



Advanced Mathematics
Support Programme®



Year 12 Regular Problem Solving Classes

Middlesbrough

13th July 2019

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 $x^2 - y^2 = 45$?

Study Schedule

Last session is this year's series which is going to take place on the 13th July is welcoming year 11 students who will have a chance to solve problems relevant in higher mathematics, so we recommend it to students who will continue Maths post 16.

Each 4 hour session is essentially stand-alone so there is no requirement necessarily to attend all five sessions, although we would encourage students to attend as many sessions as they can. Students who have attended similar sessions in previous years can expect to meet plenty of new materials this year. Year 12 and 13 students will benefit most but Year 10 and 11 who plan to study Maths post 16 are also welcome.

Sessions will take place, 9:30-13:30 on the following dates:

- 24 November 2018
- 2 February 2019
- 16 March 2019
- 4 May 2019
- **13 July 2019**

We aim to start by 9:30 am and finish by 1:30pm, with some short breaks in between. We cannot provide refreshments but there are vending machines on the site or students can bring food and drinks along with them.

We advise students to bring their own pens, pencils, paper and other equipment. If they wish, they may also bring calculators or other technological devices. We will welcome students at the Main Reception.

Middlesbrough College campus and is a 2 min walk from the train station and 5 min walk from the Middlesbrough bus station. If you are coming by car, the best thing would be to park on the side road for £ 1.20 as the parking is not free.

Follow the link for the map of Middlesbrough College.

<https://www.northernskills.co.uk/contact-us/middlesbrough-college-campus>

Please email valerija.peles@amsp.org.uk for any questions related to this course.

Key Facts

Event ref:	#5323
Audience:	Students
Target year:	Year 12
Curriculum focus:	University admissions tests, A level Mathematics, A level Further Mathematics
Mathematical focus:	Pure, Problem solving
Event format:	Student course
Event length:	20 hours
Region:	North East
Venue:	Middlesbrough College, Sixth Form building (MC6), Dock Street, Middlesbrough, TS2 1AD
Date:	Sat 13th Jul 2019
Course times:	09:30 - 13:30

Registration

For more information, or to register for this event, please visit <https://amsp.org.uk/events/details/5323>