Performance Standards
(reported in Quantile® measures)

Tests. North Carolina READY End-of-Grade Mathematics and End-of-Course Math I Assessments (Edition 4).

Test Publisher. North Carolina Department of Public Instruction.

Test Information. North Carolina READY EOG Mathematics and EOC Math I measure students' proficiency based upon the Common Core State Standards for Mathematics (CCSSM) adopted by North Carolina in 2010. The EOG assessments are administered annually to students in Grades 3 through 8. The Math I assessment is administered to students enrolled in Algebra I or Integrated Math I. Each assessment consists of items that were written for specific content standards and demand one or more of the eight Standards for Mathematical Practice that are described in the CCSSM at every grade level (NCDPI, 2013b).

Assessment results will be used both for school and district accountability under the NC READY Accountability Model and for Federal reporting purposes (NCDPI, 2013b).

Method. The Quantile Linking Study was conducted in 2013 in conjunction with the North Carolina Department of Public Instruction in Grades 3, 4, 6, 8, and Math I. Linear linking methodology was used: (A) within grade for Grades 3, 4, 6, and 8 with Grades 5 and 7 being interpolated; and (B) within course for the Math I End-of-Course Assessment.

Performance Standards. Performance standards provide a common meaning of test scores throughout a state or nation concerning what is expected at various levels of competence. In October 2013, the North Carolina Department of Instruction established four achievement levels: Level 1, Level 2, Level 3, and Level 4 (NCDPI, 2013a). In March 2014, the North Carolina Department of Instruction established five achievement levels: Level 1, Level 2, Level 3, Level 4, and Level 5.

As an example, the five achievement levels for the Grade 3 NC READY EOG Mathematics Assessment are (NCDPI, 2014):

Achievement Level 1:
Students performing at this level have **limited command** of the knowledge and skills contained in the *Common Core State Standards* (*CCSS*) for Mathematics assessed at grade 3 and are likely to need intensive academic support to engage successfully in further studies in this content area.

Level 1 students rarely represent and solve problems involving multiplication and division. They usually do not show evidence that they understand properties of multiplication and the relationship between multiplication and division. They are rarely able to multiply and divide within 100, solve problems involving the four operations, or identify and explain patterns in arithmetic. They are not usually able to use place value understanding and properties of operations to perform multi-digit arithmetic. They are usually unable to recognize and generate equivalent fractions. Level 1 students are rarely successful in solving problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects; representing data; understanding concepts of area; and relating area to multiplication and to addition. They rarely recognize perimeter as an attribute of plane figures or distinguish between linear and area measures. They do not demonstrate reasoning about shapes and their attributes.

Achievement Level 2:
Students performing at this level have **partial command** of the knowledge and skills contained in the *Common Core State Standards* (*CCSS*) for Mathematics assessed at grade 3 and are likely to need additional academic support to engage successfully in further studies in this content area.

Level 2 students sometimes represent and solve problems involving multiplication and division. They do show some evidence that they understand properties of multiplication and the relationship between multiplication and division. They are inconsistent when multiplying and dividing within 100, solving problems involving the four operations, and identifying and explaining patterns in arithmetic. They are sometimes able to use place value understanding and properties of operations to perform multi-digit arithmetic. They are seldom able to recognize and generate equivalent fractions. Level 2 students are inconsistent in solving problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects; representing data; understanding concepts of area; and relating area to multiplication and to addition. They sometimes recognize perimeter as an attribute of plane figures and distinguish between linear and area measures. They show some evidence of reasoning about shapes and their attributes.

Achievement Level 3:
Students performing at this level have a **sufficient command** of grade-level knowledge and skills contained in the *Common Core State Standards* (*CCSS*) for Mathematics assessed at grade 3, but they may need academic support to engage successfully in this content area in the next grade level. They are prepared for the next grade level but are not yet on track for college- and-career readiness without additional academic support.

