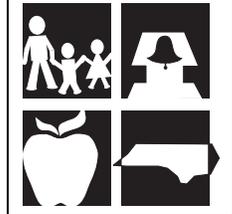


Assessment Brief



Public Schools of North Carolina • State Board of Education • William C. Harrison, Ed.D. Chairman • North Carolina Department of Public Instruction

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American Diploma Project

Algebra II Assessment

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Background

The ADP Algebra II End-of-Course Exam is an initiative of the American Diploma Project (ADP) Network, which includes 35 states that are dedicated to making sure every high school graduate is prepared for college or work. Together, Network members are responsible for educating approximately 85% of all U.S. public school students. In each state, governors, state superintendents of education, business executives, and college and university leaders are working to restore value to the high school diploma by raising the rigor of the high school standards, exams and curricula and better aligning these expectations with the demands of postsecondary education and work.

A group of states in the ADP network joined together to develop the ADP Algebra II Exam based on standards developed by Achieve, Inc. North Carolina joined the ADP Algebra II consortium in January 2008. In spring 2008 and 2009, a samples of students participated in the ADP Algebra II assessment. The information from the assessment helps inform the State Board of Education about NC students' preparedness for making an A/B in freshman-level college mathematics courses. Information is also provided for LEAs and schools to assist in evaluating their mathematics curriculum programs. Scores are not used for accountability purposes and no student reports are provided at this time. Because the ADP Algebra II Exam is still in its early stages of development and students, in NC, are sampled for participation, scores are not reported to students and parents.

Objectives of the ADP Algebra II Exam

1. To improve curriculum and instruction. The exam will help classroom teachers focus on the most important concepts and skills in Algebra II that the American Diploma Exam Project deems most important and identify areas where the curriculum needs to be strengthened.

2. To help colleges determine if students are ready to do credit-bearing work. Because the exam is based on the ADP mathematics benchmarks, it is intended to measure skills students need to enter and succeed in first-year, credit-bearing mathematics courses. However, the exam is not completely aligned with the benchmarks. The ADP Algebra II Exam reflects an agreement on test specifications among the participating states. Postsecondary institutions will be able to use the results of the test to tell high school students whether they are ready for college-level work, or if they have content and skill gaps that need to be filled before they enroll in college. This information should help high schools better prepare their students for college, and reduce the need for colleges to provide costly remediation courses.

3. *To compare performance and progress among the participating states.* Having agreed on the test specifications for Algebra II, states may be interested in tracking their ADP Algebra II Exam performance over time. Achieve Inc. will issue a report each year comparing performance and progress among the participating states. This report will help state education leaders, educators and the public assess performance, identify areas for improvement, and evaluate the impact of state strategies for improving secondary math achievement.

Item Types

The exam is a mix of multiple choice, short answer and extended response questions; at least one-third of the total points are from the short answer and extended response items. To measure advanced mathematics knowledge and skills, the exam includes a large number of open-response items that require students to show the steps they have taken and to justify their reasoning when solving a problem. These problem solving and reasoning skills are critical for credit-bearing coursework in college and are highly valued by postsecondary faculty.

Algebra II North Carolina Student Performance

	Total Tested	Average Scale Score	Standards Deviation
Consortium	102,936	1032	109
NC	2551	1055	108

Performance Levels/ Scale Score Ranges

Performance Level	Scale Score Range
Needs Preparation (for University-level Credit-bearing Mathematics Courses)	900-1149
Prepared (Algebra II related Courses)	1150-1274
Well Prepared (Algebra II related Courses)	1275-1650

Note: The ADP Algebra II Exam is a composite of multiple choice, short answer and extended response items. Because the North Carolina End-of-Course General Assessments, to date, are composed of only multiple choice items, North Carolina students are accustomed to these items in state testing situations. They may not have had adequate exposure to standardized exams with a mix of item types.

ADP Algebra II End-of-Course Exam/Content Standards

Operations on Numbers and Expressions

Successful students will be able to perform operations with rational, real, and complex numbers, using both numeric and algebraic expressions, including expressions involving exponents and roots. There are a variety of types of test items including some that cut across the objectives in this standard and require students to make connections and, where appropriate, solve contextual problems.

