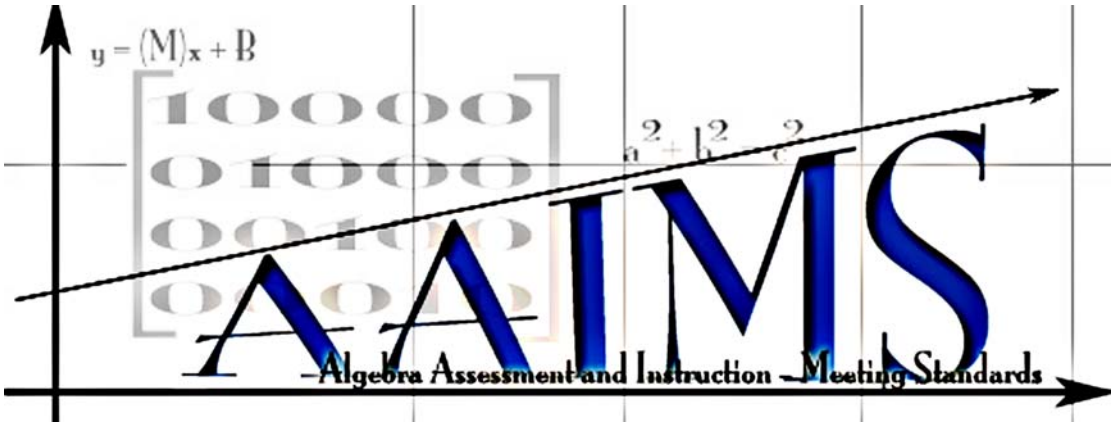
PROJECT AAIMS: ALGEBRA ASSESSMENT AND INSTRUCTION – MEETING STANDARDS



An Exploratory Study of the Use of Two Algebra Progress Monitoring Measures to Evaluate Student Growth

Technical Report #11

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Abstract

This study was a first attempt to examine the potential use of two algebra progress monitoring measures as indicators of student growth in algebra proficiency. Three research questions are addressed in this study. (1) Do the progress monitoring measures demonstrate reliability and validity? (2) To what extent do two different types of probes reflect changes in student performance over an 8-week period? (3) Is the rate of student growth on either of the measures related to other indicators of student proficiency/growth in algebra?

Regarding the first research question, findings revealed that both types of probes possessed satisfactory levels of reliability and validity. To address the second research question, we calculated students' weekly growth using ordinary least square regression. We found that students grew .32 points each week on the Algebra Concepts probes, but had an average weekly decrease of .21 units on the Content Analysis-Multiple Choice probes. To address the third research question, we correlated the rate of student growth with teacher ratings of growth. We did not find a significant relationship between these two growth variables. The study also reports growth data for a small number of students with disabilities on the Algebra Concepts measure and a third measure, Basic Skills.

Full Report

Introduction

Previous work in Project AAIMS has examined the reliability and criterion validity of five different measures for monitoring student progress in algebra. In Technical Report 7, we reported the technical features of the measures when used for static (i.e., one point in time) measurement of student performance. Three of these measures (Basic Skills, Algebra Concepts, and Content Analysis-Multiple Choice) have acceptable levels of reliability and moderate levels of criterion validity. While it is valuable to have measures that can be used at a single point in time, if teachers want to use the measures to track student progress and inform their instructional decisions, it is important that the measures also reflect changes in student performance over time. The primary focus of this study is to explore the degree to which two of these algebra measures (Algebra Concepts, Content Analysis-Multiple Choice) were sensitive to changes in student performance over time. A secondary purpose is to examine the growth of a small group of students with disabilities in a special education algebra class on the Algebra Concepts measures and a third measure, Basic Skills.

Method

The study described in this report was conducted over an eight week period during the spring of 2005 in District A. This district serves four small towns as well as the rural agricultural areas between the towns. The school district is home to approximately 7,000 residents. The junior/senior high school has an enrollment of approximately 600 students; about 12 percent of these students receive special education services. Approximately 13 percent of the district's students are eligible for free and reduced lunch; three percent are of diverse backgrounds in terms of race, culture and ethnicity.

Participants

Eighty-eight students participated in the study. Written parental/guardian consent and written student assent were obtained for all of these students using procedures approved by Iowa State University's Human Subjects Review Committee. Descriptions of the participating students are provided in Table 1.

Table 1. Demographic Characteristics of Student Participants by Grade Level for District A

	Total	Grade 8	Grade 9	Grade 10	Grade 11	Grade 12
N	88	10	60	16	2	0
Gender						
Male	45	4	31	11	1	0
Female	43	6	29	5	1	0
Ethnicity						
White	86	10	58	16	2	0
Black	1	0	1	0	0	0
Hispanic	1	0	1	0	0	0
Lunch						
Free/Red	8	0	5	3	0	0
Disability						
IEP	11	0	8	2	1	0

As the data in Table 1 indicate, almost all of the participants (over 97%) were white and an average of 68% were in ninth grade, the traditional grade in which students in this district complete algebra. Nine percent of the students participated in federal free or reduced lunch programs and 5% of the students were students with disabilities receiving special education services. Fourteen students were enrolled in Algebra 1A, 60 in Algebra 1, 10 in 8th Grade Algebra and 4 in a special education algebra course taught by a special education teacher. Algebra 1A is an option in this district that allows students to complete the first half of a traditional algebra course in a full school year, rather than in a semester.

Additional Information on Students with Disabilities. Because exploring the applicability of the algebra probes to students with disabilities is an important part of Project AAIMS, additional information about the 11 students with disabilities participating in the project is provided in Table 2.

Table 2. Descriptive Information on the Programs of Students with Disabilities

Characteristic	Quantification
Disability category	11 Entitled Individual (EI)
% time in general education	Range = 47 – 95 %; Mean = 73%
# of students with math goals	8
# of students receiving math instruction in special education classes	4
# of students receiving math instruction in general education classes	7

In algebra, students with disabilities classes earned mean grades of 2.24 [about C+] (range 0 to 4). In District A, the Iowa Tests of Educational Development (ITED) are used as a district-wide assessment for high school students and the Iowa Tests of Basic Skills are used for students in eighth grade. On average, students with disabilities obtained national percentile rank scores of 23, 30 and 30 in Concepts/Problem Solving, Computation, and Reading on the ITED, respectively.

Measures

Algebra Progress Monitoring Measures. Three algebra measures were examined in this study; sample copies of each are provided in the Appendix. The following paragraphs summarize the characteristics of each of the algebra measures.

Probe A: Basic Skills Measure The Basic Skills measure was designed to assess the 'tool skills' that students need to be proficient in algebra. Just as elementary students' proficiency with basic facts is associated with their ease in solving more complex problems, we hypothesized that there are some basic skills in algebra that serve as indicators of overall proficiency. In our discussions with teachers, they frequently commented that many students had difficulty with integers and with applying the distributive property. The items included in the *Basic Skills* measure address solving simple equations, applying the distributive property, working with integers, combining like terms, and applying proportional reasoning. The *Basic Skills* probe includes many skills one would assume that students proficient in algebra would be able to complete with reasonable levels of automaticity. Students have five minutes to work on this

probe. We created four parallel forms of the *Basic Skills* probes. Each probe consisted of 60 items; each item was scored as one point if it was answered correctly.

Probe B: Algebra Concepts Measure. The *Algebra Concepts* was designed to reflect five core concepts and skills that we derived from our reading of the literature and our conversations with colleagues in mathematics education. The five foundation areas included (1) understanding variables and expressions; (2) manipulating expressions involving integers, exponents, and order of operations; (3) graphing expressions and linear equations; (4) solving one-step equations and simplifying expressions; and (5) identifying and extending patterns and functions. Our intent with this measure was to assess the extent to which students are proficient in solving problems that address these foundations of early algebra. It is important to note that with this measure, many of the items represented concepts and skills that would be learned as part of pre-algebra or very early instruction in an Algebra I course, if not earlier. We recognize that proficiency on this measure is not equivalent to having mastered all the concepts taught in Algebra I, but we hope to determine whether the scores for this measure might serve as an indicator of more general proficiency in algebra. Students had five minutes to work on this probe. Each of the four parallel forms of the *Algebra Concepts* probe consisted of 42 items. Eight of these items required two responses, so 50 total points were possible on this probe.

