

## New Algebra 2 Test Suggests States Face High Hurdles

By Sean Cavanagh

Students across the country struggled with advanced algebra on a first-of-its-kind test in that subject, according to a report to be released this week by Achieve, the nonprofit Washington organization that helped coordinate the exam.

A dozen states had students take part in the test, the product of an unusual collaboration among states seeking to establish a common standard for judging teenagers' ability in challenging math, as well as their preparation for college.

Achieve is part of the American Diploma Project Network, an effort among two-thirds of the nation's states to align standards, tests, and graduation requirements. Achieve officials in 2005 began working with states to devise a test in advanced algebra, or Algebra 2. Nearly 90,000 students took part in the first test, which was given as an end-of-course exam this spring.

The Algebra 2 test is designed to be a demanding exam, the authors of the report say. Most state high school math exams, by contrast, gauge students on 9th or 10th grade math, not the skills they need to prosper in college classes, the report states.

Achieve was set to release the results of the algebra test Aug. 25. Not surprisingly, given the test's relative difficulty, scores from the 12 participating states were low. North Carolina's students earned the highest average of percentage points correct, 35 percent. Kentucky's students had the lowest, at 21 percent.

Achieve officials, however, cautioned against reading too much into individual states' results, which they said could be affected by several factors. They noted that the number of students taking the test varied enormously by state, from nearly 34,000 in Ohio to only a few hundred in Minnesota.

### Advanced Algebra: Success Varies by Grade

The following table shows the performance of students on a recent Algebra 2 end-of-course test, as documented in a report released by Achieve Inc. Performance varied by grade—probably because students who took the course earlier in school tend to be stronger math students, the report explains.

**AVERAGE NUMBER OF POINTS CORRECT, BY GRADE, ON ALGEBRA II TEST**

Grade Level	Number of Students	Average Number of Points Correct (Out of Possible 76)	Average Percent of Correct Items
Grade 8	56	39	51.0%
Grade 9	5,018	27	36.1
Grade 10	26,939	24	32.2
Grade 11	41,934	18	23.9
Grade 12	10,283	16	20.6
Not Identified	4,114	20	26.4

SOURCE: Achieve Inc., American Diploma Project Algebra 2 End-of-Course Exam, 2008 Annual Report

They also pointed out that students in various grades took the Algebra 2 exam, depending on the math requirements of their states.

“We were not surprised” by the low scores, said Michael Cohen, the president of Achieve, which seeks to raise academic standards and prepare students for college and the workforce. “We knew that a rigorous algebra test, pegged at a college-readiness level, was not something a lot of students would do well on.” Even so, he added “it’s a big reminder of how much further we have to go.”

### Advanced Content

Algebra 2, and high school courses with the same math content, are widely seen as vital to students’ success in college. Advanced algebra requires abstract reasoning and critical-thinking skills. Achieve’s research has shown that college faculty members regard advanced-algebra content as critical for students to survive in college math.

The goal of the Achieve exam and the report is not to emphasize state-by-state comparisons of test scores, Mr. Cohen said, but to encourage states to set agreed-upon standards for what students should know in Algebra 2. In addition, the project can demonstrate the feasibility of states working together to craft common tests, and urge them to develop tests that measure college readiness rather than a less rigorous standard, he said.

Many states have increased their math-coursetaking requirements in recent years. California, for instance, recently mandated that students be tested in introductory algebra, or Algebra 1, in 8th grade three years from now. (*See Education Week, July 30, 2008.*)

One state that participated in the Achieve test, Arkansas, requires students to complete Algebra 2 to graduate from high school, unless their families opt out. Arkansas had 22,000 students take the Achieve test, one of the largest populations of test-takers of any participating state.

Arkansas’ students, on average, got only 27 percent of the questions correct—which put the state’s performance in about the middle of the pack—but the state’s commissioner, T. Kenneth James, said he did not find those results especially startling. Arkansas has made progress on state math tests at earlier grade levels, he said, and he expects it to make strides in Algebra 2 in the future, as the state commits

more resources to teaching and to classroom improvement at the high school level.

Mr. James also said he expects more states eventually will join in Achieve’s Algebra 2 project, despite the initial low scores. Most state officials find the idea of having their students take part in a challenging exam, used across several states, appealing, he said.

“We’ve talking about a common standard,” he said. “What we expect students to demonstrate after completing Algebra 2 should not be that hard to come up with.”

The report shows that the largest group of Algebra 2 test-takers had taken that class in 11th grade. But those who took Algebra 2 earlier in school produced higher average scores—a result that was not surprising, because teenagers who enrolled in more-rigorous math classes earlier were more likely to have stronger math skills, the authors concluded.

The Achieve report also shows that students struggled far more on the algebra constructed-response questions, or those which asked them to formulate their own answers, than they did on multiple-choice items.

That weakness did not surprise Hank Kepner, the president of the National Council of Teachers of Mathematics, a 100,000-member organization based in Reston, Va., who worked with Achieve in designing the test. He saw it as evidence that students were struggling with more complex problem-solving, an important skill in college math.

Those complex questions allow teachers to understand “the thinking the student put into the problem,” Mr. Kepner said, and “where a student made a misstep.”

---

Reprinted with permission from Education Week, Vol. XXVIII, Issue 1, August 27, 2008, by The Reprint Dept., 800-259-0470. (11222-0908). For web posting only. Bulk printing prohibited.

Editorial & Business Offices:  
Suite 100, 6935 Arlington Road  
Bethesda, MD 20814  
(301) 280-3100  
FAX Editorial (301) 280-3200  
FAX Business (301) 280-3250

*Education Week is published 44 times per year by Editorial Projects in Education Inc. Subscriptions: U.S.: \$79.94 for 44 issues. Subscriptions: Canada: \$135.94 for 44 issues.*

---



# Achieve