Middlesex University London

Bridge to University

Motivational sessions for A-level students

These entirely self-contained sessions run by Middlesex Mathematics lecturers are designed to motivate and engage A-level maths students as they prepare for their exams.

Each of these $1-1.5$ hour workshops reviews a specific area of A-level mathematics before looking at how this area relates to university mathematics and to commerce, industry and research.

Contact Nick Sharples n.sharples@mdx.ac.uk to arrange one (or more) workshops either in your school or at our North London campus.

We also offer bespoke workshops for Statistics, Mechanics and Decision A-level modules.

Session list

Integration in higher dimensions

Review integration (C1, C2, or C4) before introducing calculus in higher dimensional spaces: integrating over curves, surfaces and how these relate to important physical quantities in areas such as fluid dynamics and electromagnetism.

Trigonometry and the infinite

Review trigonometric functions and trigonometric identities (C2, C3) before taking a conceptual jump to see how trigonometric functions are treated at university (as infinite series), and why this shift is important!

Binomial theorem: counting possibilities

Review the Binomial Theorem for positive integers (C2) and rational powers (C4) before looking at the derivation of this important formula and its role in

- probability, and
- combinatorics - a huge field of mathematics!

Coordinate geometry and astronomical models

Review coordinate geometry of circles (C2) or parametric equations (C4) before using Copernicus' heliocentric theory to give a gentle, geometric introduction to Fourier Analysis - hugely important in engineering!

(Computer lab required, or visit us on campus!)

Numerical methods: why computers can't do maths!

Review numerical methods for root finding (C3, FP1) and numerical integration (FP2) before looking at

- why researchers still look for faster numerical methods despite the increasing power of computers, and
- why we still need rigorous maths in the computer age.

(Computer lab required, or visit us on campus!)

Algebra to abstraction

Review algebraic fractions (C3) and partial fractions (C4) before taking a conceptual jump to how polynomials are treated at university: as abstract mathematical objects.

Functions: beyond differentiability

Review composition, inverses and properties of functions (C3) before moving from the 'nice' functions of A-level to seeing how badly behaved functions can be and why they are important in maths, science and engineering.

Matrices and geometry

Review matrices (FP1) before looking at how matrix inverses are used to find maps between geometric objects.

Matrices and groups

Review matrices (FP1) before a gentle introduction to abstract algebra using simple matrix operations.

Differential equations and long term trends

Review first and second order Ordinary Differential Equations (FP2) before looking at how we can determine long term trends from differential equations without having to solve them!