Probe E: Content Analysis-Multiple Choice Measure. The *Content Analysis-Multiple Choice* measure was a variation of the *Content Analysis-Constructed Response* probe (see Technical Report 7 for more information about the Constructed Response version of this measure). This probe consisted of 16 items that corresponded to different chapters in the textbook that was used in District A. We created four parallel forms for each version of the probe; students had seven minutes to work on each probe. Scoring for the *Content Analysis-Multiple Choice* probes was done by comparing student responses to a rubric-based key created by the research staff. Each of the 16 problems was worth up to three points. Students earned full credit (three points) by circling the correct answer from among the four alternatives. If students circled an incorrect response and did not show any work, their answer was considered a 'guess;' the total number of guesses was recorded for each probe. In cases where students showed work, the scorer compared the student's work to the rubric-based key, and determined whether the student had earned 0, 1, or 2 points of partial credit. The number of points earned across all 16 problems and the number of guesses were recorded and the student's score on the probe was computed by subtracting the number of guesses from the total points earned.

Criterion Measures.

In order to assess the criterion validity of the algebra progress monitoring measures, we gathered data on a variety of other indicators of students' proficiency in algebra. Some of these measures were based on students' performance in class. Other measures reflected students' performance on standardized assessment instruments.

The classroom-based measures included grade-based measures. Each student's *algebra grade*, the grade s/he earned in algebra during the spring semester of the 2004-2005 school year, was recorded using a four-point scale (i.e., A = 4.0, B = 3.0). In addition, we recorded students' *overall GPA* as an indicator of their general academic proficiency.

Student performance on standardized, norm-referenced assessments was evaluated using school records and with an algebra instrument administered as part of the project. In District A, high school students in Algebra 1A and Algebra 1 complete the *Iowa Tests of Educational Development* (ITED) each year. Eighth grade students enrolled in algebra complete the *Iowa Tests of Basic Skills*. District records were used to access students' scores on these instruments; national percentile ranks were used for the analyses. For the ITED, we recorded the Concepts/Problems subtest score (which was identical to the Math Total score), the Computation subtest score, and Reading subtest score. For the ITBS, we recorded scores from the Problems and Data subtest, the Concepts and Estimation subtest, the Computation subtest, Math Total scale, and the Reading Total scale.

Growth Measures. One of the major goals of the AAIMS project is to determine the extent to which the algebra measures reflect student growth over time. We were also interested in exploring whether the growth that students showed on the probes was associated with other indicators of growth. To accomplish these goals, we gathered data using two types of measures reflecting students' growth: *probe slope* and *teacher rating of growth*.

The first type of growth measure, which we called *probe slope* reflects the growth that students showed on both types of probes over the semester. We used ordinary least square regression to calculate each student's slope on each measure. The obtained slope values were calculated to reflect the amount of weekly progress a student demonstrated on a probe type. The second type of measure was the *teacher rating of growth*. At the end of the study, we asked teachers to rate all the students in their algebra classes. Student names were alphabetized across class periods to minimize any biases that might be related to particular sections. Teachers used a 5-point Likert scale to rate each student's growth in algebra in comparison to same-grade peers. A rating of 1 indicated minimal or no growth, while a rating of 5 represented unusually high growth in comparison to peers. We used correlational analysis to examine the relationships among these growth variables.

Procedures

Students participating in this study had been involved in Project AAIMS from the beginning of the academic year. Project AAIMS research staff had visited each class at the beginning of the school year to present information about the study and gather informed consent. Students completed student assent forms during class and were given parent consent forms to take home. Teachers offered extra credit to students for returning signed consent forms (regardless of whether parents provided or withheld consent). Teacher ratings of growth were gathered at the end of the study.

Data collection for the study spanned an 11-week period from February to April 2005. A total of sixteen probes were administered (2 each week), with 3 weeks in which no probes were administered due to breaks and standardized testing in the district. The specific timeline for probe administration is presented in Table 3. Participating teachers administered the algebra probes during a portion of each class period. The general education teachers alternated between the Algebra Concepts and Content Analysis-Multiple Choice probes. The special education teacher alternated between the Algebra Concepts and the Basic Skills probes.

Table 3. Progress Monitoring Probe Administration Schedule

Calendar Week	Study Week	Probe Administered	
		Gen Ed	Spec Ed
February 7	1	B-11, B-12	B-11, B-12
February 14	2	E-11, E-12	A-11, A-12
February 21			
February 28	3	B-13, B-14	B-13, B-14
March 7	4	E-13, E-14	A-13, A-14
March 14			
March 21	5	B-11, B-12	B-11, B-12
March 28	6	E-11, E-12	A-11, A-12
April 4			
April 11	7	B-13, B-14	B-13, B-14
April 18	8	E-13, E-14	A-13, A-14

Results

Scoring Reliability

Scoring accuracy was evaluated by re-scoring a portion of the probes. For each probe, an answer-by-answer comparison was conducted and an interscorer reliability estimate was calculated by dividing the number of agreements by the total number of answers scored. These individual probe agreement percentages were then averaged across all the selected probes of a common type to determine an overall average.

We selected the probes to be re-scored by sampling from the nine class periods across the four administration periods. Each form of the probes was rescored for at least 6 of the 18 administrations (33%). The one exception was the *Content Analysis-Constructed Response* probe, which was rescored for 4 of the 9 periods in which it was administered (44%). The number of student papers rescored and the average agreement for each form of the probe are reported in Table 4 below.

Table 4 Interscorer Agreement Rates and Number of Papers Rescored

Probe	# Papers Rescored	Range of Agreement	Mean % Agreement
Basic Skills	18	75 – 100%	95.3%
Algebra Concepts	200	73 – 100%	92.5%
Content Analysis-Multiple Choice	184	60 – 100%	93.6%

Descriptive Data on Score Ranges and Distributions

Table 5 lists the ranges, means, and standard deviations for Algebra Concepts and Multiple Choice-Content Analysis probes. For the Algebra Concepts probes, the number of correct answers was recorded. The total number of points possible was 50. On the *Content*

Analysis-Multiple Choice probes, the correct score represents the number of points earned on the probe (each of the 16 problems was worth up to 3 points) and the guess score represents the number of guess responses. The total possible correct and guess scores were 48 and 16, respectively.

A close examination of Table 5 reveals two important points. First, mean scores in both types of probes did not seem to increase substantially as the semester progressed. This finding suggests that students were not improving their proficiency in completing the types of problems on these probes. Second, the standard deviations were substantial (one-third to one-half of the magnitude of the means), suggesting that the measures would be beneficial in spreading out students based on scores obtained on both probes. This finding is especially important if the probe data are to be used to identify students who are particularly strong or weak in algebra.

We also examined whether scores obtained on the Algebra Concepts and Content Analysis-Multiple Choice probes differed by class type. As discussed earlier, students in three types of classes were participating in the study. We put forth two hypotheses regarding the performance of these students. The first was that 8th Grade Algebra students would have the highest level of performance in every administration period, followed by Algebra 1 students. The second was that mean scores for all the class types would increase as the semester progressed.

The means and standard deviations by class type for the Algebra Concepts probes are reported in Table 6. A close examination of this table reveals that the first hypothesis was fully supported because 8th Grade Algebra students showed the highest level of performance in each period followed by Algebra 1 students; however we failed to provide evidence to support the second hypothesis for all the class types because the mean scores for Algebra 1A and Algebra 1 classes did not seem to increase gradually as the year went on. A closer examination of this table indicates that Algebra 1A students' mean scores decreased from week 5 to week 7. Algebra 1 students' mean scores remained the same in week 5 and week 7.

