

Linking Study Report: Predicting Performance on the Georgia Milestones End-of-Course (EOC) Algebra 1 Assessment based on NWEA MAP Growth Scores

July 2020

NWEA Psychometric Solutions

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Executive Summary

To predict student achievement on the Georgia Milestones End-of-Course (EOC) Algebra 1 assessment, NWEA® conducted a linking study using Spring 2019 data to derive Rasch Unit (RIT) cut scores on the MAP® Growth™ Mathematics 6+ and Algebra 1 assessments that correspond to the Georgia Milestones achievement levels. With this information, educators can identify students at risk of failing to meet state proficiency standards early in the year and provide tailored educational interventions. The linking study has been created using the new 2020 NWEA MAP Growth norms (Thum & Kuhfeld, 2020).

Table E.1 presents the Georgia Milestones Algebra 1 *Proficient Learner* achievement level cut score and the corresponding MAP Growth RIT cut scores that allow teachers to identify students who are on track for proficiency on the EOC test and those who are not. For example, the *Proficient Learner* cut score on the Georgia Milestones Algebra 1 test is 525. A Grade 8 student with a MAP Growth Mathematics RIT score of 235 in the fall is likely to meet proficiency on the Georgia Milestones Algebra 1 test, whereas a Grade 8 student with a RIT score lower than 235 in the fall is in jeopardy of not meeting proficiency. Similarly, a student with a MAP Growth Algebra 1 RIT score of 237 in the fall is also likely to meet proficiency.

Table E.1. MAP Growth Cut Scores for Georgia Milestones Algebra 1 Proficiency

Assessment		Proficient Learner Cut Scores by Grade			
		7	8	9	10
GA Milestones Algebra 1		525			
MAP Growth Math 6+	Fall	233	235	237	237
	Winter	237	238	239	239
	Spring	240			
MAP Growth Algebra 1	Fall	237			
	Spring	245			

Please note that the results in this report may differ from those found in the NWEA reporting system for individual districts. The typical growth scores from fall to spring or winter to spring used in this report are based on the default instructional weeks most commonly encountered for each term (i.e., Weeks 4, 20, and 32 for fall, winter, and spring, respectively). However, instructional weeks often vary by district, so the cut scores in this report may differ slightly from the MAP Growth score reports that reflect spring instructional weeks set by partners.

E.1. Assessment Overview

The Georgia Milestones EOC Algebra 1 tests are part of Georgia’s state summative assessment system aligned to the Georgia Standards of Excellence. In accordance with State Board Rule, Georgia Milestones EOC measures serve as the final assessments for the specified high school courses. Based on their test scores, students are placed into one of four achievement levels: *Beginning Learner*, *Developing Learner*, *Proficient Learner*, and *Distinguished Learner*. These tests are used to provide evidence of student achievement in Algebra 1 for various test score uses such as meeting the requirements of the state’s accountability program. The *Proficient Learner* cut score demarks the minimum level of achievement considered to be proficient. MAP Growth tests are adaptive interim assessments aligned to state-specific content standards and administered in the fall, winter, and spring. Scores are reported on the RIT vertical scale with a range of 100–350.

E.2. Linking Methods

Based on scores from the Spring 2019 test administration, the equipercentile linking method was used to identify the spring RIT scores that correspond to the Georgia Milestones Algebra 1 achievement level cut score. MAP Growth fall and winter cut scores that predict proficiency on the Georgia Milestones Algebra 1 test were then projected using the 2020 NWEA growth norms that provide expected score gains across test administrations. It is common for students in Georgia to take the state Algebra 1 test in Grades 7–10, so the RIT cuts for these grades are provided in this report. The grade-specific growth norms for Grades 7–10 were used to estimate the fall and winter RIT cuts on the MAP Growth Mathematics 6+ test. Growth norms for MAP Growth Algebra 1 are only available for fall-to-spring projections for all eligible grades combined, so only the fall RIT cut was estimated regardless of grade level.

