



THE STATE EDUCATION DEPARTMENT / THE UNIVERSITY OF THE STATE OF  
NEW YORK / ALBANY, NY 12234

David Abrams, Assistant Commissioner  
Office of Standards, Assessment and Reporting

May 2010

To: District Superintendents  
Superintendents of Public and Nonpublic Schools  
Principals of Public, Nonpublic, and Charter Secondary Schools  
Other Interested Parties

From: David Abrams 

Subject: Request for Public Comment

In June 2008, the New York State Education Department (NYSED) introduced the Regents Examination in Integrated Algebra as a replacement for its Regents Examination in Mathematics A. Since this represents a revision to New York State's Title I approved assessment system, NYSED submitted this examination to the US Department of Education (USED) for Peer Review. As a result, we were informed that a waiver request must be submitted to USED so that the alternative examinations which have served as alternatives to Mathematics A may also be used as alternatives to Regents Examination in Integrated Algebra.

NYSED is requesting that the alternatives listed below and their associated required minimum scores be accepted by USED as approved alternatives to the Regents Examination in Integrated Algebra.

<b>Alternative Examination</b>	<b>Minimum Acceptable Score</b>
Advanced International Certificate of Education (AICE) Mathematics Examination	E
Advanced Placement Calculus AB Examination	3
Advanced Placement Calculus BC Examination	3
International Baccalaureate Mathematics Studies Standard Level Examination	4
International Baccalaureate Mathematics Methods Standard Level Examination	4
International Baccalaureate Mathematics Higher Level Examination	3
International General Certificate of Secondary Education (IGCSE)	A
SAT II Mathematics Level IC	470

We have been informed by USED that prior to submitting a waiver request, NYSED must provide "all interested LEAs in the State with notice and a reasonable opportunity to comment on the request (ESEA section 9401(b)(3)(A)(i)). The SEA must submit all comments it receives from those LEAs to the Secretary along with its waiver request (ESEA section 9401(b)(3)(A)(ii)). The Secretary will consider these comments when determining whether to grant the waiver request."

In response to USED's request, we are sharing the above information with you and asking that you submit any comments you may have regarding the use of the alternative examinations listed above, as alternatives to the Regents Examination in Integrated Algebra. A copy of the November 9, 2009 waiver request to Dr. Thelma Meléndez de Santa Ana, Assistant Secretary for Elementary and Secondary Education, along with documentation describing and justifying the request is attached for your information.

Please mail or fax your comments on your school/agency letterhead, no later than May 10, 2010, addressed to:

David Abrams, Assistant Commissioner  
Office of Standards, Assessment, and Reporting  
NYS Education Department  
Room 675 EBA  
Albany, New York 12234

Fax: 518-473-7737

We thank you for your support and look forward to hearing from you.

Attachments



THE STATE EDUCATION DEPARTMENT / THE UNIVERSITY OF THE STATE OF  
NEW YORK / ALBANY, NY 12234

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David Abrams, Assistant Commissioner  
Office of Standards, Assessment and Reporting

November 9, 2009

Dr. Thelma Melendez de Santa Ana  
Assistant Secretary for Elementary and Secondary Education  
United States Department of Education  
400 Maryland Ave., SW  
Washington, DC 20202

Dear Dr. Melendez de Santa Ana:

In June 2008, the New York State Education Department (NYSED) introduced the high school Regents Examination in Integrated Algebra (Integrated Algebra) as a replacement for its Regents Examination in Mathematics A (Math A) for New York State's fully approved Title I assessment system. This new Regents Examination is used for federal accountability purposes for determining whether school and/or district have met adequate yearly progress; NYSED has submitted this examination for Peer Review and we were informed that we must apply for a waiver so that the national and international examinations in mathematics which had served as alternatives to Math A, may be used in New York State's accountability system as alternatives to the Integrated Algebra.