Table 5. Descriptive Statistics for Both Types of Probes

Time Period	Probe	N	Score	Range	Mean	Standard Deviation
Algebra Concepts						
Week 1	B-11	77	5 min.	1 – 39	21.40	6.84
	B-12	76	5 min.	1- 42	23.43	8.39
Week 3	B-13	80	5 min.	2- 45	20.98	8.10
	B-14	81	5 min.	1- 48	24.94	9.03
Week 5	B-11	82	5 min.	3- 46	22.54	8.06
	B-12	80	5 min.	5- 48	26.06	9.99
Week 7	B-13	72	5 min.	4- 50	24.97	10.94
	B-14	79	5 min.	2- 48	24.42	9.82
Content Analysis-Multiple Choice						
Week 2	E-11	74	Correct	3 – 36	18.92	9.20
	E-11	74	Guess	0 – 8	.93	1.64
	E-12	78	Correct	1 – 38	19.23	9.49
	E-12	78	Guess	0 – 12	.87	2.18
Week 4	E-13	72	Correct	0 – 37	17.35	10.08
	E-13	72	Guess	0 – 13	1.68	3.31
	E-14	71	Correct	3 – 39	16.39	9.53
	E-14	71	Guess	0 – 13	1.80	3.60
Week 6	E-11	74	Correct	3 – 42	19.07	9.84
	E-11	74	Guess	0 – 13	1.58	3.01
	E-12	73	Correct	3 – 40	19.56	10.00
	E-12	73	Guess	0 – 13	1.44	3.10
Week 8	E-13	70	Correct	3 – 43	19.79	10.15
	E-13	70	Guess	0 – 14	1.76	3.43
	E-14	72	Correct	2 – 43	17.10	10.19
	E-14	72	Guess	0 – 13	1.79	3.05

Table 6. Descriptive Data for Algebra Concepts Probes by Class Type

Time Period/Class Type	N	Range	Mean	Standard Deviation
Week 1				
Algebra 1A	12	12 - 33	18.08	5.67
Algebra 1	53	1 - 35	22.76	6.54
8th Grade Algebra	9	25 - 41	30.17	5.37
Week 3				
Algebra 1A	12	8 - 40	19.25	8.18
Algebra 1	56	2 - 37	23.47	6.80
8th Grade Algebra	9	23- 47	31.17	7.55
Week 5				
Algebra 1A	13	5 - 40	21.04	8.87
Algebra 1	55	9 - 37	24.11	7.10
8th Grade Algebra	10	27 - 47	34.45	6.06
Week 7				
Algebra 1A	11	2 - 32	18.45	10.86
Algebra 1	58	6 - 42	24.12	8.46
8th Grade Algebra	10	22 - 49	36.05	7.88

We put forth the same two hypotheses for Content Analysis-Multiple Choice probes. As Table 7 indicates, the data fully supported the first hypothesis that 8th Grade Algebra students received the highest mean scores on this measure in every period followed by Algebra 1 students. The second hypothesis that means scores for each class type would gradually increase as the semester progressed was not supported for any of the types of classes.

Table 7. Descriptive Data for Content Analysis-Multiple Choice Probes by Class Type

Time Period/Class Type	N	Range	Mean	Standard Deviation
Week 2				
Algebra 1A	12	3 - 23	10.29	6.07
Algebra 1	59	1 - 37	18.01	8.45
8th Grade Algebra	10	21 - 37	29.65	4.65
Week 4				
Algebra 1A	11	1.5 - 24.5	8.55	6.37
Algebra 1	55	0 - 34	14.24	9.60
8th Grade Algebra	8	16 - 37.5	29.31	6.36
Week 6				
Algebra 1A	10	1 - 21	10.45	6.35
Algebra 1	58	1 - 40	16.72	9.36
8th Grade Algebra	10	24.5 - 40.5	31.05	5.46
Week 8				
Algebra 1A	11	1 - 22	8.45	6.23
Algebra 1	51	0 - 43	15.75	10.22
8th Grade Algebra	10	23 - 39	29.65	4.44

Reliability of Probe Scores

We assessed the alternate form reliability of individual probes by looking at the correlation between two forms of a probe given during the same data collection session. Results of alternate form reliability presented in Table 8 revealed that both the Algebra Concepts and the Content Analysis-Multiple Choice probes possessed satisfactory levels of reliability.

Table 8. Alternate Form Reliability Results for Single Probes

Time Period	Probes	Reliability
Algebra Concepts		
Week 1	B-11 and B-12	.88
Week 3	B-13 and B-14	.87
Week 5	B-11 and B-12	.84
Week 7	B-13 and B-14	.75
Content Analysis-Multiple Choice		
Week 2	E-31 and E-32	.82
Week 4	E-33 and E-34	.89
Week 6	E-35 and E-36	.85
Week 8	E-31 and E-32	.89

Note: All correlations were significant at $p < .01$.

We evaluated the test retest reliability of the probes by examining the correlation between the means of two forms of a probe administered across two data collection time periods. For example, the two scores on the Algebra Concepts probes administered in Week 1 were averaged and then correlated with the mean of the two scores on the Algebra Concepts probes administered in Week 3. Results of test-retest reliability presented in Table 9 indicated that both Algebra Concepts and Content Analysis- Multiple Choice probes possessed adequate levels of test-retest reliability.

Table 9. Test-Retest Reliability Results for Aggregated Probes

Time Period	Reliability
Algebra Concepts	
Week 1 and Week 3	.86
Week 3 and Week 5	.81
Week 5 and Week 7	.83
Content Analysis-Multiple Choice	
Week 2 and Week 4	.87
Week 4 and Week 6	.89
Week 6 and Week 8	.84

Note: All correlations were significant at $p < .01$.

Criterion Validity

The criterion validity of the measures was assessed by correlating scores on the probes with the criterion measures that functioned as additional indicators of students' proficiency in

algebra. The indicators we employed included classroom-based measures, such as algebra grades and overall GPA, and scores obtained from norm-referenced tests of achievement, such as ITED and ITBS. We correlated students' scores on the first and last two weeks of the semester with criterion variables. Results presented in Table 10 revealed that both types of probes were, in general, moderately correlated with classroom-based measures and ITED scores. Grade-based measures were more strongly related to students' performance on the Content Analysis-Multiple Choice probes than the Algebra Concepts probes. It is interesting to note that correlations between the algebra measures and the ITED reading subtest were in the same range as the correlations obtained with the ITED math subtests.

Table 10. Correlations Between Algebra Probes, Classroom-based Measures, and ITED Scores

Time Period	GPA	Algebra Grade	ITED-Concepts	ITED-Computation	ITED-Reading
Algebra Concepts					
Week 1	.51	.34	.64	.52	.52
Week 7	.50	.36	.46	.56	.46
Content Analysis-Multiple Choice					
Week 2	.62	.58	.56	.61	.52
Week 8	.65	.62	.54	.56	.55

Note: All the correlations were significant at .01 level

As discussed earlier, students enrolled in 8th Grade Algebra class took the ITBS rather than the ITED. We examined the relationship between scores obtained on both types of probes and ITBS subtest scores. Our findings, presented in Table 11, revealed that the scores from the Algebra Concepts probes administered at the end of the study were moderately or highly correlated with all the subtest scores except for reading. We did not find a significant correlation between Content Analysis-Multiple Choice probes and ITBS scores.

Table 11. Correlations between both types of probes and ITBS subtest scores.

