



Advanced Mathematics  
Support Programme®



## Year 12 Regular Problem Solving Classes

### Peterborough

30th January 2020

#### Overview

A series of maths problem-solving sessions designed to give students the confidence to apply for university courses that require or take into consideration achievement in an admissions test.

These regular classes offer students the opportunity to develop mathematical problem-solving skills through discussion and collaboration. They are designed to help students to develop strategies and confidence when tackling unfamiliar problems in maths and will help with preparations for taking advanced papers such as the MAT, TMUA and STEP examinations.

At the same time, the problems used in the course are fun and rewarding. Attending the sessions will greatly enrich students' mathematical experience and help them to develop a better understanding of A level Mathematics.

#### Aims

- To develop initial strategies when dealing with maths problems
- To develop confidence when dealing with maths problems
- To provide some initial information about the problem solving involved in university admissions tests
- To provide a platform on which to build secure problem solving techniques
- To develop tenacity when dealing with maths problems

#### Who will benefit from attending?

The course is designed for any A level Mathematics students who have an enquiring mind and wish to develop their problem solving ability for their A level studies and beyond.

It is particularly useful for those students who wish to make the first steps in preparing for university admissions tests such as the MAT, TMUA and STEP examinations.

## Content

The course covers a wide range of mathematical disciplines with problems. These can include

- Algebra: the difference between two squares and other identities
- Geometry: angles, triangle and circles
- Number: digits and divisibility
- Algebra: forming and solving equations
- Combinatorics: systematic counting
- Number: prime factorisation, fractions and irrationals
- Algebra: sequences and series
- Number: indices and logarithms
- Algebra: quadratics, cubics and other polynomials
- Geometry: trigonometry
- Combinatorics: further systematic counting and placement
- Geometry: coordinates and vectors
- Calculus: curve sketching and differentiation
- Calculus: integration
- Combinatorics: the binomial expansion

## Materials and Equipment

Students do not need any special equipment for the course although a smartphone with the GeoGebra or the Desmos apps installed may be useful.

## Other Information

The following problems provide a taste of the sort of problem solving that will be encountered in the classes

**Problem 1:** How many primes greater than two can be found that are one less than a square number?

**Problem 2:** How many pairs of integers can you find that satisfy the equation  $\sqrt{x^2 - y^2} = 45$ ?

## Study Schedule

### Spring Term

**30-Jan** Difference of two squares

**13-Feb** Angles, triangles and circles

**27-Feb** Digits and Divisibility

**12-Mar** Forming and solving equations

**20-Mar** Counting

### Summer Term

**23-Apr** Prime factors, fractions, irrationals

**07-May** Trigonometry

**21-May** Quadratics, cubics, other polynomials

**4-Jun** Curve sketching and differentiation

**18-Jun** Indices and Logarithms

## Key Facts

<b>Event ref:</b>	#7142
<b>Audience:</b>	Students
<b>Target year:</b>	Year 12
<b>Curriculum focus:</b>	University admissions tests, A level Mathematics, A level Further Mathematics
<b>Mathematical focus:</b>	Pure, Problem solving
<b>Event format:</b>	Student course
<b>Event length:</b>	20 hours
<b>Region:</b>	East of England
<b>Venue:</b>	The Kings (The Cathedral) School, Park Road, Peterborough, PE1 2UE
<b>Next session:</b>	Thu 18th Jun 2020
<b>Course times:</b>	16:00 - 18:00

## Registration

For more information, or to register for this event, please visit <https://amsp.org.uk/events/details/7142>