E.3. Student Sample

Only students who took both the MAP Growth and Georgia Milestones Algebra 1 assessments in Spring 2019 were included in the study sample (i.e., students who took both the MAP Growth Mathematics 6+ and Georgia Milestones Algebra 1 assessments and students who took both the MAP Growth Algebra 1 and Georgia Milestones Algebra 1 assessments). From the 15 districts and 37 schools across both samples who participated in this study, 1,209 students were included in the MAP Growth Mathematics 6+ sample, and 1,109 students were included in the MAP Growth Algebra 1 sample.

The linking study sample is voluntary and can only include student scores from partners who share their data. Also, not all students in a state take MAP Growth. The sample may therefore not represent the general student population as well as it should. To ensure that the linking study sample represents the state student population in terms of race, sex, and achievement level, weighting (i.e., a statistical method that matches the distributions of the variables of interest to those of the target population) was applied to the sample. As a result, the RIT cuts derived from the study sample can be generalized to any student from the target population. All analyses in this study were conducted based on the weighted sample.

E.4. Test Score Relationships

Correlations between Georgia Milestones Algebra 1 scores and MAP Growth RIT scores are 0.84 for Mathematics 6+ and 0.85 for Algebra 1. These values indicate a strong relationship among the scores, which is important validity evidence for the claim that MAP Growth scores are good predictors of performance on the Georgia Milestones Algebra 1 assessment.

E.5. Accuracy of MAP Growth Classifications

Classification accuracy statistics indicate the proportion of students correctly classified by their RIT scores as proficient or not proficient on the Georgia Milestones Algebra 1 test. The overall MAP Growth Mathematics 6+ *Proficient Learner* cut score has a 0.86 classification accuracy rate, meaning it accurately classified student achievement on the state test for 86% of the sample. Similarly, the overall MAP Growth Algebra 1 *Proficient Learner* cut score has a 0.87 classification accuracy rate. These results indicate that RIT scores have a high accuracy rate of identifying student proficiency on the Georgia Milestones Algebra 1 test.

1. Introduction

1.1. Purpose of the Study

NWEA® is committed to providing partners with useful tools to help make inferences about student learning from MAP® Growth™ test scores. One important use of MAP Growth results is to predict a student's performance on the state summative assessment at different times throughout the year. This allows educators and parents to determine if a student is on track in their learning to meet state standards by the end of the year or, given a student's learning profile, is on track to obtain rigorous, realistic growth in their content knowledge and skills.

This document presents results from a linking study conducted by NWEA in July 2020 to statistically connect the scores of the Georgia Milestones End-of-Course (EOC) Algebra 1 assessment with Rasch Unit (RIT) scores from the MAP Growth Mathematics 6+ and Algebra 1 assessments taken during the Spring 2019 term. The linking study has been created using the new 2020 NWEA MAP Growth norms (Thum & Kuhfeld, 2020). This report presents the following results:

1. Student sample demographics
2. Descriptive statistics of test scores
3. MAP Growth cut scores that correspond to the Georgia Milestones Algebra 1 achievement levels using the equipercentile linking procedure for the spring results and the 2020 norms for the fall and/or winter results
4. Classification accuracy statistics to determine the degree to which MAP Growth accurately predicts student proficiency status on the Georgia Milestones Algebra 1 test
5. The probability of achieving grade-level proficiency on the Georgia Milestones Algebra 1 assessment based on MAP Growth RIT scores from fall, winter, and spring using the 2020 norms

1.2. Assessment Overview

The Georgia Milestones EOC Algebra 1 assessment is part of Georgia's state summative assessment system aligned to the Georgia Standards of Excellence. The assessment has three cut scores (i.e., the minimum score a student must get on a test to be placed in a certain achievement level) that distinguish between the following achievement levels: *Beginning Learner*, *Developing Learner*, *Proficient Learner*, and *Distinguished Learner*. The *Proficient Learner* cut score demarks the minimum level of performance considered to be proficient for accountability purposes.

MAP Growth interim assessments from NWEA are computer adaptive and aligned to state-specific content standards. Scores are reported on the RIT vertical scale with a range of 100–350. Each content area has its own scale. To aid the interpretation of scores, NWEA periodically conducts norming studies of student and school performance on MAP Growth. Achievement status norms show how well a student performed on the MAP Growth test compared to students in the norming group by associating the student's performance on the MAP Growth test, expressed as a RIT score, with a percentile ranking. Growth norms provide expected score gains across test administrations (e.g., the relative evaluation of a student's growth from fall to spring). The most recent norms study was conducted in 2020 (Thum & Kuhfeld, 2020).