### **Background Information and Rationale**

In the 1990s, the New York State Board of Regents adopted changes to the Regulations of the Commissioner of Education pertaining to graduation requirements; these require all students to pass New York State high school level Regents Examinations in English, mathematics, science, and social studies to graduate. As part of this implementation of higher standards, a process was established by the NYSED to consider proposals that would allow schools to accept specified minimum scores on alternative standardized achievement tests in lieu of a passing score on a required Regents Examination for meeting the State's graduation requirements. The process for submission of proposed alternative assessments and their evaluation by NYSED are explained in Attachment A, *Guidelines for Presenting Alternative Assessment Proposals*. A critical element in this review process has been the State Assessment Panel, which was charged with the responsibility of carefully reviewing alternative assessments for the Commissioner's consideration and approval. Attachment B, *New York State Assessment Panel Members*, shows the membership of this advisory body. The criteria that the State Assessment panel used to evaluate proposed alternative tests are specified in Section 100.2(f) of the Regulations of the Commissioner of Education and are as follows:

1. assessments shall measure the State learning standards for the respective content area;
2. alternative assessments shall be at least as rigorous as the corresponding required State assessment;
3. alternative assessments shall be consistent with technical criteria for validity, reliability, and freedom from bias;
4. alternative assessments shall be developed by an entity other than a local school or school district;
5. alternative assessments shall be available for use by any school or school district in New York State; and
6. alternative assessments shall be administered under secure conditions approved by the Commissioner.

The alternative examinations and associated minimum scores approved through this evaluation process request are listed in the table below:

<b><i>Alternative Examination</i></b>	<b><i>Minimum Acceptable Score</i></b>
Advanced International Certificate of Education(AICE) Mathematics Examination	E
Advanced Placement Calculus AB Examination	3
Advanced Placement Calculus BC Examination	3
International Baccalaureate Mathematical Studies Standard Level Examination	4
International Baccalaureate Mathematics Methods Standard Level Examination	4
International Baccalaureate Mathematics Higher Level Examination	3
International General Certificate of Secondary Education (IGCSE)	A
SAT II Mathematics Level 1	470
SAT II Mathematics Level 2	510

NYSED is requesting that these alternative assessments, and their associated required minimum scores, be accepted by the USED as approved alternatives to the new Regents Examination in Integrated Algebra. This request is based on an analysis of curriculum. Attachment C, *CROSSWALK, Comparison of Core Curriculum for High School Mathematics, September 2005*, shows that there is considerable overlap in the

mathematics content covered by the new Regents Examination in Integrated Algebra and the Math A exam, which it replaced.

In reviewing proposed alternative assessments, NYSED staff, the State Assessment Panel, and the Commissioner carefully considered the fairness and rigor of the proposed alternative as well as its alignment between the knowledge and skills measured by the State's assessment. In some instances, e.g., AP Calculus Examinations, approval was based on the recognition that achieving the required minimum score on the alternate required that the student had first achieved mastery of the prerequisite mathematics skills and knowledge measured by the Regents Examination.

Following the Commissioner's approval of the alternative assessments, NYSED experts and outside consultants studied the performance level descriptors for the Regents Examination and the alternative assessment, as well as concordance data when it was available, to establish a minimum acceptable score for the alternative assessment. The minimum acceptable score represents a high degree of likelihood that the student earning that score on the approved alternative assessment would earn a passing score on the Regents Examination. For example, NYSED established a minimum score on the AP Calculus AB and BC Examinations of 3, which is the minimum score colleges and universities will accept for granting college credit in mathematics. In establishing the required scores for all of the approved alternatives, NYSED made certain that the required examination and score could not be viewed as a means of meeting the graduation requirements via a less rigorous standard than that demonstrated by passing the Regents Examination.

The incidence with which New York State students use NYSED approved alternative assessments in place of required Regents Examinations to meet graduation requirements is low. For the 2004 Accountability Cohort of 195,883 students, only 21 students met graduation requirements by achieving a required score on one of NYSED's nine alternative assessments. While many more New York State students participate in the above-listed assessments and related mathematics instruction, the majority take these assessments after having already taken, and passed, the Regents Examinations in mathematics. Our primary purpose in requesting this waiver is to avoid unnecessary duplication of effort in demonstrating the required level of mathematics proficiency for those students who transfer into New York State schools near the time of their expected graduation.

