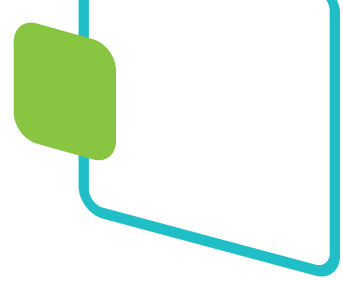




# Algebra Readiness Performance-Level Recommendations: A Skills-Based Approach

Curriculum Associates | August 2022



# Introduction

Students' success in Algebra I determines their access to advanced learning in mathematics and prepares them for the demands of college and careers in many fields. Placing students in the course at the right moment in their development is key—students with sufficient conceptual knowledge and skills will be appropriately challenged by the material, while underprepared students are likely to struggle less productively without the right sort of support.

*i-Ready Diagnostic* can provide one source of information to factor into decisions about whether students are ready for Algebra I and what sort of additional support might be helpful for students nearly ready. By considering students' Diagnostic scale scores alongside other evidence of their abilities, including classroom grades and the professional opinions of their teachers and counselors, educators can develop a well-rounded profile of a student's strengths and weaknesses as they prepare to transition to Algebra I.

This study uses a skills-based approach to arrive at a performance-level recommendation for classifying students as "algebra ready." Curriculum Associates (CA) mathematics content experts created a list of algebra skills considered to be critical for algebra-ready students and cross-referenced this list with other available information to make recommendations.

## Identifying a Performance-Level Standard

To identify the most essential skills for algebra readiness, CA content experts extensively reviewed a number of sources, including the *i-Ready* middle school construct map, the [scope and sequence for the Common Core State Standards' accelerated Grade 7 course](#), the [Student Achievement Partners' progression to algebra](#), and others. As a result, a scale score of 541 was determined to be an appropriate recommendation for an algebra readiness performance-level standard.<sup>1</sup> This scale score of 541 represents a Mid On Grade Level placement for a Grade 8 student, and it reflects sufficient command of crucial Algebra I prerequisites, including rational number arithmetic, modeling and solving real-world and mathematical problems, and interpreting and analyzing quantitative relationships.

While CA recommends a scale score of 541 as an indicator of algebra readiness, individual districts may find that adjusting this number up or down results in a performance-level standard that is better suited to their local conditions. In making this determination, districts may want to consider:

- Their Algebra I scope and sequence and time allotted for remediation of pre-algebra skills—If the Algebra I curriculum incorporates a review of prerequisites, it may be reasonable to include students who are not yet proficient in those skills by applying a lower performance-level standard. However, if little time is available for remediation, it may be advisable to apply a higher, more exclusive performance-level standard.
- The performance of past students in Algebra I and their associated *i-Ready Diagnostic* scores—Over time, districts can accumulate enough of this data to identify the performance-level standard that best predicts success in their Algebra I course.

---

1 In 2014, CA held a standard setting for contrasting groups in which panelists were asked to help set the placement cut scores for Grades K–8. The mid placement was described as students who met the bare-minimum requirements to be considered proficient in Grade 8 and should be ready to take on the next level.

To help districts choose a performance-level standard, the following table compares student performance at **four different levels**:

- The recommended performance-level standard, which is equal to a scale score of 541
- A more inclusive performance-level standard, which is equal to a score one minimum standard error of measurement (SEM) below 541
- A more exclusive performance-level standard, which is equal to one minimum SEM above 541
- The most exclusive performance-level standard, which is equal to two minimum SEMs above 541

<b>Spring <i>i-Ready Diagnostic</i> Performance-Level Standard Scale Scores</b>	<b>Score Definition</b>	<b>Spring Percentile (Grade 7)<sup>2</sup></b>	<b>Spring Percentile (Grade 8)<sup>3</sup></b>	<b>Equivalent Winter Scale Scores<sup>4</sup></b>
<b>535</b> <b>More Inclusive</b>	One minimum SEM below 541	81	73	528
<b>541</b> <b>Recommended Score</b>	<b>Grade 8 mid placement</b>	<b>85</b>	<b>78</b>	<b>534</b>
<b>547</b> <b>More Exclusive</b>	One minimum SEM above 541	88	82	540
<b>553</b> <b>Most Exclusive</b>	Two minimum SEMs above 541	92	86	546

2 Interpretation example: A student with a score of 535 scored higher than 81 percent of Grade 7 students.

3 Interpretation example: A student with a score of 535 scored higher than 73 percent of Grade 8 students.

4 Administrators who wish to use winter *i-Ready Diagnostic* results to identify students for Algebra I should use these equivalent scale scores.