2. Methods

2.1. Data Collection

This linking study is based on data from the Spring 2019 administrations of the MAP Growth Mathematics 6+ and Algebra 1 assessments and the Georgia Milestones Algebra 1 assessment. NWEA recruited Georgia districts to participate in the study by sharing their student and score data from the Georgia Milestones Algebra 1 test taken in Spring 2019. Districts also gave NWEA permission to access students' associated MAP Growth scores from the NWEA in-house database. Once Georgia state score information was received by NWEA, each student's state testing record was matched to the MAP Growth score by using the student's first and last names, date of birth, student ID, and other available identifying information. Only students who took both MAP Growth Mathematics 6+ or Algebra 1 and the Georgia Milestones Algebra 1 assessment in Spring 2019 were included in the study sample.

2.2. Post-Stratification Weighting

Post-stratification weights were applied to the calculations to ensure that the linking study sample represented the state population in terms of race, sex, and achievement level. These variables were selected because they are correlated with the student's academic achievement within this study and are often provided in the data for the state population. The weighted sample matches the target population as closely as possible on the key demographics and test score characteristics. Specifically, a raking procedure was used to calculate the post-stratification weights and improve the representativeness of the sample. Raking uses iterative procedures to obtain weights that match sample marginal distributions to known population margins. The following steps were taken during this process:

- Calculate marginal distributions of race, sex, and achievement level for the sample and population.
- Calculate post-stratification weights with the rake function from the survey package in R (Lumley, 2019).
- Trim the weight if it is not in the range of 0.3 to 3.0.
- Apply the weights to the sample before conducting the linking study analyses.

2.3. MAP Growth Cut Scores

The equipercntile linking method (Kolen & Brennan, 2004) was used to identify the spring RIT scores that correspond to the Georgia Milestones Algebra 1 cut scores. Since the state Algebra 1 test is not grade-dependent (i.e., any student can take the assessment once they finish the course), the spring RIT cuts were established based on all the students in the study sample regardless of their grades. Fall and winter RIT cut scores were then projected using the 2020 growth norms and the spring RIT cuts. The RIT cuts for Grades 7–10 were reported because it is common for students in this grade range to take the Georgia Milestones Algebra 1 test. The same spring RIT cuts on the MAP Growth Mathematics 6+ test were reported for each grade because the corresponding national percentile ranks are different for each grade. The growth norms from fall or winter to spring are grade-specific for the MAP Growth Mathematics 6+ test, so the corresponding RIT cut scores were reported for each grade. In contrast, the growth norms for MAP Growth Algebra 1 are available for fall-to-spring projections for all eligible grades combined. Therefore, only the fall RIT cut was reported independent of grade level.

Percentile ranks are also provided that show how a nationally representative sample of students in the same grade scored on MAP Growth for each administration, which is an important interpretation of MAP Growth test scores. This is useful for understanding (1) how student scores compare to peers nationwide and (2) the relative rigor of a state's achievement level designations for its summative assessment.

The MAP Growth spring cut scores could be calculated using the equipercentile linking method because that data are directly connected to the Georgia Milestones spring data used in the study. The equipercentile linking procedure matches scores on the two scales that have the same percentile rank (i.e., the proportion of tests at or below each score). For example, let x represent a score on Test X (e.g., Georgia Milestones Algebra 1). Its equipercentile equivalent score on Test Y (e.g., MAP Growth), $e_y(x)$, can be obtained through a cumulative-distribution-based linking function defined in Equation 1:

$$e_y(x) = G^{-1}[P(x)] \quad (1)$$

where $e_y(x)$ is the equipercentile equivalent of score x on Georgia Milestones Algebra 1 on the scale of MAP Growth, $P(x)$ is the percentile rank of a given score on Georgia Milestones Algebra 1, and G^{-1} is the inverse of the percentile rank function for MAP Growth that indicates the score on MAP Growth corresponding to a given percentile. Polynomial loglinear pre-smoothing was applied to reduce irregularities of the score distributions and equipercentile linking curve.

