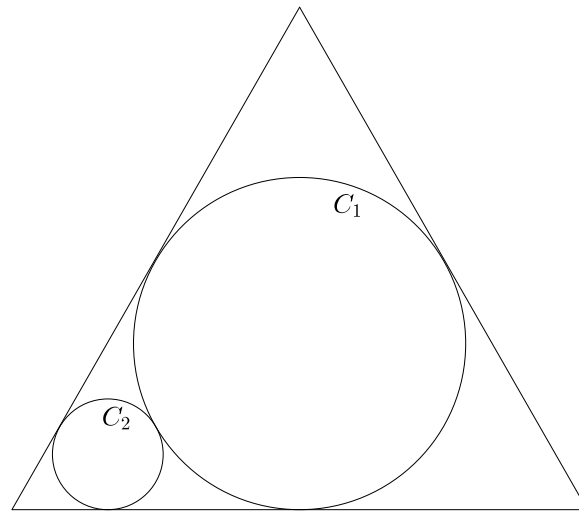


## Year 12 Advanced mathematics problems course 2022-2023.

*Sample problem.* The diagram below shows a circle  $C_1$  inscribed in an equilateral triangle of side 6 units.  $C_2$  is a circle that touches  $C_1$  and two sides of the triangle as shown. Given that the base of the triangle is on the  $x$  axis with the origin at the lower left vertex. Find the coordinates of the centres and equations of  $C_1$  and  $C_2$ .



### Course aims and description

The aims of the year 12 advanced problems course are:

1. The development of students' mathematical thinking.
2. Increasing students' confidence in solving unstructured problems.
3. Improved preparation for the MAT, AEA and STEP examinations.

The problems in the course are based year 12 pure mathematics topics but are unstructured and challenging. Students on the course are expected to do preparatory reading prior to the problems classes.

The course is free for all year 12 students. Students should email [mathsor@le.ac.uk](mailto:mathsor@le.ac.uk) to apply for a place on the course.

The classes will be face-to-face in university venues.

Students who attend regularly will obtain a School of Computing and Mathematical Sciences Certificate of Participation. Students who attend regularly and submit the course assignment will obtain a School of Computing and Mathematical Sciences Certificate of Achievement.

The topics and dates for the classes are given in the table below.

### The course schedule

Class topic:	Date/times
Algebra 1	Oct tba: 4.30 to 6 pm
Coordinate Geometry 1	Nov tba: 4.30 to 6 pm
Series 1	Nov tba: 4.30 to 6 pm
Calculus 1	Dec tba: 4.30 to 6 pm
Algebra 2	Jan tba: 4.30 to 6 pm
Coordinate Geometry 2	Feb tba: 4.30 to 6 pm
Series 2	Feb tba: 4.30 to 6 pm
Trigonometry	March tba: 4.30 to 6 pm
Logarithms	March tba: 4.30 to 6 pm
Calculus 2	April tba: 4.30 to 6 pm