



EDUCATION

Crunching the Numbers

Would-be masters meet their match in the Putnam Competition, the world's toughest math test

By LEV GROSSMAN

EVERY YEAR, ON THE FIRST SATURDAY IN December, 2,500 of the most brilliant college students in North America take what may be the hardest math test in the world. How tough is it? Although there are only 12 questions, the test lasts six hours. And although these are the best and brainiest young minds our country has to offer, the median score on last year's test was 1 point. Out of a possible 120.

Welcome to the William Lowell Putnam Mathematical Competition, which was administered for the 63rd time in its grueling history on Dec. 7. The Putnam is arguably the most prestigious math contest in the world. It's also a rite of passage for math cognoscenti—think of it as a coming-out party for the next generation of beautiful minds. Do well, and you'll earn the envy of your peers and the inside track on a future Nobel. Do badly and—well, don't feel too bad. John Nash took the test twice and never scored among the top five.

The Putnam Competition was originally proposed by a Boston lawyer named William Lowell Putnam as a friendly intercollegiate math competition, and it was first held in 1938 (bragging rights that year went to the University of Toronto). Each year a three-professor committee spends four or five months devising the 12 problems, which are arranged in order of increasing difficulty. It's an all-day affair: two three-

hour sessions with a two-hour break. No calculators, no notes, no mercy. "There certainly is a mystique surrounding the exam," says Ravi Vakil, co-author of a book about the exam. "I think awe, respect and terror all apply."

Students compete both individually and as teams representing their colleges. The top five individual finishers, designat-

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ed Putnam Fellows, get \$2,500 each; the top teams get larger cash prizes: \$25,000 for first place. As for the rest, the names and rankings of the top 500 scorers are circulated on a list that's released in March and eagerly perused by the math elite—a social register for the aristocracy of arithmetic. "Grading is quite strict," says Professor Richard Stanley, who coaches M.I.T.'s team. Partial credit is rare. Out of 2,954 students who took the test last year, only 50 got 50% or better.

So what does it take to ace the Putnam? It's not about memorizing theorems. "The Putnam does not try to measure mathematical knowledge," says Leonard Klosinski, director of the competition and a professor of math at Santa Clara University in California. "What it does test is the ability to solve very challenging problems in a fixed period of time. Students who do well are mathematically gifted, very quick and highly creative." The past winners aren't exactly household names—unless you live in an extremely enlightened household—but they include Richard Feynman and Kenneth Wilson, two Nobel prizewinners. Three Putnam winners have won the Fields Medal, the highest honor a mathematician can receive.

There's a lot at stake. A high score on the Putnam can fast-track a young mathematician's career, and a team win can put a math department on the map. Currently, Harvard is at the tail end of a dynasty of Michael Jordanian proportions, with 13 first-place finishes since 1985. At one point, Harvard teams went 8-0. "Once Harvard began its roll, the most talented high school students in the U.S. started to overwhelmingly choose to go to Harvard," says Vakil. "As a result, the undergraduate math program at Harvard has become the hardest in the country, and perhaps the world."

Not everybody in the math community believes in the Putnam as an augur of future greatness. "Many think it's a frivolous exercise," says Kevin Lacker, one of last year's winners. "Doing well on the Putnam and doing good math research are two different tasks that take two different kinds of intelligence." In other words, there's hope for us all. Even a genius can flunk a math test—and sometimes that's a good thing. "If you're someone who only likes getting 100% on everything you do, you're going to find the Putnam quite distressing," Vakil says philosophically. "But then again, in both life and in research mathematics, you'll have to deal with problems that you can't solve." ■

AN EASY ONE

Height 3

Cube edge s

Radius 1

A right circular cone has a base of radius 1 and a height of 3. A cube is inscribed in the cone so that one face of the cube is contained in the base of the cone. What is the length of an edge of the cube?

ANSWER: $s = \frac{9\sqrt{2}-6}{7}$