# MATH 4907/6101, Winter 2018 Topics in Algebra

# Topic: Introduction to Noncommutative Algebraic Geometry

Carleton University
School of Mathematics and Statistics

### **INSTRUCTOR**

Colin Ingalls

# **CLASS TIMES**

Tue Thu 10:05 - 11:25

## **LOCATION**

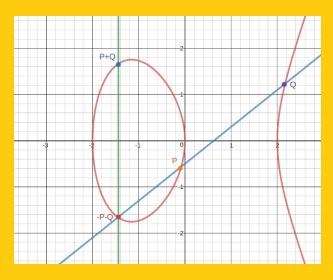
230 Tory Building

**Recommended:** Taking this course concurrently with M4107 and/or M4306.

Prerequisite: MATH 3158 or permission

of the School.

Here as he walked by on the 16th of October 1843 Sir William Rowan Hamilton in a flash of genius discovered the fundamental formula for quaternion multiplication  $i^2 = j^2 = k^2 = ijk = -1$  & cut it on a stone of this bridge





### **COURSE DESCRIPTION**

Noncommutative Algebraic Geometry studies the interplay between noncommutative algebra and geometric methods and ideas. Noncommutative algebra plays a key role in quantum mechanics and representation theory. We will discuss hereditary orders, skew group rings and noncommutative curves and surfaces. Algebras of polynomial differential operators and algebras associated to elliptic curves will also be studied.

- Are there matrix solutions to yx xy = I
- For a fixed  $q \in \mathbb{C}^*$  are there matrix solutions to

$$yx = qxy$$
?

 $\mathbb{H}=\mathbb{R}\oplus\mathbb{R}i\oplus\mathbb{R}j\oplus\mathbb{R}k$   $\mathbb{H}\otimes\mathbb{H}=\mathbb{R}^{4 imes4}$