NYSED is interested in notifying schools regarding the use of approved alternative examinations as soon as possible in order to make this option available for the 2009-10 school year. We respectfully request that your office consider this waiver allowing these alternative assessments and associated scores to be used for federal accountability purposes for the very limited number of students who may exercise this option.

If you have any questions, or require further information, please do not hesitate to contact me at (518) 473-7880 at your convenience. Thank you for your attention to this request, and we look forward to hearing from you.

Sincerely,

David Abrams

Attachments

c: Dr. John B. King, Jr.



## Attachment A

THE STATE EDUCATION DEPARTMENT / THE UNIVERSITY OF THE STATE OF NEW YORK / ALBANY, NY 12234

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March 2004

### Guidelines for Presenting Alternative Assessment Proposals

#### ***Who May Apply and Which Regents Examinations Are Included***

1. A school or schools write to the Coordinator, Office of State Assessment, to request the use of an external assessment or group of assessments. The Department contacts the entity that produces the assessment and invites the entity to apply to bring the assessment to the Panel.
2. Alternative assessment applications will be considered for the following Regents examinations: Comprehensive English, Mathematics A, Global History and Geography, United States History and Government, Physical Setting: Earth science, and Living Environment (Biology).

#### ***Application Process***

Applicants must:

1. Submit the assessment (test booklet, answer sheet, scoring key, directions and all other auxiliary materials) and related documentation for verification that the assessment has addressed all the conditions described in the *Criteria for Alternative Assessments for Regents Examinations (8NYCRR 100.2(f))*, in which case, presenters will receive an invitation to appear before the Panel. These materials must be submitted at least **three months** before the meeting at which the assessment will be presented.
2. After receiving an invitation to present to the Panel, send materials to the State Assessment Panel members so that the Panel members receive them no later than **three weeks** before a meeting. The Department will provide Panel members' addresses).

#### ***Structure for Presentation of Proposal***

1. Applicants are permitted to make a team presentation; the team may include teachers. The number of presenters per team is limited to **five**.
2. Presentations for each proposal are limited to one hour. During that time, Panel members may ask questions, but are asked to reserve most of their questions until the presentation is completed.
3. Panel members have 30 minutes to ask questions. Following the question and answer period, the presenters are asked to leave the room.
4. Panel members have 30 minutes to discuss and vote on the proposal.
5. A record will be kept of how the Panel members voted, and the Panel's reasons, based on the established criteria, for recommending acceptance, denial, or resubmission.
6. Applicants will be notified by mail of the Commissioner's decision. Presenters may be offered the opportunity to revise their application, based on the Panel's recommendation, and re-submit their proposal.

7. Observers are not permitted to ask questions, or to contribute to the discussion.
8. Applicants are not reimbursed for any expenses.

***Charge to the New York State Assessment Panel***

- Review alternative tests to the New York State Regents Examinations for use as substitutes for State-developed Regents Examinations.
- Advise the Commissioner and staff as to the acceptability of proposed alternatives.

***Panel Member***

1. Are asked to serve for a period of three years.
2. Will be asked to resign if they miss more than three consecutive meetings.
3. Are responsible for reviewing materials sent to them in advance of each meeting.
4. Must be at least 10 in number in order for a meeting to be held. Panel members are asked to notify the Department as soon as possible about last-minute changes in plans that prevent them from attending a meeting.
5. Will generally meet at least twice a year (October/November and March/April) with additional meetings scheduled, if needed.
6. Who wish to resign must submit a written letter of resignation.
7. Are reimbursed for travel expenses. Breaks and lunches will be provided as the fiscal situation permits. There are no honoraria or substitute reimbursement to districts. If meetings are scheduled to begin earlier than 10 AM, Panel members' hotel costs will be paid.