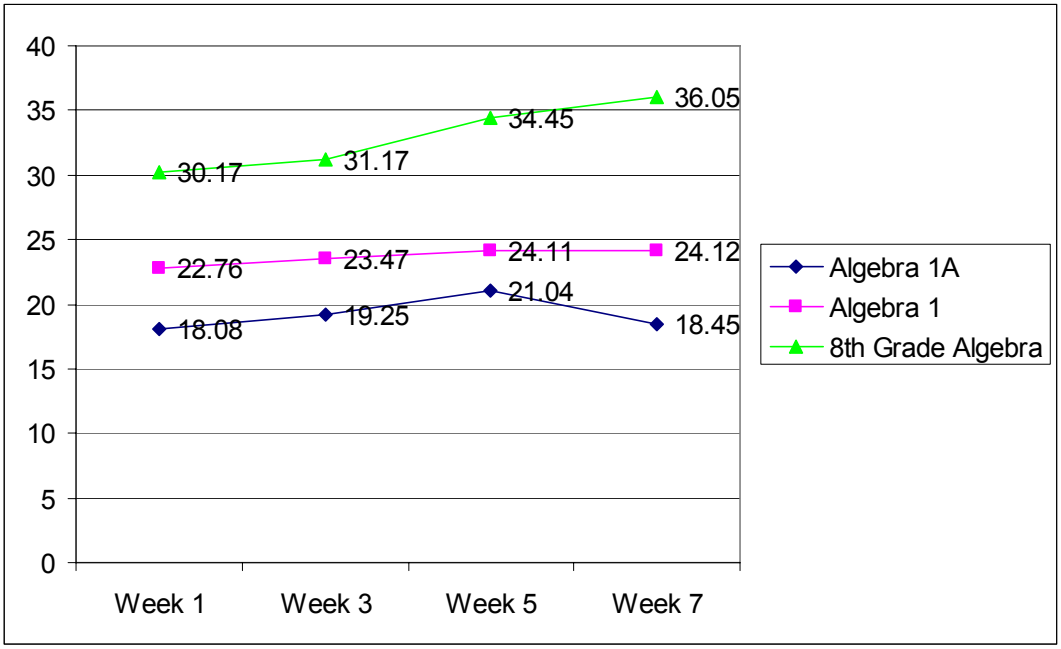
Time Period	ProbData	ConEst	Comp	Math Total	Reading Total
Algebra Concepts					
Week 1	.59	.59	.54	.64	.23
Week 7	.57	.80**	.80**	.70*	.34
Content Analysis-Multiple Choice					
Week 2	.28	.20	.22	.21	.20
Week 8	.23	.28	.38	.24	-.01

** $p < .01$
* $p < .05$

Growth

As we considered our hypotheses related to students' growth on the measures, we assumed that type of class would play an important role. We hypothesized that probe scores would increase for each type of class as the semester progressed. Figure 1 shows the growth that each type of class demonstrated on the Algebra Concepts probes over the semester. We supported our hypothesis for the Algebra 1 and 8th Grade Algebra classes. For the Algebra 1A class, this hypothesis was not supported because mean scores decreased from Week 5 to Week 7.

Figure 1. Mean Scores on the Algebra Concepts Probe



We put forth the same hypothesis for Content Analysis-Multiple Choice probes. As Figure 2 reveals, we failed to support hypothesis for all types of classes since scores showed no growth or a decrease over the semester.

We also conducted the same analysis for special education students. Our results, presented in Figures 3 and 4, revealed slight growth from initial to final scores on the Algebra Concepts measure and growth from the first to the second administration of the Basic Skills probes, followed by constant performance levels. These data reveal that we did not support our hypothesis for Algebra Concepts probes because mean scores showed an initial decrease followed by small increases. The hypothesis was not supported for Basic Skills probes either because scores did not increase over the final three data collection sessions.

Figure 2. Mean Scores on the Content Analysis-Multiple Choice Probes

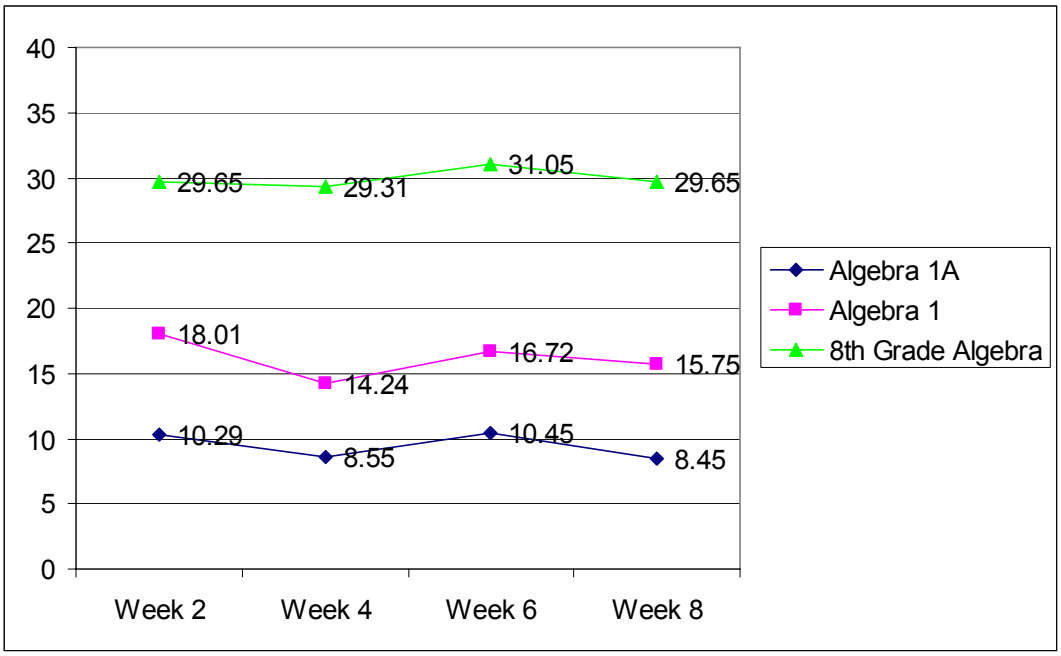


Figure 3. Mean Scores on the Algebra Concepts Probes for Special Education Students

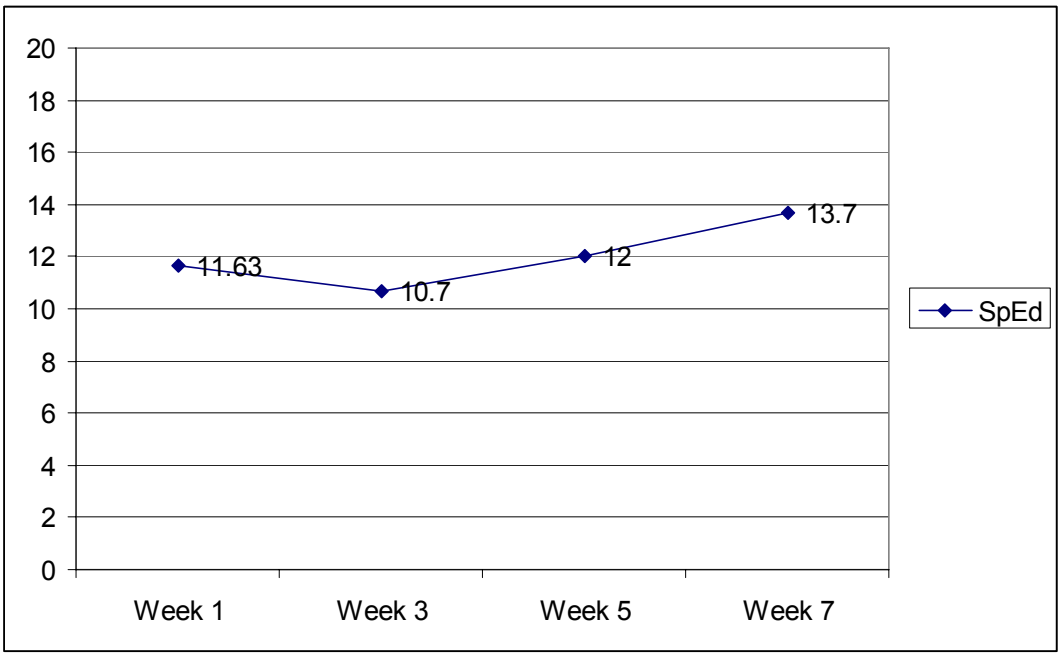
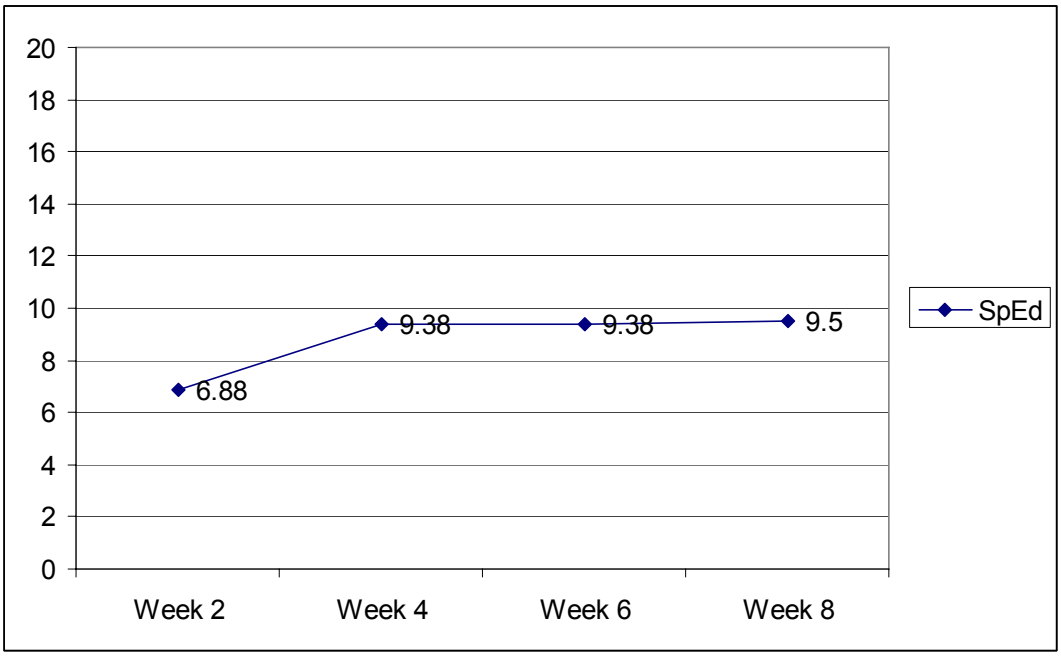


