

# R.E.U. IN NUMBER THEORY: INVESTIGATING ELLIPTIC CURVES, MODULAR FORMS AND $q$ -SERIES

## OVERVIEW.

Pending final approval by the National Science Foundation, we will be running an intense seven week research experience for 8-10 undergraduates for the summer of 2003 in the Department of Mathematics at the University of Wisconsin at Madison. The program is an ambitious research experience in Number Theory concentrating on the following two themes:

- I. Elliptic curves and Modular forms.
- II.  $q$ -series, Partitions and values of functions like Riemann's Zeta-function.

There are two main objectives for this REU. First and foremost, we aim to have fun with the program. The selected problems are of wide interest, and are carefully chosen as to maximize the likelihood of success. In particular, there are many natural incremental problems in the course of these projects, and so it is virtually certain that all of the students will enjoy a measure of success. Secondly, we hope to resolve some modest open problems in each of these two main areas. With some luck, the effort will result in publications which are solid contributions to the literature.

The students will be divided into two teams at the end of the first week, and they will spend most of their research time working with their team-mates on the designated problems (see below).

The seven week program will begin with one week of lectures. During the first week of the program, each day there will be three one hour lectures. At the end of the first week, detailed descriptions of the two main research projects will be distributed. The two teams will be selected at that time. The remaining six weeks are devoted to reading, research, cross-fertilization, and exposure.

## FINANCIAL SUPPORT

To be eligible for the program, an applicant must be an undergraduate student that is a U.S. citizen or permanent resident. Moreover, the student must not hold an undergraduate degree during the period of the program. Selected participants will receive free lodging, a \$ 3,200 stipend, and up to \$400 in travel expenses.

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