***Criteria for Alternative Assessments for Regents Examinations [BNYCRR 100.2 (f)]***

1. **Assessments shall measure the State learning standards for the respective content area.**
  - The assessment design must be submitted showing alignment with the learning standards at the level of performance indicators (cf. core curriculum guides).
  - The alternative assessment design must include a cross section of the learning standards comparable to that measured by the corresponding Regents examination.
  - The assessment design must sample from the learning standards in the subject in such a way that performance on the assessment tasks can be used to infer student achievement of the broader content of the standards.
2. **Alternative assessments shall be at least as rigorous as the corresponding required State assessment.**
  - A description of the performance levels for the assessments must be presented with a passing level representing achievement of the learning standards at a comparable depth and breadth to the corresponding Regents examination.
  - A description of the development process must be presented indicating steps to ensure adequate representation of the learning standards, evaluation of quality of all assessment components, and consistent administrative procedures that ensure fair and accurate assessment.

- There must be an established procedure for determining test performance standards, based on achievement of learning standards (i.e., a standard setting procedure).

**3. Alternative Assessments shall be consistent with technical criteria for validity, reliability, and freedom from bias.**

- Validity
  - ✓ Data must be presented showing that passing the assessments indicates that students have the requisite knowledge and skills to be eligible to receive a New York State Regents high school diploma, according to the requirements established by the Board of Regents in 1996.
  - ✓ The assessment design must indicate elements that measure a continuum of skills and knowledge (from foundational to advanced) required by the learning standards.
- Reliability
  - ✓ Data must be presented to demonstrate the consistency of the assessments across test forms, testing sites, and administrations.
  - ✓ Data must be presented indicating the degree of agreement among raters on the point values awarded to student responses to open-ended questions.
- Freedom from Bias
  - ✓ Data must be presented demonstrating the appropriateness of all assessment tasks and questions for various populations. These data must come from a formal analysis of all test items (e.g., the Mantel-Haenszel procedure).
  - ✓ Data from additional analyses must be presented to demonstrate that the assessments consistently measure the same knowledge and skills across various populations, such as limited English proficient English language learners.

**4. Alternative assessments shall be developed by an entity other than a local school or school district.**

- A description of the entity developing the assessment must be presented. The entity may include representatives from schools.
- A description must be presented of the process for ensuring that neither teachers nor students have previous knowledge of the specific tasks or questions by which the students will be assessed. Under these conditions, performance on the assessment can be used to infer student achievement of the broader content required by the State learning standards.

**5. Alternative assessments shall be available for use by any school or school district in New York State.**

- A description must be provided of the process for making the alternative assessment available to other schools.

**6. Alternative assessments shall be administered under secure conditions approved by the Commissioner.**

- Descriptions must be presented of provisions to ensure that no student has an unfair advantage over other students by reason of prior knowledge of the specific tasks or questions on the assessment, inequitable opportunities for revisions, or access to outside help.

## **Attachment B**

### **New York State Assessment Panel Members**

Ms. Crystal Barton  
McKinley Vocational High School  
Buffalo, NY

Ms. Julia Lara  
Assistant Director/SCASS Project  
Council of Chief State School Officers  
Washington, DC

Mr. Vincent Beni  
District Superintendent  
Southern Westchester BOCES  
Rye Brook, NY

Sister Ann McCarthy, C.S.J.  
Director of School Services  
Education and Human Services  
St. John's University  
Jamaica, NY

Mr. Jeffrey Bowen  
Assistant Superintendent  
Yorkshire-Pioneer Central School District  
Yorkshire, NY

Mrs. Constance Moss  
School District Administrator for Assessment  
Niagara Falls City School District  
Niagara Falls, NY

Mr. William Caroscio  
Southside High School  
Elmira, NY

Ms. Jessie Pollack  
Specialist Research and Development Office  
Maryland State Department of Education  
Baltimore, Maryland

Mr. Harris Dinkoff  
Board Member  
Valley Stream 13 Board and Central Board  
Valley Stream, NY

Rev. Msgr. Guy J. Puglisi  
Superintendent of Schools  
Diocese of Brooklyn  
Brooklyn, NY