Figure 4. Growth Shown on Basic Skills Probes for Special Education Students



Our second set of analyses focused on individual students' slope data, rather than the group means. As described earlier, students' weekly growth rates were calculated using ordinary least square regression. Table 12 presents the range, mean, and standard deviation of slopes for the Algebra Skills and Content Analysis-Multiple Choice probes for all students with and without outliers. As the the data in Table 12 reveal, mean weekly slopes calculated without outliers were .32 points on the Algebra Concepts measure. We were surprised to find that students' mean slope values decreased .21 units each week on the Content Analysis-Multiple Choice. This result suggests that Algebra Concepts probes may be more sensitive in identifying student growth and raises questions about whether the Content Analysis-Multiple Choice measure was accurately depicting student learning.

Table 12. Descriptive Statistics for Weekly Slope Values on Both Probes

	With Outlier				Without Outlier			
	N	Range	Mean	SD	N	Range	Mean	SD
Algebra Concepts	88	-5.50 – 2.88	0.25	1.22	87	-3.03 – 2.88	0.32	1.05
Content Analysis-Multiple Choice	81	-3.3 – 1.9	-0.25	0.97	80	-2.2 – 1.9	-0.21	0.91

We were also interested in determining whether the Algebra Concepts and Content Analysis-Multiple Choice probes reflected growth for each type of class similarly. Table 13 reports the average slope values on each of the measures by class type. As this table reveals, students in 8th Grade Algebra demonstrated more growth on the Algebra Concepts and Content

Analysis-Multiple Choice probes than did students in the other types of classes (1.06 versus .54, .56 and .12 for the Algebra Concepts and .05 versus -.13, -.28 for Content Analysis-Multiple Choice probes). This result suggests that 8th Grade Algebra students were demonstrating more growth on both the Algebra Concepts and the Content Analysis-Multiple Choice probes than were their peers.

Table 13: Descriptive Statistics for Weekly Slope Values on Both Probes by Class Type

	N	Range	Mean	SD
Algebra Concepts				
Special Education Algebra	5	.05 - .88	.54	.38
Algebra 1A	13	-2.25 – 2.83	.56	1.44
Algebra 1	59	-3.03 – 1.88	.12	.95
8th Grade Algebra	10	-.25 – 2.88	1.06	.96
Content Analysis-Multiple Choice				
Algebra 1A	14	-1.6 – 1.3	- .13	.70
Algebra 1	58	-2.2 – 1.9	-.28	.99
8th Grade Algebra	10	-1.0 - .8	.05	.50

It is important to note that we used a weekly growth rate of .5 as benchmark and goal in our research. We anticipate that in order for algebra progress monitoring measures to be useful to teachers on a practical level, they must be able to expect to see scores grow by at least one point every two weeks (hence a weekly growth rate of .5). Results indicated that we reached our goal for Special Education, Algebra 1A and 8th Grade Algebra students on the Algebra Concepts probes. None of the student groups demonstrated growth over time on the Content Analysis-Multiple Choice measure.

Finally, we were interested in determining whether the growth rates students obtained on the two types of probes were associated with other indicators of growth. As a result, we examined the relationship of the slope values of both types of probes to teacher growth ratings. We found that there was no significant relationship between slope values on either type of probes and teacher growth ratings.

Summary and Future Research

The purpose of this study was to evaluate the reliability and validity of the Algebra Concepts and the Content-Analysis-Multiple Choice probes, to examine the extent to which these types of probes reflect changes in student performance over an 8-week period, and to examine whether the rate of student growth on either of the measures was related to other indicators of student proficiency/ growth in Algebra.

We assessed the alternate form reliability and test-retest reliability of both types of probes. Our findings revealed that both types of probes possessed adequate levels of reliability. To assess the validity of both types of probes, we gathered data from a variety of indicators of students' proficiency in algebra including classroom-based measures including algebra grades, overall GPA and performance on standardized assessment instruments including ITED, ITBS scores. Our findings revealed that, in general, both types of probes were moderately correlated

with classroom-based measures and ITED scores. ITBS scores were found to be correlated with the Algebra Concepts probes but not with the Content Analysis-Multiple Choice probes.

We were also interested in examining whether the Algebra Concepts and Content Analysis-Multiple Choice probes reflected growth similarly for each type of class. To address this issue, three sets of analyses were conducted. First, we examined graphs of the mean scores for students in each of the three class types for each data collection session. We found that students in Algebra 1 and 8th Grade Algebra classes displayed increases on the Algebra Foundation probes as the semester progressed. On the Content Analysis-Multiple Choice probes, none of the students, regardless of class type, showed a change in scores over the semester.

Next, we calculated individual student slope values for each type of probe and computed weekly rates of growth. We found that 8th Grade Algebra students had higher mean slope values than students in other types of classes on both probes. Finally, we were also interested in to see if the growth that students showed on both types of probes was related to their teachers' ratings of growth. We did not find a significant correlation between either type of probes and teacher rating of growth.

APPENDIX

Standardized Administration Directions: Week 1
(All Classes)

Standardized Administration Directions: Week 2
(Special Educational Algebra, General Education Algebra Classes)

Basic Skills – Form 1

Algebra Concepts – Form 1

Content Analysis-Multiple Choice – Form 1

Teacher Rating of Student Growth

Algebra Progress Monitoring Data Collection Procedures
District A High School
Spring 2005 – Week 1

Materials:

1. Student copies of the probes
2. Stopwatch/timer
3. Pencils for students

General Introduction: *(NOTE: You only need to read this introduction for the very first probe.)*

As you all know, your class and other algebra classes at District A High are working with Iowa State on a research project to learn more about improving algebra teaching and learning. Today you will start a new phase of this project called progress monitoring. Each week you will complete two probes to show what you know about different aspects of algebra. You will do this for several weeks. One thing that is different about this part of the project is that I will be administering the probes instead of the Project AAIMS staff. The goal of this phase of the project is to see which probes do the best job of showing how much your understanding of algebra grows as time passes. As you may remember, ALL students will complete the tasks, but we will only use your scores in the research project if you and your parent or guardian have both given us permission to do so. Please clear your desk—the only thing you'll need for this activity is a pencil or a pen. (Distribute pencils to any students who need them.)