The MAP Growth conditional growth norms provide students' expected score gains across terms, such as growth from fall or winter to spring within the same grade or from spring of a lower grade to the spring of the adjacent higher grade. This information can be used to calculate the fall and winter RIT cut scores. Equation 2 was used to determine the previous term's MAP Growth score needed to reach the spring cut score, considering the expected growth associated with the previous RIT score:

$$RIT_{predSpring} = RIT_{previous} + g \quad (2)$$

where:

- $RIT_{predSpring}$ is the predicted MAP Growth spring score.
- $RIT_{previous}$ is the previous term's RIT score.
- g is the expected growth from the previous RIT (e.g., fall or winter) to the spring RIT.

2.4. Classification Accuracy

The degree to which MAP Growth predicts student proficiency status on the Georgia Milestones Algebra 1 assessment can be described using classification accuracy statistics based on the MAP Growth spring cut scores that show the proportion of students correctly classified by their RIT scores as proficient (*Proficient Learner* or *Distinguished Learner*) or not proficient (*Beginning Learner* or *Developing Learner*). Table 2.1 describes the classification accuracy statistics provided in this report (Pommerich, Hanson, Harris, & Scoring, 2004). The results are based on the Spring 2019 MAP Growth and Georgia Milestones data for the *Proficient Learner* cut score.

Table 2.1. Description of Classification Accuracy Summary Statistics

Statistic	Description*	Interpretation
Overall Classification Accuracy Rate	$(TP + TN) / (\text{total sample size})$	Proportion of the study sample whose proficiency classification on the state test was correctly predicted by MAP Growth cut scores
False Negative (FN) Rate	$FN / (FN + TP)$	Proportion of not-proficient students identified by MAP Growth in those observed as proficient on the state test
False Positive (FP) Rate	$FP / (FP + TN)$	Proportion of proficient students identified by MAP Growth in those observed as not proficient on the state test
Sensitivity	$TP / (TP + FN)$	Proportion of proficient students identified by MAP Growth in those observed as such on the state test
Specificity	$TN / (TN + FP)$	Proportion of not-proficient students identified by MAP Growth in those observed as such on the state test
Precision	$TP / (TP + FP)$	Proportion of observed proficient students on the state test in those identified as such by the MAP Growth test
Area Under the Curve (AUC)	Area under the receiver operating characteristics (ROC) curve	How well MAP Growth cut scores separate the study sample into proficiency categories that match those from the state test cut scores. An AUC at or above 0.80 is considered “good” accuracy.

*FP = false positives. FN = false negatives. TP = true positives. TN = true negatives.

2.5. Proficiency Projection

In addition to calculating the MAP Growth fall and winter cut scores, the MAP Growth conditional growth norms data were also used to calculate the probability of reaching proficiency on the Georgia Milestones Algebra 1 test based on a student’s RIT scores from fall, winter, and spring. Equation 3 was used to calculate the probability of a student achieving *Proficient Learner* on the Georgia Milestones Algebra 1 test based on their fall or winter RIT score:

$$Pr(\text{Achieving Proficient Learner in spring} | \text{starting RIT}) = \Phi \left(\frac{RIT_{previous} + g - RIT_{SpringCut}}{SD} \right) \quad (3)$$

where:

- Φ is a standardized normal cumulative distribution.
- $RIT_{previous}$ is the student’s RIT score in fall or winter.
- g is the expected growth from the previous RIT (e.g., fall or winter) to the spring RIT.
- $RIT_{SpringCut}$ is the MAP Growth *Proficient Learner* cut score for spring.
- SD is the conditional standard deviation of the expected growth, g .

Equation 4 was used to estimate the probability of a student achieving *Proficient Learner* on the Georgia Milestones Algebra 1 test based on their spring RIT score (RIT_{Spring}):

$$Pr(\text{Achieving Proficient Learner in spring} | \text{spring RIT}) = \Phi \left(\frac{RIT_{Spring} - RIT_{SpringCut}}{SE} \right) \quad (4)$$

where SE is the standard error of measurement for MAP Growth.