Equations and Inequalities

Successful students will be able to solve and graph the solution sets of equations and inequalities and systems of linear equations and inequalities. The types of equations are to include linear, linear absolute value, quadratic, exponential, rational, radical, and higher order polynomials; the types of inequalities are to include linear and quadratic. There are a variety of types of test items including some that cut across the objectives in this standard and require students to make connections and, where appropriate, solve contextual problems. In contextual problems, students will be required to graph and interpret their solutions in terms of the context. (Contextual test items will be limited to inequalities, systems of equations and inequalities, and those equations that do not represent a function.)

Polynomial and Rational Functions

Successful students will be able to use tables, graphs, verbal statements, and symbols to represent and analyze quadratic, rational, and higher order polynomial functions. They will be able to recognize and solve problems that can be modeled using these functions. There are a variety of types of test items including some that cut across the objectives in this standard and require students to make connections and solve rich contextual problems.

Exponential Functions

Successful students will be able to use tables, graphs, verbal statements, and symbols to represent, analyze, model, and interpret graphs of exponential functions. While some facility with the properties of logarithms may be helpful, it is not required on the core exam. There are a variety of types of test items including some that cut across the objectives in this standard and require students to make connections and solve rich contextual problems.

Function Operations and Inverses

Successful students will be able to perform function operations of addition, subtraction, multiplication, division, and composition and to combine several functions defined over restricted domains to form a piecewise-defined function. They will be able to determine, graph and analyze the inverse of a function and use composition to determine whether two functions are inverses. There are a variety of types of test items including some that cut across the objectives in this standard and require students to make connections.

Algebra II: Percent of Students at Mastery Level, By Content Standard, By State:

ALGEBRA II: PERCENT OF STUDENTS AT MASTERY LEVEL, BY CONTENT STANDARD, BY STATE						
	Total Tested	Operations on Numbers and Expressions	Equations and Inequalities	Polynomial and Rational Functions	Exponential Functions	Function Operations and Inverses
Consortium	102,936	20.2%	21.8%	18.8%	24.3%	22.7%
AR	23,608	13.9%	18.9%	17.9%	22.4%	21.3%
AZ	2,982	22.9%	22.9%	22.5%	25.1%	26.9%
HI	6,291	18.9%	16.8%	17.0%	21.7%	21.6%
IN	45,443	24.8%	24.6%	19.7%	26.3%	23.2%
KY	1,384	13.2%	15.2%	11.9%	18.9%	15.3%
MA	584	19.9%	21.6%	26.4%	23.5%	24.5%
MD	1,295	16.3%	20.3%	18.8%	27.2%	25.4%
MN	1,164	7.9%	12.4%	12.6%	18.9%	16.8%
NC	2,551	23.8%	28.4%	24.0%	30.1%	27.3%
NJ	8,063	19.2%	20.3%	16.9%	23.0%	22.1%
OH	2,416	16.6%	19.5%	18.1%	26.7%	23.1%
PA	6,786	16.4%	20.2%	17.9%	20.5%	23.6%
RI	369	16.0%	21.1%	20.9%	24.4%	23.3%

Next Steps

Although extensive research has taken place to establish these results, these results should be used with additional data when deciding what steps are academically appropriate for each student. A student's readiness to succeed in college mathematics will depend on other factors, such as continuing to take rigorous mathematics courses in high school if the student is not a senior. The most important thing a student can do to be prepared

for college-level mathematics is to take mathematics courses during all four years of high school. Students who complete Algebra II prior to their senior year should continue to take advanced mathematics (e.g., Prep Calculus and Advanced Functions in Modeling).

Additional Resources

- <http://www.achieve.org/Algebra2stateinformation> – View state specific information about the exam.
- www.PearsonAccess.com – Sample Algebra II items can be found by selecting ADP from the drop-down menu, then selecting the Support tab. The released items are in the Resources box on the right side of the page.
- <http://www.ncpublicschools.org/docs/accountability/policyoperations/amdiplomaproject.pdf> –View the objectives and outcomes of the project.

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