There are a few things you should know about the task(s), or probe(s), you will complete today. First, you will be given a limited amount of time to work on the tasks. You are NOT expected to be able to finish the probe(s). These tasks are different from classroom tests or quizzes and are not meant to be completely finished. Second, there may be problems on the probes that are difficult or unfamiliar. Please try each problem. If you do not know how to answer it, skip it, and go on to the next problem. DO NOT spend a great deal of time on any one problem. If you get to the end of the probe and still have time to work, go back to the problems you skipped and try to solve them. Remember, your score on the probe will not hurt your grade in algebra class, but it is important for the research project that you do your best work. Do you have any questions at this point?

Directions for Version B Probes

1. Distribute copies of the B-11 probe to all students in the group FACE DOWN. Ask students to keep the probes face down until they are told to begin the sample page. Ask students to write their names, your name/teacher's name, the class period, and the date on the back of the probe.

2. Say to the students:

Today you are going to do the Algebra Concepts Probe. The problems on this probe include translating words into expressions, solving simple equations, interpreting line graphs, and completing function or pattern tables. Look at each problem carefully before you answer it.

This probe starts with a sample page so you have a chance to practice doing these kind of problems.

Turn your probe over so you can see what you will be doing today. This page includes a sampling of what appears on the next two pages. As you can see, there are several different kinds of problems. You are to fill in the blanks, empty boxes or write an expression or word phrase for each problem. It is okay to skip around on this probe and work on what you think are the easier problems first.

You will have one minute to work through the problems on this sample page. Do NOT turn the page if you finish before one minute has passed. You may start writing when I say "Begin."

3. Set timer for **1** minute. Say ***Begin*** and start your stopwatch.
4. When timer goes off, say ***Stop. Put your pencils down.***

Now that you have had a chance to see what is expected of you, do you have any questions at this point? ***(Only answer procedural questions, do not suggest ways to solve the problems.)***

As I said before, you can skip around in order to complete the greatest number of problems. DO NOT spend a great deal of time on any one problem. If you get to the end of the probe and still have time to work, go back to the problems you skipped and try to solve them. It is important for you to do your best work so that your score truly reflects your current understanding of algebra.

When I say 'begin,' flip the sample page over and start doing the problems. You will have 5 minutes to work.

5. Set timer for **5** minutes. Say ***Begin*** and start your stopwatch.
6. When timer goes off, say ***Stop. Put your pencils down.***
7. Ask students to pass papers in.

If you are only doing one probe, thank students for their participation and let them know that they will do another probe later in the week. Use the directions that follow for the second administration.

If you are doing a second probe, continue with the directions below:

1. Distribute copies of the B-12 probe to all students in the group FACE DOWN. Ask students to keep the probes face down until they are told to begin. Ask students to write their names, your name/teacher's name, the class period, and the date on the back of the probe.

2. Say to the students:

You are going to do another Algebra Concepts Probe. This probe is like the one you just completed/completed earlier so the research team can see if this type of probe provides consistent results.

Remember, you can skip around in order to complete the greatest number of problems. It is important that you do NOT spend a great deal of time on any one problem. If you get to the end of the probe and still have time to work, go back to the problems you skipped and try to solve them. It is important for you to do your best work so that your score truly reflects your understanding of algebra.

When I say 'begin,' turn your paper over and start doing the problems. You will have 5 minutes to work.

3. Set timer for **5** minutes. Say ***Begin*** and start your stopwatch.
4. When timer goes off, say ***Stop. Put your pencils down.***
5. Ask students to pass papers in.

Once again thank students for their participation. Once your class is finished with the probes for the week, place them in the appropriate folders and give them to the site coordinator so we can pick them up to score them.

Thanks for your assistance with this part of the project.

Algebra Progress Monitoring Data Collection Procedures
District A High School
Spring 2005 – Week 2
Special Education Algebra

Materials:

1. Student copies of the probes
2. Stopwatch/timer
3. Pencils for students

General Introduction: *(NOTE: You only need to read this introduction for the very first probe.)*

It's time to do probes for this week. Please clear your desk—the only thing you'll need for this activity is a pencil or a pen. (Distribute pencils to any students who need them.)

This week, the type of probe you'll be doing will be different from last week, but there will be several things that will be the same. First, you will be given a limited amount of time to work on the tasks. Second, there may be problems on the probes that are difficult or unfamiliar. Feel free to skip around, but try to answer as many problems as possible. Remember, your score on the probe will not hurt your grade in algebra class, but it is important for the research project that you do your best work. Do you have any questions at this point?

Directions for the Version A Probes (Basic Skills)

1. Distribute copies of the A-11 probe to all students in the group FACE DOWN. Ask students to keep the probes face down until they are told to begin the sample page. Ask students to write their names, your name/teacher's name, the class period, and the date on the back of the probe.

2. Say to the students:

Today you are going to do the Basic Algebra Probe. The problems on this probe include algebra equations using basic math facts, simplifying expressions by combining like terms, using the distributive property to simplify expressions, an using formulas. Look at each problem carefully before you answer it.

Please begin in this corner (demonstrate, pointing to upper left corner) and work down each column, considering each problem. If you do not know how to do a problem, skip it. DO NOT spend a great deal of time on any one problem. When you get to the end of the first column, go on to the second, and then to the second page. If you get to the end of the probe and still have time to work, go back to the problems you skipped and try to solve them. Do you have any questions at this point?

This probe starts with a sample page so you have a chance to practice doing these kinds of problems.

Turn you probe over so you can see what you will be doing today. This page includes some example problems so you can be familiar with how to complete this type of probe. As you can see some problems are basic math facts, some require you to combine like terms, some use the distributive property, and some ask you to use a formula to solve the problem.

You will have one minute to practice this type of probe by working the problems on this sample page. Be sure to go as far as you can any time you need to combine like terms. DO NOT turn the page if you finish before one minute has passed. You may start working when I say "Begin".

3. ***Set timer for 1 minute. Say*** Begin ***and start your stopwatch.***
4. ***When timer goes off, say*** Stop. Put your pencils down.

Now that you have had a chance to see what is expected of you, do you have any questions at this point? ***(Only answer procedural questions, do not suggest ways to solve the problems.)***

You may skip around in order to complete the greatest number of problems. If you get to the end of the probe and still have time to work, go back to the problems you skipped and try to solve them. Remember to go as far as you can whenever you need to combine like terms. It is important for you to do your best work so that your score truly reflects your current understanding of algebra.

When I say 'begin,' flip the sample page over and start answering the problems. You will have 5 minutes to work.

5. Set timer for **5** minutes. Say ***Begin*** and start your stopwatch. .
6. When timer goes off, say ***Stop. Put your pencils down.***
7. Ask students to pass papers their papers in.

If you are only doing one probe, thank the students for their participation and let them know that they will do another probe later in the week. Use the directions that foloow for the second administration.

If you are doing a second probe, continue with the directions below:

1. Distribute copies of the A-12 probe to all students in the group FACE DOWN. Ask students to keep the probes face down until they are told to begin. Ask students to write their names, your name/teacher's name, the class period, and the date on the back of the probe.

2. Say to the students:

You are going to do another Basic Algebra Probe. This probe is like the one you just completed/completed earlier so the research team can see if this type of probe provides consistent results.

Remember, you can skip around in order to complete the greatest number of problems. If you get to the end of the probe and still have time to work, go back to the problems you skipped and try to solve them. It is important for you to do your best work so that your score truly reflects your current understanding of algebra.

When I say 'begin,' turn your paper over and start doing the problems. You will have 5 minutes to work.

3. Set timer for **5** minutes. Say ***Begin*** and start your stopwatch.
4. When timer goes off, say ***Stop. Put your pencils down.***
5. Ask students to pass papers in.

