

CONTESTS – A NON-THREATENING APPROACH

*Lowell Leake
Department of Mathematical Sciences
University of Cincinnati
Cincinnati, OH 45267*

For the past three years the University of Cincinnati (U.C.) has sponsored high school competitions (grades 7–12) in mathematics and computer science. The Department of Mathematical Sciences and the Department of Computer Science have organized and administered the contests, and a local school district has assumed responsibility for getting schools to enter teams for the competitions. The local school district was Wyoming in 1985-6 and Oak Hills in 1986-7 and 1987-8. The idea for the contests came from one of the Superintendents of the Wyoming Schools, and the unusual features of the contests which he suggested have been extremely successful. The purpose of this paper is to describe these unusual features so that other school districts and local colleges or universities might use U.C.'s experience to launch their own contests.

The contests are held on a Saturday morning on the campus of the University of Cincinnati. About 70 teams from about 45 schools are entered. Although most of the schools have been public schools, the number of parochial and private schools are increasing (5 in 1988). Each team from a school has 3 to 5 members. Each team works as a group, and a single, team solution is presented for each problem for judging. No individual is identified as the "solver". A total of 325 students took part in 1988. A team can enter any one of three levels of competition in mathematics or any one of two levels in computer science. At the final meeting of all contestants on the contest day awards are given out. These consist of a certificate and a ribbon for each student who participated. The levels of the awards (which are printed on the ribbons) are SUPERIOR, EXCELLENT, GOOD and PLACE. The unusual features that have worked so well are: No individual is scored – only team results are graded by the judges. Second, no team awards are announced or publicized in any way – only the members of a particular team know the award their team achieved.

The reasons for having only team scores and for not announcing team awards are primarily for broadening participation. The Cincinnati region has, like any metropolitan area, a wide variety of public, parochial, and private schools. By keeping team awards a private matter, it was felt that schools which might not

emphasize college preparatory programs would be more willing to enter teams in the same contests with schools that are designed for college preparatory students. Without doubt, this has been achieved. Secondly, by having team scores only — in addition to not announcing team awards — it was felt that the contests would attract more students who typically have not been eager to risk such competition; specifically, it was hoped that more female students and more minority students would take part. This hope has been partially achieved. In 1988, 34% of the student participants were female, 40% if only the students in the mathematics contest are counted. This has been very encouraging, and it is anticipated that there will be an even larger proportion of females for 1989. The contests have had only mild success in attracting minority students, but mild success is better than none. In 1989 there will be a more involved strategy for getting more minority students to participate.

In addition to the 325 student participants, about 80 — 90 people assist in the details of running the contests. These people are local high school mathematics or computer science teachers, faculty from the University of Cincinnati (including mathematics/computer science specialists from the College of Education) and graduate students from the Department of Mathematical Sciences. A few undergraduate students also assist. This aspect of the contests has already created a much better mutual understanding between faculty at U.C. and local high school teachers. It has also made some very bright high school students much better acquainted with the University. Finally, it has improved communications between the two departments involved and the specialists in those areas from the College of Education.

After the first year of the contest, 1986, the author wrote a proposal for support from the Ohio Board of Regents, under the Ohio Education for Economic Security Act Program (EESA), Section 207(c). This section specifically encourages contests for certain subject matter areas. The OBR did give awards for the 1987 and 1988 contests (about \$4,000 each year). Another proposal has been sent to the OBR for 1989, but it is not yet known if this will be awarded. The principal reason for the grant proposal was to give modest stipends (about \$50) to each high school teacher, faculty member or graduate student who helped with the contest. It was felt that giving up a Saturday morning or helping to prepare questions ought to have some kind of concrete recognition. This has definitely been appreciated by those who have helped, and the Ohio Board of Regents deserves a great deal of

credit for its assistance.

The contests are evaluated in two ways. One is with formal questionnaires and letters to those who help. Another is by having the director of the contests chat informally with those who are helping on the day of the contests. These contacts turn up minor glitches that occur and give the director valuable feedback about all aspects of the contests — good or bad.

Following are some statistics for the 1987-88 contests. The numbers represent number of student participants in that category.

	Grades 6-9	Grades 10-12	Female	Male
Mathematics	98	153	101	150
Computer Science	19	55	10	64
Totals	117	208	111	214

One thing that has been talked about is the possibility of school districts adapting this format for contests among elementary school children. No one has done this yet, and perhaps it is not feasible or desirable. Consequently, the contests have reached students mostly in grades 7-12. A few 6th graders become involved; this depends on the organization of the grade levels in that school.

To summarize, this contest model has been very successful in the Cincinnati region. It is hoped that readers will consider beginning their own contests, and perhaps use this kind of model for their own purposes.

Note: There are some nitty-gritty details of running the contests described that may be of interest to some readers. If you will send the author a self-addressed, stamped envelope, he will provide you with those details.

Solutions to Fall, 1988 cryptarithms

$$\begin{array}{r} \text{SAM} \quad 620 \\ + \text{CAN} \quad + \underline{125} \\ \hline \text{WIN} \quad 745 \end{array} \quad \begin{array}{r} + \text{PAY} \quad 132 \\ + \text{THE} \quad + \underline{704} \\ \hline \text{MAN} \quad 836 \end{array} \quad \begin{array}{r} \text{SAD} \quad 431 \\ + \text{DAD} \quad + \underline{131} \\ \hline \text{CRY} \quad 562 \end{array} \quad \begin{array}{r} \text{HOW} \quad 415 \\ + \text{ARE} \quad + \underline{203} \\ \hline \text{YOU} \quad 618 \end{array}$$

There are other solutions.