells Motion Along a Straight Line (1- Dimension) First Order Separable Differential Equations Exponential Growth and Decay Mod- eling (First-Order Differential Equa- tions)

## Expectations

### Attendance

Students are expected to attend each class and notify the school if and when they have to be absent, giving a suitable reason for the absence.

Students should arrive at their classes on time and be prepared to study. They should not normally expect to leave the classroom near the beginning or end of class.

## **Clothing and Appearance**

School clothing must be evident as the outer layer while in the classroom.

Body modification, in any of its forms, may not be suitable for the school community and may require a return to an original presentation.

## **Electronic Devices**

Students must turn off their cell phones during class, and put them in their locker.

Ear buds and headphones are prohibited in the classroom, unless specifically allowed.

## **Attitude**

In order to succeed, it is important that students pay close attention in every class, attend and participate in all class activities, do all homework assignments on time, and bring materials to class such as a printed English language dictionary, a binder in which to keep notes and papers, and stationary.

## **Language**

The use of the English language at all times when in the classroom.

## **Classroom Environment**

It is important to keep the classroom clean and tidy. Other than water, no food or drink is permitted in the classroom.

## **Honesty**

Students always present work that is their own, original work - and not the result of cheating or plagiarism; the course is founded upon the trust in academic honesty.

## **Evaluation**

<b>Course Work</b>	<b>Percentage</b>
Homework	20%
Quizzes	20%
Midterm	20%
Final Exam	40%
<b>Total</b>	<b>100%</b>