3. Results

3.1. Study Sample

Only students who took both the MAP Growth and Georgia Milestones Algebra 1 assessments in Spring 2019 were included in the study sample. Data used in this study were collected from 15 districts and 37 schools in Georgia across both samples. Table 3.1 presents the demographic distributions of race, sex, and achievement level of the student population that took the Spring 2019 Georgia Milestones Algebra 1 test (GOSA, 2019). It also presents the demographic distributions in the original unweighted study sample and the weighted sample. Since the unweighted data are different from the general Georgia Milestones population, post-stratification weights were applied to the linking study sample to improve its representativeness. The analyses in this study were therefore conducted based on the weighted sample.

Table 3.1. Linking Study Sample Demographics

Demographic Subgroup		%Students by Sample				
		Georgia Population*	Unweighted Sample		Weighted Sample	
			Math 6+	Algebra 1	Math 6+	Algebra 1
Total N		121,900	1,209	1,109	1,209	1,109
Race	Asian	4.7	4.1	2.5	4.7	4.7
	Black	35.0	23.6	8.4	35.1	34.9
	Hispanic	16.5	27.9	44.1	16.5	16.5
	Multi-Race	3.5	3.5	3.4	3.5	3.5
	Other	0.3	1.7	0.2	0.3	0.3
	White	40.0	39.3	41.4	39.9	40.1
Sex	Female	48.9	50.1	49.1	48.9	48.9
	Male	51.1	49.9	50.9	51.1	51.1
Achievement Level	<i>Beginning</i>	27.3	13.2	26.8	27.3	27.3
	<i>Developing</i>	32.4	27.0	35.2	32.4	32.4
	<i>Proficient</i>	29.2	39.8	30.7	29.2	29.2
	<i>Distinguished</i>	11.1	19.9	7.3	11.1	11.1

*The number of students who took the Georgia Milestones Algebra 1 assessment in Spring 2019.

3.2. Descriptive Statistics

Table 3.2 presents descriptive statistics of the MAP Growth and Georgia Milestones Algebra 1 test scores from Spring 2019, including the correlation coefficient (r) between them. The correlation coefficients are 0.84 for Mathematics 6+ and 0.85 for Algebra 1. These values indicate a strong relationship among the scores, which is important validity evidence for the claim that MAP Growth scores are good predictors of performance on the Georgia Milestones Algebra 1 assessment.

Table 3.2. Descriptive Statistics of Test Scores

Sample	N	r	MAP Growth*				Georgia Milestones Algebra 1*			
			Mean	SD	Min.	Max.	Mean	SD	Min.	Max.
Math 6+	1,209	0.84	234.3	21.9	169	291	517.9	62.2	383	785
Algebra 1	1,109	0.85	237.9	21.0	175	303	515.0	62.1	383	785

*SD = standard deviation. Min. = minimum. Max. = maximum.

3.3. MAP Growth Cut Scores

Table 3.3 presents the Georgia Milestones Algebra 1 scale score ranges and the corresponding MAP Growth RIT cut scores and percentile ranges. These tables can be used to predict a student’s likely achievement level on the Georgia Milestones Algebra 1 assessment when MAP Growth is taken in the fall, winter, or spring. For example, a Grade 8 student who obtained a RIT score of 235 on the MAP Growth Mathematics 6+ test in the fall is likely to reach *Proficient Learner* on the Georgia Milestones Algebra 1 test. A Grade 8 student who obtained a RIT score of 240 in the spring is also likely to reach *Proficient Learner*. The spring cut score is higher than the fall cut score because growth is expected between fall and spring as students receive more instruction during the school year.

Within this report, the cut scores for fall and winter are derived from the spring cuts and the typical growth scores from fall-to-spring or winter-to-spring. The typical growth scores are based on the default instructional weeks most commonly encountered for each term (Weeks 4, 20, and 32 for fall, winter, and spring, respectively). Since instructional weeks often vary by district, the cut scores in this report may differ slightly from the MAP Growth score reports that reflect instructional weeks set by partners. If the actual instructional weeks deviate from the default ones, a student’s projected achievement level could be different from the generic projection presented in this document. Partners are therefore encouraged to use the projected achievement level in students’ profile, classroom, and grade reports in the NWEA reporting system since they reflect the specific instructional weeks set by partners.