Ms. Carolyn Fiori  
President  
New York State PTA  
Massapequa, NY

Mr. Charles Santelli  
Director of Policy and Program Development  
New York State United Teachers  
Albany, NY

Ms. Linda Gush  
Superintendent  
Greenville Central School District  
Greenville, NY

Mr. Robert Tobias, Director  
Office of Research, Evaluation and Assessment  
New York City Board of Education  
Brooklyn, NY

Dr. Howard C. Johnson  
Dean of the Graduate School and  
Associate Vice Chancellor for Academic Affairs  
Syracuse University  
Syracuse, NY

Ms. Lillian Turner  
Niskayuna High School  
Schenectady, NY 12309

Mr. William H. Johnson  
Superintendent  
Rockville Centre Union Free School District  
Rockville Centre, NY

Ms. Jacqueline Welkowitz  
Educational Coordinator, P'TACH Program  
Yeshiva University High School for Girls  
Holliswood, NY

## Attachment C



*Integrated Algebra* is the first mathematics course in the high school. The algebra course set forth here is not the algebra of 30 years ago. The focal point of this course is the algebra content strand. Algebra provides tools and ways of thinking that are necessary for solving problems in a wide variety of disciplines, such as science, business, social sciences, fine arts, and technology. This course will assist students in developing skills and processes to be applied using a variety of techniques to successfully solve problems in a variety of settings. Problem situations may result in all types of linear equations in one variable, quadratic functions with integral coefficients and roots as well as absolute value and exponential functions. Coordinate geometry will be integrated into the investigation of these functions allowing students to make connections between their analytical and geometrical representations. Problem situations resulting in systems of equations will also be presented. Alternative solution methods should be given equal value within the strategies used for problem solving. For example, a matrix solution to a system of equations is just as valid as a graphical solution or an algebraic algorithm such as elimination. Measurement within a problem-solving context will include calculating rates using appropriate units and converting within measurement systems. Data analysis including measures of central tendency and visual representations of data will be studied. An understanding of correlation and causation will be developed and reasonable lines of best fit will be used to make predictions. Students will solve problem situations requiring right triangle trigonometry. Elementary probability theory will be used to determine the probability of events including independent, dependent and mutually exclusive events.

### CROSSWALK

#### Comparison of 1999 Core Curriculum and 2005 Core Curriculum for High School Mathematics September 2005

The following chart lists the concepts and skills in *Integrated Algebra* (2005 Core) and indicates where it was included in the 1999 Core.

## INTEGRATED ALGEBRA

<b>Number Sense and Operations Strand</b>			
<b>2005 Core Curriculum</b>		<b>1999 Core Curriculum</b>	
<b>Performance Indicator</b>	<b>Concept/Skill</b>	<b>Key Idea</b>	<b>Concept/Skill</b>
A.N.1	Identify and apply properties of real numbers	Math A – 2C Math A – 3D	Properties of real numbers Use field properties to justify mathematical procedures
A.N.2	Simplify radical terms (no variable in radicand)	Math A – 3A	Simplification of radicals
A.N.3	Operations with radicals (using like and unlike radical terms)	Math A – 3A	Operations with radicals
A.N.4	Scientific notation to compute products and quotients	Math A – 3A	Use addition, subtraction, multiplication, division, and exponentiation with real numbers and Algebraic expressions <ul style="list-style-type: none"> <li>• Scientific notation</li> </ul>

