## Lancaster University

## Supporting students without A-level maths

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- Not all STEM courses at Lancaster University require A-level mathematics - widening participation policy.
- Environmental Sciences and Chemistry do not require A-level mathematics - the minimum GCSE requirement for maths is a grade of 5 .


## What is the problem?

- Engineering admits students with BTEC in "an Engineering related subject". The minimum GSCE requirement for maths is a grade of 6 .
- Some students come from abroad or are mature students.


## Case study A

## "Paula" -

 a mature first year student in Environmental SciencePaula's level of mathematics

- Paula has achieved a B in GCSE mathematics 10 years ago.
- Struggles to do basic algebra - e.g. cannot rearrange equations.
- No knowledge of indices.
- Struggles to do basic arithmetic with fractions.
- Lacks basic arithmetic skills
- e.g. does not differentiate between $(5-1)$ and $5 \times(-1)$
- Simultaneous equations
- Trigonometry
- Differentiation
- Integration
- Numerical methods for integration


## Case study B

## "Mark" a first year student in Engineering

## Mark's level of mathematics

- Mark has done a BTEC in Engineering.
- Failed all first year maths modules and is repeating the year.
- Struggles to do basic algebra - e.g. can't rearrange equations without guidance.
- Struggles to do algebra and arithmetic with fractions e.g. thinks that $\frac{1}{a+b}=\frac{1}{a}+\frac{1}{b}$.
- Has no knowledge of functions and how to graph a function.
- Complex Numbers
- Limits, Series and Sequences
- Advanced Calculus
- Linear Algebra - matrices and vectors
- Fourier Series
- Differential equations


## What has been done?

- We offered:
- Additional maths workshops for Environmental and Engineering students
- General workshops covering GCSE and A-level topics
- Weekly Drop-in Sessions
- One-to-one tutorials covering year one topics


## What more can be done?

- Department cooperation
- Additional Funding
- Suggestions:
- A foundation year
- A crash course in algebra
- Timetabled/compulsory workshops
- Additional one-to-one support to cover the gaps in knowledge


## Thank you!

Questions?