Table 3.3. MAP Growth Cut Scores

Georgia Milestones EOC Algebra 1								
EOC Test	Beginning Learner		Developing Learner		Proficient Learner		Distinguished Learner	
Algebra 1	200–474		475–524		525–593		594–785	
MAP Growth Mathematics 6+*								
Grade	Beginning Learner		Developing Learner		Proficient Learner		Distinguished Learner	
	RIT	Percentile	RIT	Percentile	RIT	Percentile	RIT	Percentile
Fall								
7	100–214	1–37	215–232	38–76	233–252	77–96	253–350	97–99
8	100–214	1–29	215–234	30–69	235–254	70–93	255–350	94–99
9	100–216	1–31	217–236	32–69	237–256	70–93	257–350	94–99
10	100–216	1–27	217–236	28–64	237–256	65–91	257–350	92–99
Winter								
7	100–217	1–36	218–236	37–75	237–256	76–96	257–350	97–99
8	100–218	1–31	219–237	32–69	238–257	70–93	258–350	94–99
9	100–219	1–32	220–238	33–69	239–258	70–92	259–350	93–99
10	100–219	1–28	220–238	29–64	239–258	65–90	259–350	91–99
Spring								
7	100–220	1–37	221–239	38–75	240–259	76–95	260–350	96–99
8	100–220	1–31	221–239	32–68	240–259	69–92	260–350	93–99
9	100–220	1–32	221–239	33–68	240–259	69–92	260–350	93–99
10	100–220	1–29	221–239	30–63	240–259	64–89	260–350	90–99

MAP Growth Algebra 1*								
Grade	Beginning Learner		Developing Learner		Proficient Learner		Distinguished Learner	
	RIT	Percentile	RIT	Percentile	RIT	Percentile	RIT	Percentile
Fall	100–219	1–24	220–236	25–64	237–253	65–92	254–350	93–99
Spring	100–226	1–26	227–244	27–62	245–262	63–89	263–350	90–99

*Cut scores for fall and winter are derived from the spring cuts and growth norms based on the typical instructional weeks. Bolded numbers indicate the cut scores considered to be at least proficient for accountability purposes.

3.4. Classification Accuracy

Table 3.4 presents the classification accuracy summary statistics, including the overall classification accuracy rate. These results indicate how well MAP Growth spring RIT scores predict proficiency on the Georgia Milestones Algebra 1 test, providing insight into the predictive validity of MAP Growth. The overall classification accuracy rate is 0.86 for Mathematics 6+ and 0.87 for Algebra 1. These values suggest that the RIT cut scores are good at classifying students as proficient or not proficient on the Georgia Milestones Algebra 1 assessment.

Although the results show that MAP Growth scores can be used to accurately classify students as likely to be proficient on the Georgia Milestones Algebra 1 test, there is a notable limitation to how these results should be used and interpreted. Georgia Milestones Algebra 1 and MAP Growth assessments are designed for different purposes and measure slightly different constructs even within the same content area. Therefore, scores on the two tests cannot be assumed to be interchangeable. MAP Growth may not be used as a substitute for the state tests and vice versa.

Table 3.4. Classification Accuracy Results

Sample	N	Cut Score		Class. Accuracy*	Rate*		Sensitivity	Specificity	Precision	AUC*
		MAP Growth	Georgia Milestones		FP	FN				
Math 6+	1,209	240	525	0.86	0.16	0.11	0.89	0.84	0.79	0.94
Algebra 1	1,109	245	525	0.87	0.14	0.12	0.88	0.86	0.81	0.95

*Class. Accuracy = overall classification accuracy rate. FP = false positives. FN = false negatives. AUC = area under the ROC curve.

3.5. Proficiency Projection

Table 3.5 and Table 3.6 present the estimated probability of achieving *Proficient Learner* performance on the Georgia Milestones Algebra 1 test based on RIT scores from fall, winter, or spring for the Mathematics 6+ sample and from fall and spring for the Algebra 1 sample. “Prob.” indicates the probability of obtaining proficient status on the Georgia Milestones test in the spring. For example, a Grade 8 student who obtained a MAP Growth Mathematics score of 241 in the fall has an 81% chance of reaching *Proficient Learner* or higher on the Georgia Milestones Algebra 1 test.

