Math Camp is one challenging way for some high schoolers to spend vacation

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For Dr. Max Warshauer, no principle of mathematics is more important than the lesson he learned as a high school student at Ohio University's summer math camp: "Think deeply of simple things."

Thinking mathematically, Warshauer is convinced, involves far more than solving a problem correctly. To think mathematically, he maintains, is also "to question, to explore, and reason carefully, rigorously, and precisely."

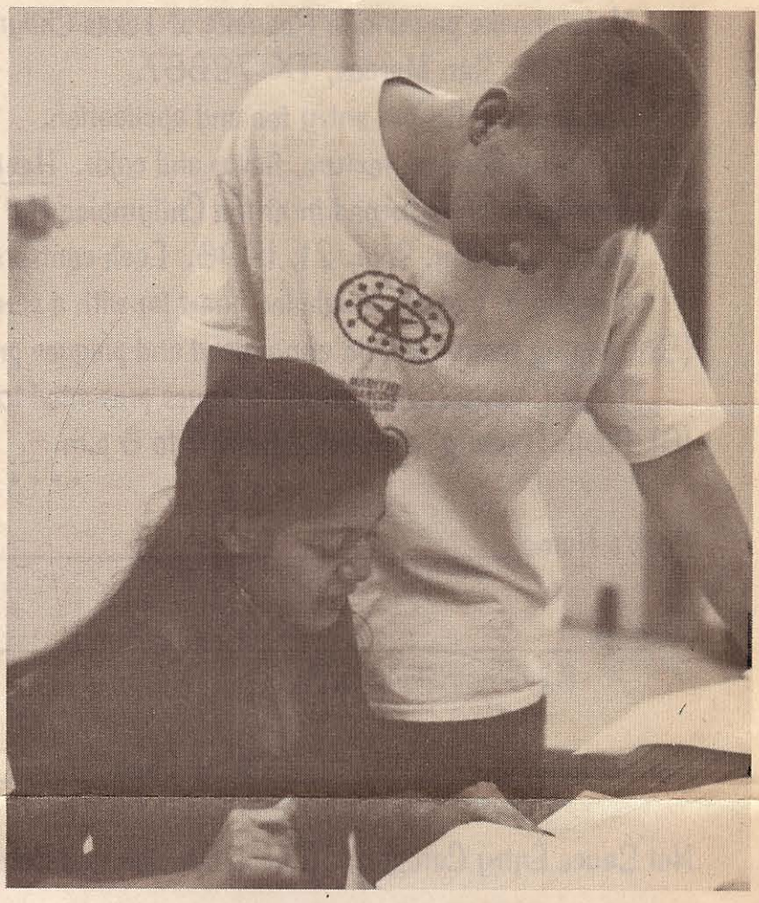
And it is this philosophy that has guided Warshauer not only in his role as professor of mathematics at Southwest Texas State University, but also as director of the SWT Math Camp, which recently completed its seventh session.

"We begin by assuming almost nothing [about what the students know]," explains Warshauer, "but by the end of the program, they're proving Gauss' Theorem of Quadratic Reciprocity, which took him a year to prove when he was their age."

Sponsored by the National Science Foundation Young Scholars Program, the Math Camp Endowment, and the RGK Foundation, the SWT Math Camp is open to high school students, 10th grade and above. This year's participants included 35 first-year students, 17 returning students, four junior counselors, and 10 senior counselors. For the first time in the camp's history, the program also was open to high school teachers, who, like the majority of the students, came from throughout the state of Texas.

The purpose of this new component, which is made possible by the NSF and the Texas Statewide Systemic Initiative, is both to "excite participants with the joy of doing mathematics" and to give them the pedagogical skills needed to teach such mathematics in appropriate high school courses.

"The National Science Foundation set up state systemic initiatives with the idea of impacting public education systemically," explains Warshauer, noting that the SWT Math Camp is more than a recipient of the initiative's support. It also will be featured as a model during a special convocation to be held by the Initiative at the University of Texas or SWT in the spring of 1997.



Math campers

High school students at Max Warshauer's SWT Math Camp spend their summer vacation proving Gauss' Theorem of Quadratic Rciprocity.

