University of Toronto

Mathematics Network

SOAR 2000

Mathematical Sciences Summer Camp

*S**ummer** O**pportunity in** A**pplied** R**esearch*

A great way to spend part of the summer--exploring mathematics!

SOAR through an intensive three-week mathematical sciences camp!

SOAR 2000 takes place from July 24 to August 11, 2000, at the University of Toronto's St. George campus. It runs Monday through Friday, from 10:00 am to 3:00 pm. The topic this year is **NUMBER THEORY**.

The **SOAR into Mathematical Sciences Summer Camp** is an opportunity to explore a challenging mathematical topic in a stimulating environment. Excellent high school students, who can easily grasp new concepts, will soar into these investigations of sophisticated university-level mathematics and be challenged to think in different ways. **SOAR 2000** will be a great way to see what life at the University of Toronto and mathematical research are really like. You'll have the opportunity to explore and use campus resources such as the mathematics library and some computer facilities, as well as participate in recreational activities during the social events. A typical week at **SOAR 2000** will include lectures, tutorials, problem-solving sessions, and related games. Since mathematics is best learned by doing, emphasis will be on solving numerous problems related to **number theory**.

About the Topic

Number theory deals with the properties of the oldest mathematical objects studied by mankind: the natural numbers 1, 2, 3, etc. Despite the apparent simplicity of the objects of study and the ease with which questions about the natural numbers are posed, number theory contains some of the most complex and beautiful mathematics ever discovered. In the past, number theory has had very few practical applications, but it has recently evolved to play an important role in information transmission and retrieval, both in terms of reliability (error-correcting codes) and security (cryptography).

This introduction to number theory will cover topics such as the Euclidean algorithm, modular arithmetic (congruences), quadratic residues, factorization, the structure of codes, Egyptian fractions, and sums of squares. From this program you will gain a sound understanding of the foundations of number theory as well as exposure to several applications and areas of advanced research. Most of all, you will have the chance to immerse yourself in one of the most elegant areas of pure mathematics, one which has engaged scientists for over 4,000 years.

Who can attend?

The program is for students who are currently in grades 10 to OAC. Acceptance into SOAR will be based on a competitive process which takes into consideration mathematical aptitude, personal maturity, motivation, and the ability to work in a team. Other desirable assets are experience with Mathematica (which will be used during the program) and Maple, descriptive writing proficiency and artistic ability. **SOAR** receives applications from some of the best students in Ontario and elsewhere.

Residence information is available for those who live beyond an easy commute. We cannot take responsibility for the students outside program hours.

How much does it cost?

A fee of $300 per student, payable to 'University of Toronto', is required for the three week program and should accompany the application form. Refunds (minus a $35 administration charge) will only be issued up to June 30th. **SOAR** is a non-profit program; the fee assists in covering the cost of lectures and computer time, class notes, occasional lunches, daily snacks and other incidentals.

*NOTE: There is financial assistance available on the basis of need. The Department of Mathematics will support your request to reduce the cost of the camp **jointly** with your school. If you feel that you would need such assistance, please indicate this fact on your application.*

How to apply?

Mail the **application form** and the **teacher recommendation form**, *along with your **registration fee** and the **required supporting materials*** (as listed on the application form), to the address below by **Friday, June 2, 2000**. Late applications will be considered only if space is still available.

SOAR 2000 Mathematical Sciences Camp
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Direct your inquiries to the address on the left or:
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