Once again thank students for their participation. Once your class is finished with the probes for the week, place them in the appropriate folders and give them to the site coordinator so we can pick them up to score them.

Thanks for your assistance with this part of the project.

Algebra Progress Monitoring Data Collection Procedures
District A High School
Spring 2005 – Week 2
General Education Algebra Classes

Materials:

1. Student copies of the probes
2. Stopwatch/timer
3. Pencils for students

General Introduction: *(NOTE: You only need to read this introduction for the very first probe.)*

It's time to do probes for this week. Please clear your desk—the only thing you'll need for this activity is a pencil or a pen. (Distribute pencils to any students who need them.)

This week, the type of probe you'll be doing will be different from last week, but there will be several things that will be the same. First, you will be given a limited amount of time to work on the tasks. Second, there may be problems on the probes that are difficult or unfamiliar. Feel free to skip around, but try to answer as many problems as possible. Remember, your score on the probe will not hurt your grade in algebra class, but it is important for the research project that you do your best work. Do you have any questions at this point?

Directions for Version E Probes (Content Analysis-Multiple Choice):

1. Distribute copies of the E-11 probe to all students in the group FACE DOWN. Ask students to keep the probes face down until they are told to begin the sample page. Ask students to write their names, your name/teacher's name, the class period, and the date on the back of the probe.

2. Say to the students:

Today you are going to do the Multiple Choice Textbook Probe. The problems on this probe are drawn from the different types of problems you are learning in the textbook. One thing that is different about this type of probe (compared to the probes you did last week) is that the answers are multiple choice. Each problem is worth 3 points, but you can earn partial credit by showing your work. Unless you are completely certain of the correct answer, the best strategy is to show your work. If you do not know the answer, you should NOT make wild guesses. You will lose points from your total score on the probe when you make wild guesses.

This probe starts with a sample page so you have a chance to practice doing these kinds of problems.

Turn your probe over so you can see what you will be doing today. This page includes some example problems so you can become familiar with how to complete this type of probe. Look at the three boxes in the first row labeled A, B, and C. You'll notice that all three have answers and that the problem is the same for all three. Look at the box for Student A. She thought she knew the correct answer, so she just circled her choice at the bottom. Unfortunately, she was incorrect, so she will lose a point for this problem. Student B showed his work, but made an error when he divided 24 by 3. Because he has parts of the problem correct, Student B

will earn 2 out of 3 points on this problem. Student C started solving the problem, but made an error in the second step. She will earn 1 out of 3 points on the problem. As you can see from these examples, it is important to show your work on these probes.

You will have one minute to practice this type of probe by working the problems on this sample page. Do NOT turn the page if you finish before one minute has passed. You may start working when I say "Begin."

3. Set timer for **1** minute. Say ***Begin*** and start your stopwatch.
4. When timer goes off, say ***Stop. Put your pencils down.***

Now that you have had a chance to see what is expected of you, do you have any questions at this point? ***(Only answer procedural questions, do not suggest ways to solve the problems.)***

As I said before, you can skip around in order to complete the greatest number of problems. If you get to the end of the probe and still have time to work, go back to the problems you skipped and try to solve them. Remember that you can earn partial credit by showing your work. You should NOT make wild guesses. It is important for you to do your best work so that your score truly reflects your current understanding of algebra.

When I say 'begin,' flip the sample page over and start doing the problems. You will have 7 minutes to work.

5. Set timer for **7** minutes. Say ***Begin*** and start your stopwatch.
6. When timer goes off, say ***Stop. Put your pencils down.***
7. Ask students to pass papers in.

If you are only doing one probe, thank students for their participation and let them know that they will do another probe later in the week. Use the directions that follow for the second administration.

If you are doing a second probe, continue with the directions below:

1. Distribute copies of the E-12 probe to all students in the group FACE DOWN. Ask students to keep the probes face down until they are told to begin. Ask students to write their names, your name/teacher's name, the class period, and the date on the back of the probe.

2. Say to the students:

You are going to do another Multiple Choice Textbook Probe. This probe is like the one you just completed/completed earlier so the research team can see if this type of probe provides consistent results.

Remember, you can skip around in order to complete the greatest number of problems. If you get to the end of the probe and still have time to work, go back to the problems you skipped

and try to solve them. Remember that you can earn partial credit by showing your work. You should NOT make wild guesses. It is important for you to do your best work so that your score truly reflects your current understanding of algebra.

When I say 'begin,' turn your paper over and start doing the problems. You will have 7 minutes to work.

3. Set timer for **7** minutes. Say ***Begin*** and start your stopwatch.
4. When timer goes off, say ***Stop. Put your pencils down.***
5. Ask students to pass papers in.

Once again thank students for their participation. Once your class is finished with the probes for the week, place them in the appropriate folders and give them to the site coordinator so we can pick them up to score them.

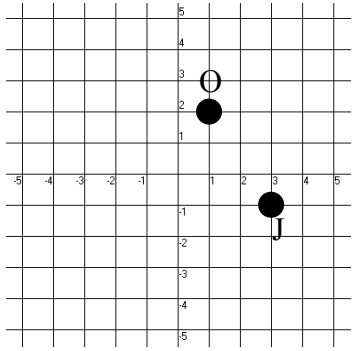
Thanks for your assistance with this part of the project.

Solve: $9 + a = 15$ $a =$	Simplify: $y^2 + y - 4y + 3y^2$
Simplify: $2x + 4 + 3x + 5$	Solve: $\frac{z}{5} = 5$ $z =$
Evaluate: $-9 + 3 + 8$	Simplify: $2(t + 4) - 6t$
Simplify: $b + b + 2b$	Simplify: $6r - 5 - 2r + 6$
Solve: $12 - 6 = e$ $e =$	Simplify: $7 - 2(f - 8) + f$
Simplify: $4(3 + s) - 7$	Solve: $t - 5 = 4$ $t =$
Simplify: $17 + 6d + 2d - 9$	Evaluate: $8 - (-6) - 4$
Evaluate: $12 + (-8) + 3$	Simplify: $w - w\,(4+5) - 6$
Solve: $8m = 72$ $m =$	Solve: $6 \bullet 9 = d$ $d =$
The formula for calculating the time needed for a trip is $t = d \div r$. Find the time when $d = 24$ miles and r = 4 mph. $t =$	The formula for calculating volume is $v = l \bullet w \bullet h$. Find the volume when $l = 4$ inches, $w = 2$ inches, and $h = 3$ inches. $v =$

Solve: $63 \div c = 9$ $c =$	Simplify: $3(u + 3) - 2u + 5$
Simplify: $4 - 7b + 5(b - 1)$	Solve: $\frac{36}{6} = s$ $s =$
Simplify: $-3w^2 + 5w^2 - 5 + 12$	Simplify: $3g - 4(g + 2)$
Simplify: $6 + 5(r - 1)$	Simplify: $8m - 3(m - 2)$
Solve: $y + 4 = 11$ $y =$	Simplify: $5 + 4(b + 3) + 2b$
Simplify: $3z - 8z + 2 + 9$	Solve: $5 + 9 = x$ $x =$
Evaluate: $14 - 7 + (-3)$	Simplify: $1 - 6(h - 3)$
Simplify: $5r - 2r + 6r$	Simplify: $7b - 4 - 3 - 2b$
Solve: $k \bullet 3 = 18$ $k =$	Solve: $f - 7 = 3$ $f =$
The formula for calculating interest is $i = prt$. Find the interest if $p = \$10$, $r = 5\%$ per month, and $t = 3$ months. $i =$	The formula for calculating the area of a triangle is $a = \frac{1}{2}b \bullet h$. Find the area if $b = 7$ feet and $h = 4$ feet. $a =$

Find the ordered pair for each point:

J(,) O(,)



Fill in the empty box:

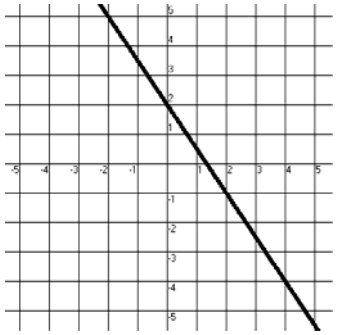
s	$3s$
6	18
7	21
8	
9	27

Fill in the empty box:

n	$4n+7$
-1	3
-2	-1
-3	
-4	-9

Fill in the empty box:

b	
5	2
3	0
0	-3
-2	-5



What is the slope?