## INTEGRATED ALGEBRA

<b>Number Sense and Operations Strand</b>			
<b>2005 Core Curriculum</b>		<b>1999 Core Curriculum</b>	
<b>Performance Indicator</b>	<b>Concept/Skill</b>	<b>Key Idea</b>	<b>Concept/Skill</b>
A.N.5	Solving Algebraic problems involving fractions, decimals, percents (decrease/increase and discount), and proportionality/direct variation	Math 7/8 – 2B	Understand and apply ratios, proportions, and percents through a wide variety of hands-on explorations <ul style="list-style-type: none"> <li>• Find the percent of a number, calculate the percent of increases and decreases, rate, commissions, taxes, and simple interest</li> </ul>
A.N.6	Evaluating expressions involving factorial(s), absolute value(s), and exponential expression(s)	Math A – 3B Math A – 5G Math A – 6D Math 7/8 – 2A Math7/8 – 3A	Use integral exponents on integers and Algebraic expressions Absolute value and the length of a line segment  Factorial notation Understand the meaning of absolute value symbol Determine the absolute value of real numbers expanded to include numerical expressions beyond a single value
A.N.7	Fundamental Principle of Counting	Math A – 6C	Counting principle
A.N.8	Permutations	Math A – 6C	Permutations: ${}_nP_n$ and ${}_nP_r$

## INTEGRATED ALGEBRA

<b>Integrated Algebra Strand</b>			
<b>2005 Core Curriculum</b>		<b>1999 Core Curriculum</b>	
<b>Performance Indicator</b>	<b>Concept/Skill</b>	<b>Key Idea</b>	<b>Concept/Skill</b>
A.A.1	Translate: Quantitative verbal phrase into an Algebraic expression	Math A – 4A	Represent problem situations symbolically by using Algebraic expressions
A.A.2	Write: Verbal expression for a given mathematical expression	Math A – 4A	Implied but not explicitly stated
A.A.3	Difference between an Algebraic expression and an Algebraic equation		Not directly addressed
A.A.4	Translate: Verbal sentences into mathematical equations or inequalities	Math A – 4A Math A – 7C	Represent problem situations symbolically by using Algebraic expressions Translate among the verbal descriptions, tables, equations, and graphic forms of functions
A.A.5	Write Algebraic equations or inequalities that represent a situation	Math A – 4A Math A – 7C	Implied but not explicitly stated Translate linear functions and inequalities between representations that are verbal descriptions, tables, equations, or graphs
A.A.6	Analyze and solve verbal problems whose solution requires solving a linear equation in one variable or linear inequality in one variable	Math A – 7B	Graphic and Algebraic solutions of linear function in the solution of problems
A.A.7	Analyze and solve verbal problems whose solution requires solving systems of linear equations in two variables	Math A – 7A Math A – 7E	Graphic solution of systems of linear equations and inequalities (problem solving implied) Solve systems of linear equations (problem solving implied)
A.A.8	Analyze and solve verbal problems that involve quadratic equations	Math A – 7B	Graphic and Algebraic solutions of quadratic function in the solution of problems

## INTEGRATED ALGEBRA

<b>Integrated Algebra Strand</b>			
<b>2005 Core Curriculum</b>		<b>1999 Core Curriculum</b>	
<b>Performance Indicator</b>	<b>Concept/Skill</b>	<b>Key Idea</b>	<b>Concept/Skill</b>
A.A.9	Analyze and solve verbal problems that involve exponential growth and decay	Math 7/8 – 7C	Use Algebraic expressions, equations, and inequalities to model exponential growth
A.A.10	Algebraic solution of a system of two linear equations in two variables	Math A – 7A  Math A – 4E	Algebraic solution of systems of linear equations by substitution method and addition-subtraction method  Model real world problems with systems of equations <ul style="list-style-type: none"> <li>• Systems of linear equations</li> </ul>
A.A.11	Solve a system of one linear and one quadratic equation in two variables (only factoring required and the quadratic equation should represent a parabola and the solution should be integers)	Math A – 7A	Algebraic solution of a system of equations – one linear and one quadratic
A.A.12	Multiplication/Division of monomials expressions with a common base using the properties of exponents (integral exponents only)	Math A – 3A	Products of monomials (division by monomials not specifically addressed as such)
A.A.13	Add, subtract, and multiply monomials and polynomials	Math A – 3A	Addition and subtraction of polynomials: combining like terms Multiplication of polynomials: powers, products of monomials and binomials
A.A.14	Divide a polynomial by a monomial or binomial (quotient has no remainder)	Math A – 3A	Division of polynomials by monomials – no mention of division by binomial
A.A.15	Find values of a variable for which an Algebraic fraction is undefined		Not specifically addressed