# Student Performance Descriptions

## Number and Operations

535

**More Inclusive**

Compared to students who have a scale score of 541, students at this level are **more likely to need additional practice** computing with positive and negative rational numbers.

541

**Recommended Score**

Students with a scale score of 541 demonstrate **proficiency** in:

- Using the four operations to compute with positive rational numbers

Students with a scale score of 541 are **progressing** in the following skills:

- Solving problems with positive and negative rational numbers in all forms
- Identifying, approximating, and comparing irrational numbers

Students at this level **may need additional support** with:

- Working with integer exponents

547

**More Exclusive**

Compared to students who have a scale score of 541, students at this level are **more likely able to:**

- Identify rational numbers
- Compare numbers expressed in scientific notation

553

**Most Exclusive**

Compared to students who have a scale score of 541, students at this level are **more likely able to:**

- Solve multistep problems involving positive and negative rational numbers in all forms, including complex fractions
- Approximate and compare irrational numbers
- Work with integer exponents and numbers expressed in scientific notation

# Student Performance Descriptions

## Algebra and Algebraic Thinking

535

**More Inclusive**

Compared to students who have a scale score of 541, students at this level are **more likely to need additional practice**:

- Applying the properties of operations to manipulate variable expressions
- Formulating and solving simple equations and inequalities in one variable to solve real-world and mathematical problems
- Applying foundational concepts of functions

541

**Recommended Score**

Students with a scale score of 541 demonstrate **proficiency** in:

- Middle school ratio and proportional reasoning concepts
- Applying the properties of operations to manipulate variable expressions
- Formulating and solving simple equations in one variable
- Identifying and making simple descriptions of functions

Students at this level are **progressing** in the following skills:

- Formulating and solving simple inequalities in one variable
- Analyzing and comparing properties of functions

547

**More Exclusive**

Compared to students who have a scale score of 541, students at this level are **more likely able to**:

- Solve real-world and mathematical problems by formulating and solving equations and inequalities in one variable and systems of equations
- Define and describe functions

553

**Most Exclusive**

Compared to students who have a scale score of 541, students at this level are **more likely able to**:

- Solve real-world and mathematical problems by formulating and solving equations and inequalities in one variable and systems of equations
- Analyze the properties of functions presented in graphs, tables of values, verbal descriptions, and equations
- Fluently solve linear equations with one variable, including those with positive and negative rational coefficients

# Student Performance Descriptions

## Geometry

**535**

**More Inclusive**

Compared to students who have a scale score of 541, students at this level are **more likely to need additional practice**:

- Applying formulas to calculate area and volume

**541**

**Recommended Score**

Students with a scale score of 541 demonstrate **proficiency** in:

- Using proportional reasoning to solve problems involving similar figures

Students at this level are **progressing** in the following skills:

- Solving problems involving scale drawings and the area of polygons
- Finding unknown measures of angles formed by intersecting lines

Students at this level **may need additional support** with:

- Solving problems involving the Pythagorean theorem and volume and surface area of three-dimensional figures

**547**

**More Exclusive**

Compared to students who have a scale score of 541, students at this level are **more likely able to**:

- Use the Pythagorean theorem to solve problems involving right triangles

**553**

**Most Exclusive**

Compared to students who have a scale score of 541, students at this level are **more likely able to**:

- Use the Pythagorean theorem to solve problems involving right triangles
- Find the surface area of three-dimensional figures

# Student Performance Descriptions

## Measurement and Data

**535**

**More Inclusive**

Compared to students who have a scale score of 541, students at this level are **more likely to need additional practice**:

- Using measures of center and variability to analyze and informally compare data distributions
- Understanding foundational probability concepts

**541**

**Recommended Score**

Students with a scale score of 541 demonstrate **proficiency** in:

- Displaying data in dot and scatter plots and describing patterns in the data

Students with a scale score of 541 are **progressing** in the following skills:

- Calculating measures of center and variability

Students at this level **may need additional support**:

- Understanding probability concepts and developing simple probability models

**547**

**More Exclusive**

Compared to students who have a scale score of 541, students at this level are **more likely able to**:

- Find and interpret measures of center and variability
- Develop and evaluate simple probability models

**553**

**Most Exclusive**

Compared to students who have a scale score of 541, students at this level are **more likely able to**:

- Use measures of center and variability to analyze and compare data distributions
- Understand the importance of random sampling and the process of creating probability models for compound events

## Appendix: Other Algebraic Readiness Performance Standards

1. [MetaMetrics found that the median Quantile of tasks in Algebra I textbooks analyzed is 1020Q.](#) 1020Q equates to an *i-Ready* scale score of 534.
2. HMH/Scholastic uses 1030Q as one definition of algebra readiness. 1030Q equates to an *i-Ready* scale score of 536.