Table 3.5. Proficiency Projection based on RIT Scores—Mathematics 6+

Mathematics 6+											
Grade	Start %ile	Spring Cut	Fall			Winter			Spring		
			Fall RIT	Projected Proficiency		Winter RIT	Projected Proficiency		Spring RIT	Projected Proficiency	
				Proficient	Prob.		Proficient	Prob.		Proficient	Prob.
7	5	240	192	No	<0.01	194	No	<0.01	196	No	<0.01
	10	240	198	No	<0.01	201	No	<0.01	203	No	<0.01
	15	240	202	No	<0.01	205	No	<0.01	207	No	<0.01
	20	240	206	No	<0.01	209	No	<0.01	211	No	<0.01
	25	240	208	No	<0.01	212	No	<0.01	214	No	<0.01
	30	240	211	No	<0.01	215	No	<0.01	217	No	<0.01
	35	240	213	No	<0.01	217	No	<0.01	220	No	<0.01
	40	240	216	No	<0.01	219	No	<0.01	222	No	<0.01
	45	240	218	No	0.01	222	No	<0.01	224	No	<0.01
	50	240	220	No	0.02	224	No	<0.01	227	No	<0.01
	55	240	222	No	0.04	226	No	0.01	229	No	<0.01
	60	240	225	No	0.10	229	No	0.04	231	No	<0.01
	65	240	227	No	0.17	231	No	0.10	234	No	0.02
	70	240	229	No	0.26	233	No	0.20	236	No	0.08
	75	240	232	No	0.44	236	No	0.42	239	No	0.37
	80	240	235	Yes	0.63	239	Yes	0.67	242	Yes	0.75
	85	240	238	Yes	0.79	243	Yes	0.90	246	Yes	0.98
90	240	243	Yes	0.95	247	Yes	0.98	251	Yes	>0.99	
95	240	249	Yes	>0.99	254	Yes	>0.99	257	Yes	>0.99	
8	5	240	194	No	<0.01	196	No	<0.01	197	No	<0.01
	10	240	201	No	<0.01	203	No	<0.01	205	No	<0.01
	15	240	205	No	<0.01	208	No	<0.01	210	No	<0.01
	20	240	209	No	<0.01	212	No	<0.01	214	No	<0.01
	25	240	212	No	<0.01	215	No	<0.01	217	No	<0.01
	30	240	215	No	<0.01	218	No	<0.01	220	No	<0.01
	35	240	218	No	0.01	221	No	<0.01	223	No	<0.01
	40	240	220	No	0.02	223	No	<0.01	225	No	<0.01
	45	240	223	No	0.04	226	No	0.01	228	No	<0.01
	50	240	225	No	0.07	228	No	0.02	230	No	<0.01
	55	240	227	No	0.12	231	No	0.07	233	No	0.01
	60	240	230	No	0.24	233	No	0.15	235	No	0.04
	65	240	232	No	0.33	236	No	0.34	238	No	0.25
	70	240	235	Yes	0.50	238	Yes	0.50	241	Yes	0.63
	75	240	238	Yes	0.67	241	Yes	0.73	244	Yes	0.92
	80	240	241	Yes	0.81	244	Yes	0.89	247	Yes	0.99
	85	240	245	Yes	0.93	248	Yes	0.98	251	Yes	>0.99
90	240	249	Yes	0.98	253	Yes	>0.99	256	Yes	>0.99	
95	240	256	Yes	>0.99	260	Yes	>0.99	263	Yes	>0.99	