Achievement Level 4:
Students performing at this level have **solid command** of the knowledge and skills contained in the *Common Core State Standards* (*CCSS*) for Mathematics assessed at grade 3 and are academically prepared to engage successfully in further studies in this content area.

Level 4 students typically understand how to represent and solve problems involving multiplication and division. They demonstrate a strong understanding of properties of multiplication and the relationship between multiplication and division. They are usually able to multiply and divide within 100, solve problems involving the four operations, and identify and explain patterns in arithmetic. They are typically able to use place value understanding and properties of operations to perform multi-digit arithmetic. They are also typically able to recognize and generate equivalent fractions. Level 4 students generally solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects; represent data; understand concepts of area; and relate area to multiplication and to addition. They usually recognize perimeter as an attribute of plane figures and distinguish between linear and area measures. They demonstrate sound reasoning about shapes and their attributes.

Achievement Level 5:
Students performing at this level have **superior command** of the knowledge and skills contained in the *Common Core State Standards* (*CCSS*) for Mathematics assessed at grade 3 and are academically well prepared to engage successfully in further studies in this content area.

Level 5 students consistently understand how to represent and solve problems involving multiplication and division. They demonstrate an excellent understanding of properties of multiplication and the relationship between multiplication and division. They are able to multiply and divide within 100, solve problems involving the four operations, and identify and explain patterns in arithmetic. They can consistently use place value understanding and properties of operations to perform multi-digit arithmetic. They are able to recognize and generate equivalent fractions. Level 5 students can solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects; represent data; understand concepts of area; and relate area to multiplication and to addition. They

recognize perimeter as an attribute of plane figures and distinguish between linear and area measures. They demonstrate strong reasoning about shapes and their attributes.

The five achievement levels for NC READY EOC Math I Assessment are (NCDPI, 2014):

Achievement Level 1:
Students performing at this level have a **limited command** of the knowledge and skills contained in the *Common Core State Standards* (*CCSS*) for Mathematics assessed at the end of Math I and will need academic support to engage successfully in more rigorous studies in this content area. They will also need continued academic support to become prepared to engage successfully in credit-bearing, first-year Mathematics courses without the need for remediation.

Level 1 students are seldom successful when attempting to justify or extend relationships of rational exponents, or develop and use appropriate units, quantities, and scale to solve multi-step problems. These students are rarely able to develop expressions, equations, and inequalities from context or use them to solve multi-step problems. Level 1 students seldom use reasoning to model, interpret, explain, and apply key features of linear, exponential, and quadratic functions. In geometry, they are usually unable to apply and implement precise definitions and formulas to algebraically prove geometric theorems in the coordinate plane. Students rarely demonstrate the ability to summarize, represent, and interpret data for both one variable and two variables or precisely compute and interpret linear models that represent data.

Achievement Level 2:
Students performing at this level have a **partial command** of the knowledge and skills contained in the *Common Core State Standards* (*CCSS*) for Mathematics assessed at the end of Math I and will likely need academic support to engage successfully in more rigorous studies in this content area. They will also likely need continued academic support to become prepared to engage successfully in credit-bearing, first-year Mathematics courses without the need for remediation.

Level 2 students are sometimes successful when justifying and extending relationships of rational exponents or developing and using appropriate units, quantities, and scale to solve multi-step problems. These students are sometimes able to develop expressions, equations, and inequalities from context and use them to correctly solve multi-step problems. Level 2 students show limited evidence that they are able to use reasoning to model, interpret, explain, and apply key features of linear, exponential, and quadratic functions. In geometry, they can sometimes apply and implement precise definitions and formulas to algebraically prove geometric theorems in the coordinate plane. Students have limited ability to summarize, represent, and interpret data for both one variable and two variables or to precisely compute and interpret linear models that represent data.

Achievement Level 3:
Students performing at this level have a **sufficient command** of knowledge and skills contained in the *Common Core State Standards* (*CCSS*) for Mathematics assessed at the end of Math I but may need academic support to engage successfully in more rigorous studies in this content area. They are prepared for further studies in this content area but are not yet on track for college-and- career readiness without additional academic support.

