Advanced Functions and Modeling Workshop

Date:       June 19-23, 2006

Location:   The North Carolina School of Science and Mathematics, Durham, NC

Offered by: The Mathematics Faculty at The North Carolina School of Science and Mathematics

Cost:       $25 Registration fee

Students admitted to any University of North Carolina institution must complete four years of high school mathematics. To meet this requirement many students take the new mathematics course, Advanced Functions and Modeling (AFM).

To prepare North Carolina teachers to teach Advanced Functions and Modeling, the mathematics faculty at The North Carolina School of Science and Mathematics, with support from Duke Energy Foundation and other funders, will offer a one-week residential workshop on the NCSSM campus. Participating teachers will learn the mathematics content of the new AFM course, focusing on concepts such as data analysis, mathematical models, and the process of using functions to model real world phenomena. Interactive, hands-on sessions will provide participants the opportunity to explore new ideas and practice with calculator technology and lab activities. In addition, pedagogy and assessment will be discussed. This workshop is also a special opportunity to gather materials and ideas to share with colleagues who may also teach AFM. The daily schedule will run from 8:30 am until 4:30 pm.

Participants have the option to reside on the NCSSM campus for the week. Single occupancy dormitory housing, continental breakfast, lunch, and two snacks will be provided each day.

Apply now. Closing date April 17, 2006 or when maximum enrollment attained.

Participants will receive:
Housing and board, a notebook of materials, a resource textbook, a stipend of $50/day, a calculator and 3 CEUs

Registration Contact
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To register, please complete an application.

Application available at http://courses.ncssm.edu/math/ConfWork.html

The North Carolina Department of Public Instruction (NCDPI) has developed the curriculum for this course. AFM course goals and sample problems are on the web at http://courses.ncssm.edu/math/ConfWork.html
Advanced Functions and Modeling

Sample problems that will be explored in the AFM workshop

The Midge Problem: In 1981, two new varieties of a tiny biting insect called a midge were discovered in the jungles of Brazil by biologists W. L. Grogan and W. W. Wirth. They dubbed one kind of midge an Apf midge and the other an Af midge. The biologists found that the Apf midge is a carrier of a debilitating disease that causes swelling of the brain when a human is bitten by an infected midge. Although the disease is rarely fatal, the disability caused by the swelling may be permanent. The other form of the midge, the Af, is quite harmless and a valuable pollinator. In an effort to distinguish the two varieties, the biologists took measurements on the midges they caught. The two measurements taken were wing length and antenna length, both measured in centimeters. The data are provided below.

Af midges

Wing length (cm) 1.72 1.64 1.74 1.7 1.82 1.82 1.9 1.82 2.08

Antenna length (cm) 1.24 1.38 1.36 1.4 1.38 1.48 1.38 1.54 1.56

Apf midges

Wing length (cm) 1.78 1.86 1.96 2.0 2.0 1.96

Antenna length (cm) 1.14 1.2 1.3 1.26 1.28 1.18

Determine a way to distinguish an Af midge from an Apf midge on the basis of wing and antenna lengths?


A Drug Problem using Recursion: After a person takes a pain medication, his kidneys filter the medicine out of his bloodstream. During any 4 hour time period, his kidneys will remove 35% of the medication that remains in the bloodstream. Suppose a patient takes 800 mg of ibuprofen at 8 am on Tuesday morning. If he does not repeat the dosage, how much medicine will remain in his bloodstream at 12 midnight on the same day? Next suppose a patient takes 800 mg of ibuprofen at 8 am on Tuesday morning, and repeats the same dosage every 4 hours. How much medicine will remain in his bloodstream at 12 midnight on the same day (immediately before he takes his 5th dosage)? This patient continues taking 800 mg of ibuprofen every 4 hours for several days. The amount of ibuprofen in his bloodstream (in mg) varies between two amounts. What are they? (sample indicator from NC SCOS AFM goal 2.05)