Mathematics 6+											
Grade	Start %ile	Spring Cut	Fall			Winter			Spring		
			Fall RIT	Projected Proficiency		Winter RIT	Projected Proficiency		Spring RIT	Projected Proficiency	
				Proficient	Prob.		Proficient	Prob.		Proficient	Prob.
9	5	240	194	No	<0.01	196	No	<0.01	196	No	<0.01
	10	240	201	No	<0.01	203	No	<0.01	204	No	<0.01
	15	240	206	No	<0.01	208	No	<0.01	209	No	<0.01
	20	240	210	No	<0.01	212	No	<0.01	213	No	<0.01
	25	240	213	No	<0.01	215	No	<0.01	216	No	<0.01
	30	240	216	No	<0.01	218	No	<0.01	219	No	<0.01
	35	240	219	No	0.01	221	No	<0.01	222	No	<0.01
	40	240	221	No	0.02	224	No	<0.01	225	No	<0.01
	45	240	224	No	0.05	226	No	<0.01	227	No	<0.01
	50	240	226	No	0.09	229	No	0.02	230	No	<0.01
	55	240	229	No	0.17	231	No	0.05	233	No	0.01
	60	240	231	No	0.21	234	No	0.16	235	No	0.04
	65	240	234	No	0.34	236	No	0.27	238	No	0.25
	70	240	237	Yes	0.50	239	Yes	0.50	241	Yes	0.63
	75	240	240	Yes	0.66	242	Yes	0.73	244	Yes	0.92
	80	240	243	Yes	0.79	246	Yes	0.92	247	Yes	0.99
	85	240	247	Yes	0.91	249	Yes	0.98	251	Yes	>0.99
90	240	252	Yes	0.98	254	Yes	>0.99	256	Yes	>0.99	
95	240	259	Yes	>0.99	262	Yes	>0.99	264	Yes	>0.99	
10	5	240	196	No	<0.01	197	No	<0.01	197	No	<0.01
	10	240	203	No	<0.01	205	No	<0.01	205	No	<0.01
	15	240	208	No	<0.01	210	No	<0.01	210	No	<0.01
	20	240	212	No	<0.01	214	No	<0.01	215	No	<0.01
	25	240	215	No	<0.01	217	No	<0.01	218	No	<0.01
	30	240	218	No	0.01	220	No	<0.01	221	No	<0.01
	35	240	221	No	0.01	223	No	<0.01	224	No	<0.01
	40	240	224	No	0.04	226	No	<0.01	227	No	<0.01
	45	240	227	No	0.09	229	No	0.02	230	No	<0.01
	50	240	229	No	0.14	231	No	0.05	232	No	<0.01
	55	240	232	No	0.25	234	No	0.16	235	No	0.04
	60	240	234	No	0.34	236	No	0.27	238	No	0.25
	65	240	237	Yes	0.50	239	Yes	0.50	241	Yes	0.63
	70	240	240	Yes	0.66	242	Yes	0.73	244	Yes	0.92
	75	240	243	Yes	0.79	245	Yes	0.89	247	Yes	0.99
	80	240	246	Yes	0.89	249	Yes	0.98	250	Yes	>0.99
	85	240	250	Yes	0.96	253	Yes	>0.99	254	Yes	>0.99
90	240	255	Yes	0.99	258	Yes	>0.99	260	Yes	>0.99	
95	240	262	Yes	>0.99	265	Yes	>0.99	267	Yes	>0.99	

Table 3.6. Proficiency Projection based on RIT Scores—Algebra 1

Algebra 1							
Start %ile	Spring Cut	Fall			Spring		
		Fall RIT	Projected Proficiency		Spring RIT	Projected Proficiency	
			Proficient	Prob.		Proficient	Prob.
5	245	205	No	<0.01	207	No	<0.01
10	245	210	No	<0.01	214	No	<0.01
15	245	214	No	<0.01	219	No	<0.01
20	245	217	No	0.01	223	No	<0.01
25	245	220	No	0.02	226	No	<0.01
30	245	223	No	0.05	229	No	<0.01
35	245	225	No	0.09	231	No	<0.01
40	245	227	No	0.13	234	No	<0.01
45	245	229	No	0.19	236	No	<0.01
50	245	231	No	0.25	239	No	0.03
55	245	233	No	0.33	241	No	0.11
60	245	235	No	0.41	244	No	0.38
65	245	237	Yes	0.50	246	Yes	0.62
70	245	239	Yes	0.59	249	Yes	0.89
75	245	242	Yes	0.71	252	Yes	0.98
80	245	244	Yes	0.81	255	Yes	>0.99
85	245	248	Yes	0.91	259	Yes	>0.99
90	245	251	Yes	0.95	263	Yes	>0.99
95	245	257	Yes	0.99	270	Yes	>0.99

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