What is the y intercept?

If $y > 9$, two possible values for y are _____ and _____

$6 \bullet 4 + 1 =$ _____

Simplify:
$7f + (2f + f)$

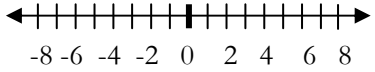
Solve:
$n + 3 = 8$
$n =$ _____

Evaluate $4b + 2$ when
$b = 1$ _____ and when
$b = 3$ _____

Write the expression for this phrase:
6 less than a number

$(-2) \bullet (-4) =$ _____

Graph the expression
$m > 6$



Write a word phrase for this expression:
$n + 9$

$8 \div 2 + 4 \bullet 3 =$ _____

$2^3 =$ _____

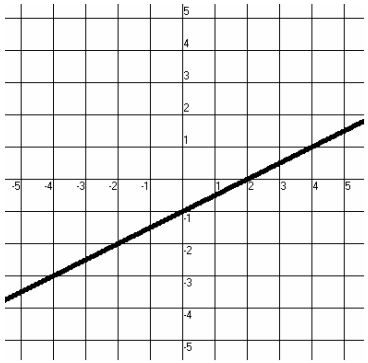
Write the expression for this phrase:
9 times a number

Write a word phrase for this expression:
$10b - 7$

Evaluate $2x + y$ when
$x = 2$ and $y = 3$
_____

If $2a + 4 < 20$, two possible values for a are _____ and _____

Simplify:
$6 - 2(b - 4)$



What is the slope?

What is the *y* intercept?

Fill in the empty box:

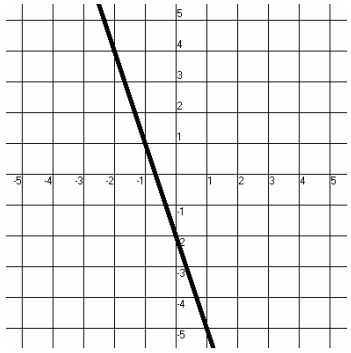
n	
6	4
9	6
12	8
15	10

Fill in the empty box:

t	*t* - 7
-2	-9
2	-5
6	
10	3

Fill in the empty box:

w	
4	11
6	17
8	23
10	29



What is the slope?

What is the *y* intercept?

Write a word phrase for this expression:
$x \div 4$

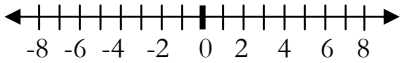
(-16) ÷ (-4) = _____

Write the expression for this phrase:
8 more than twice a number

Solve:
$3x = 27$
$x =$ _____

Solve:
$6t = 36$
$t =$

Graph the expression $p \leq -3$



Simplify:
$9x - 3 - 4x + 9 =$

Solve:
$24 \div x = 6$
$x =$ _____

Evaluate $8g - 4$ when
$g = 2$ _____
$g = 4$ _____

Write the expression for this phrase:
10 divided by a number

9 • 4 – 6 = _____

Simplify:
$12n - 5 - 7n + 3$

Write a word phrase for this expression:
$h \bullet 5$

(-3)(9 – 7) = _____

$\sqrt{36}$ = _____

Simplify:
$3(6 - 1) + 2(-4 + 4)$

Evaluate $a^2 - b \div 2$ when $a = 4$ and $b = 6$

a) 1
b) 5
c) 10
d) 13

Simplify:
$3(m + 2) + 2(m - 1)$

a) $5m + 4$
b) $5m + 1$
c) $6m + 8$
d) $6m - 8$

Simplify:
$6(p - 2) - 3(p + 3)$

a) $3p + 1$
b) $9p + 11$
c) $3p - 21$
d) $9p - 21$

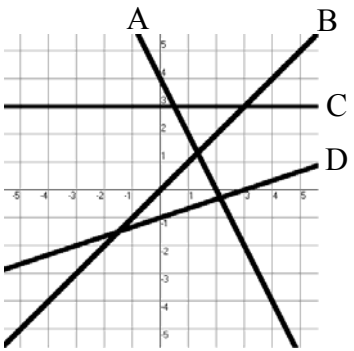
Solve:
$\frac{y}{3} = 4$

a) –10
b) 7
c) $\frac{4}{3}$
d) 12

Solve:
$6c + 4 = -3c - 14$

a) $-\frac{10}{3}$
b) -2
c) 2
d) 6

Which line on the graph is $y + 2x = 4$?



a) Line A
b) Line B
c) Line C
d) Line D

Find the slope of a line through (1, -1) (5, 2)

a) $\frac{1}{5}$
b) $\frac{3}{4}$
c) -6
d) $-\frac{4}{3}$

Write the equation in slope-intercept form if $m = \frac{1}{2}$ and $b = 3$

a) $y = 2x + 3$
b) $y = 3x + \frac{1}{2}$
c) $x = \frac{1}{2}y - 3$
d) $y = \frac{1}{2}x + 3$

Write the equation of a line through (5, 3) (4, 9). Use point-slope form. a) $y + 1 = 2(x - 4)$ b) $y + 4 = -6(x - 1)$ c) $y - 3 = -6(x - 5)$ d) $y = -6x + 30$	Solve: $-5 \le 2x - 11 \le 9$ a) $-8 \le x \le 2$ b) $-6 \ge x \ge 5$ c) $3 \le x \le 10$ d) $6 \le x \le 20$	Solve: $\lvert 2x \rvert > 16$ a) $x > 8$ or $x < -8$ b) $-8, 8$ c) $-8 < x < 8$ d) $x > 14$ or $x < -14$	Solve the linear system: $-6x + 3y = -6$ $2x + 6y = 30$ a) (6, 3) b) (3, 4) c) (2, 6) d) (4, -3)
Simplify, with no negative exponents: $\left(\frac{6x^2y^{-1}}{2xy}\right)^2$ a) $9x^2$ b) $3x^2y^3$ c) $\frac{3x}{y^2}$ d) $\frac{9x^2}{y^4}$	Simplify: $\sqrt{32}$ a) $4\sqrt{2}$ b) $8\sqrt{4}$ c) $\sqrt{16} \bullet \sqrt{2}$ d) $8\sqrt{2}$	Factor this trinomial: $2x^2 + 5x - 3$ a) $(x - 2)(x - 1)$ b) $(2x - 1)(x + 3)$ c) $(2x + 1)(x - 3)$ d) $(x - 1)(x + 3)$	Simplify: $\frac{12}{2x+4} + \frac{3x}{x+2}$ a) $\frac{3x+12}{3x+6}$ b) $\frac{x+4}{x+2}$ c) 3 d) $9x$

Teacher _____

Project AAIMS:
Algebra Assessment and Instruction:
Meeting Standards
XXX Senior High

Teacher Rating of Student Progress

Directions: Below is a list of the students you teach. Please rate the amount of progress or improvement each student has made in algebra during this course. A rating of "1" indicates no growth or a decrease in level of performance, "3" indicates average progress, and "5" indicates exceptional progress, far beyond what you expected. If the list includes a student who has dropped the class, just draw a line through his/her name. Thank you!

Student	Algebra Progress				
	Low		Average		High
	1	2	3	4	5
	1	2	3	4	5
	1	2	3	4	5
	1	2	3	4	5
	1	2	3	4	5
	1	2	3	4	5
	1	2	3	4	5
	1	2	3	4	5
	1	2	3	4	5
	1	2	3	4	5
	1	2	3	4	5
	1	2	3	4	5
	1	2	3	4	5
	1	2	3	4	5
	1	2	3	4	5