Achievement Level 4:
Students performing at this level have **solid command** of the knowledge and skills contained in the *Common Core State Standards* (*CCSS*) for Mathematics assessed at the end of Math I and are academically prepared to engage successfully in more rigorous studies in this content area. They are also on track to become academically prepared to engage successfully in credit-bearing, first-year Mathematics courses without the need for remediation.

Level 4 students are usually successful when justifying and extending relationships of rational exponents and developing and using appropriate units, quantities, and scale to solve multi-step problems. These

students are typically able to develop expressions, equations, and inequalities from context and use them to correctly solve multi-step problems. Level 4 students are usually able to use complex reasoning to model, interpret, explain, and apply key features of linear, exponential, and quadratic functions. In geometry, they can apply and implement precise definitions and formulas to algebraically prove geometric theorems in the coordinate plane. Students are typically able to summarize, represent, and interpret data for both one variable and two variables and precisely compute and interpret linear models that represent data.

Achievement Level 5:
Students performing at this level have a **superior command** of the knowledge and skills contained in the *Common Core State Standards* (*CCSS*) for Mathematics assessed at the end of Math I and are academically well-prepared to engage successfully in more rigorous studies in this content area. They are also on-track to become academically prepared to engage successfully in credit-bearing, first-year Mathematics courses without the need for remediation.

Level 5 students have a high level of success when justifying and extending relationships of rational exponents and developing and using appropriate units, quantities, and scale to solve multi-step problems. These students have a strong ability to develop expressions, equations, and inequalities from context and use them to correctly solve multi-step problems. Level 5 students consistently use complex reasoning to model, interpret, explain, and apply key features of linear, exponential, and quadratic functions. In geometry, they have a high level of success when applying and implementing precise definitions and formulas to algebraically prove geometric theorems in the coordinate plane. Students are consistently able to summarize, represent, and interpret data for both one variable and two variables and precisely compute and interpret linear models that represent data.

Table 1 presents the achievement level cut scores expressed as Quantile measures.

Table 1. NC READY EOG Mathematics/NC READY EOC Math I performance standards in the Quantile measure.

Grade	Limited Command	Partial Command	Sufficient Command	Solid Command	Superior Command
3	425Q and Below	430Q to 605Q	610Q to 675Q	680Q to 880Q	885Q and Above
4	550Q and Below	555Q to 720Q	725Q to 760Q	765Q to 945Q	950Q and Above
5	600Q and Below	605Q to 770Q	775Q to 815Q	820Q to 1005Q	1010Q and Above
6	755Q and Below	760Q to 905Q	910Q to 945Q	950Q to 1120Q	1125Q and Above
7	805Q and Below	810Q to 955Q	960Q to 995Q	1000Q to 1160Q	1165Q and Above
8	920Q and Below	925Q to 1090Q	1095Q to 1135Q	1140Q to 1330Q	1335Q and Above
Math I	890Q and Below	895Q to 1015Q	1020Q to 1075Q	1080Q to 1305Q	1310Q and Above

Test Administration. The NC READY EOG Grades 3-8 tests will be administered within the last 10 instructional days of the school year. The NC READY EOC Math I test will be administered within the final 10 instructional days of the school year for year-long courses and within the final five instructional days of the semester for semester courses.

References

North Carolina Department of Public Education. (2014). *Achievement Level Information.* Retrieved on March 20, 2014 from http://www.ncpublicschools.org/accountability/testing/shared/achievelevel/

North Carolina Department of Instruction. (2013a). *Accountability Services Achievement Levels*. Retrieved on October 31, 2013 from http://www.ncpublicschools.org/accountability/

North Carolina Department of Public Instruction. (2013b). *Common Core State Standards (CCSS) for Mathematics North Carolina Assessments, Grades 3-8 READY EOC Algebra I/Integrated I Assessments* Retrieved on October 31, 2013 from http://www.dpi.state.nc.us/docs/acre/assessment/math.pdf