What are the components of the camp, which has been so successful these last seven years? At the heart of the program are the six courses taught by SWT faculty: elementary number problem solving, with *Mathematica* computer lab (Max Warshauer); problem solving, with *Mathematica* computer lab (Don and Carol Hazlewood); discrete mathematics (Terry McCabe and Eugene Curtin); the honors seminar (Ron Brown); analysis (Terry McCabe); and abstract algebra (Xingde Jia).

The eight high school teachers, each of whom made a two-summer commitment to the program, took a course in learning theory (Sharon Gronberg and Paul Kennedy) in addition to courses in mathematics.

To supplement these core courses, students and teachers also participated in a weekly colloquium and picnic, which was held at City Park each Friday during the six-week camp. Speakers were chosen not only for their expertise in the field, but also for their ability to reinforce the ideals of teamwork and persistence, and to provide good career models for the students.

"They really add a depth to the program," says Warshauer. This year's guest lecturers included Darrell Piersol from the Governor's Executive Development Program ("Careers and Managing Change"), the syndicated columnist Heloise ("Practical Use of Mathematics"), Barbara Bolin from Dell Computers ("What Is Business Looking For?"), Kathy Davis from the University of Texas ("Chaos and Fractals"), Martha Smith from UT ("Various Angles on the Sum of the Angles of a Triangle"), Elaine Hernandez and Ann Molly from Teach for America ("The Role of Mathematics in Education"), Steve McAdam from UT ("Irrational Numbers"), Pat Cassidy from SWT ("Careers in Science"), and Mike Starbird from UT ("The Fourth Dimension").

Yet another important component of the program is the problem solving session held each day. Divided into groups of four, students spend the afternoon working with each other and a senior counselor on a variety of problems. The emphasis during this time, Warshauer says, is learning to communicate ideas clearly.

In addition to working with camp participants during the problem solving session and the study sessions held each evening, counselors also present workshops on such topics as the National Math

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Exam and techniques for build ing a homepage.

"They really set a wonderfu tone for the program," War shauer says of the counselors Of the 10 senior counselors par ticipating this summer, seve were undergraduates who previ ously had attended the mat camp, two were undergraduate at SWT, and one was a graduat student at UT. Universities rep resented, in addition to SWT an UT, were Harvard, MIT, Rice Grinnell, and TCU.

Intense as their schedule is students attending the SW Math Camp also have ampl time for recreation. "We do mor than mathematics," says War shauer. "We try to develop a per son who will want to contribut to society and feel comfortabl working with people. It's sort o a holistic experience."

Weekend activities include a canoe trip down the San Marco River, a hiking expedition a Enchanted Rock, a visit t Southwest Research, and a trip to the Bamberger Ranch nea Johnson City.

"David Bamberger gives us a special tour and talks and con servation, about how you can' solve problems in isolation, Warshauer explains. "Carefu thinking about problems is on of the things we're interested in so we're looking forward to visit ing him again next year."

During their time in San Mar cos, students also enjoyed visits from SWT administrators including President Jerome Sup ple and Vice President Geral Hill, and from State Representa tive Sheri Greenburg. ""It was really exciting for her to see what we were doing firsthand," notes Warshauer. "I appreciate her taking time to visit with us."

What does Warshauer see when he looks to the future o the SWT Math Camp? Two important changes instituted this summer—the creation o the component for teachers and the addition of a two-week camp for younger students—will no doubt have a long-term impact on the program.

"We've expanded into a junior camp to introduce fourth through sixth graders to algebra and using calculators," explains Warshauer. "Next year we'll have a drama component with [SWT playwright] Chuck Pascoe."

Looking ahead, Warshauer also hopes to see significant growth in the SWT Math Camp Endowment. "We're continuing to build it up," he points out. "Money from this fund, which got its biggest push from the RGK Foundation, goes to student scholarships. Many students wouldn't be able to come otherwise."

In short, without assistance from the endowment, a number of students would miss what, for many, is literally the experience of a lifetime. One former participant summed up the benefits of the camp in this way:

"Now that I have completed my first year as an undergraduate at MIT, I realize the impact camp had in my preparation for college. I was never challenged very much in high school. When I attended the math camp in