## INTEGRATED ALGEBRA

<b>Integrated Algebra Strand</b>			
<b>2005 Core Curriculum</b>		<b>1999 Core Curriculum</b>	
<b>Performance Indicator</b>	<b>Concept/Skill</b>	<b>Key Idea</b>	<b>Concept/Skill</b>
A.A.16	Simplify fractions with polynomials in the numerator and denominator by factoring both (simplify answer)	Math A – 3A	Simplification of fractions – polynomials in numerator and denominator not mentioned
A.A.17	Add/Subtract fractional expressions with monomial or like binomial denominators	Math A – 3A	Addition and subtraction of fractions with like denominators – no mention of binomial denominators
A.A.18	Multiply/Divide Algebraic fractions and express answer in simplest form	Math A – 3A	Multiplication and division of fractions
A.A.19	Identify and factor the difference of two perfect squares	Math A – 3A	Difference of two squares
A.A.20	Complete factoring (including trinomials with a lead coefficient of one (after factoring a GCF)	Math A – 3A	Factoring: common monomials, binomial factors of trinomials- no mention of complete factoring
A.A.21	Verifying a value as a solution to a linear equation or inequality in one variable	Math 7/8 – 7E	Verify results of substituting variables <ul style="list-style-type: none"> <li>• Solve an equation and check the solution by substitution</li> </ul>
A.A.22	Solution of all types of linear equations in one variable	Math A – 7E	Solve linear equations with integral, fraction, or decimal coefficients
A.A.23	Solution of literal equations for a given variable	Math A – 4A	Formulas and literal equations
A.A.24	Solution of linear inequalities in one variable	Math A – 7E	Solve linear inequalities
A.A.25	Solve equations involving fractional expressions (fractional expressions result in linear equations in one variable)	Math A – 7E	Solve linear equations with fractional coefficients

## INTEGRATED ALGEBRA

<b>Integrated Algebra Strand</b>			
<b>2005 Core Curriculum</b>		<b>1999 Core Curriculum</b>	
<b>Performance Indicator</b>	<b>Concept/Skill</b>	<b>Key Idea</b>	<b>Concept/Skill</b>
A.A.26	Solution of Algebraic proportions in one variable which result in linear or quadratic equations		Solution of proportional not directly addressed
A.A.27	Use of multiplication property of zero to solve quadratic equations with integral coefficients and integral roots	Math A – 7E	Solve factorable quadratic equations (zero property of multiplication implied)
A.A.28	Relation between roots and factors of a quadratic equation		Not specifically addressed
A.A.29	Set builder notation and/or interval notation to represent the elements of a set		Not addressed
A.A.30	Complement of a set		Not addressed
A.A.31	Intersection of Sets		Not addressed
A.A.32	Slope as a rate of change		Not addressed

## INTEGRATED ALGEBRA

<b>Integrated Algebra Strand</b>			
<b>2005 Core Curriculum</b>		<b>1999 Core Curriculum</b>	
<b>Performance Indicator</b>	<b>Concept/Skill</b>	<b>Key Idea</b>	<b>Concept/Skill</b>
A.A.33	Slope of a line given the coordinates of two points on the line	Math A – 5G	Relate absolute value, distance between two points, and the slope of a line to the coordinate plane
A.A.34	Write the equation of a line, given its slope and the coordinates of a point on the line	Math A – 5G	Equation of a line: point-slope
A.A.35	Write the equation of a line given the coordinates of two points on the line		Not addressed
A.A.36	Write the equation of a line parallel to the x- or y-axis		Not addressed
A.A.37	Determine the slope of a line given its equation in any form	Math A -5G	Equation of a line: point-slope and slope intercept form
A.A.38	Determine if two lines are parallel, given their equation in any form	Math A – 5G	Comparison of parallel and perpendicular lines
A.A.39	Determine whether a given point is on a line , given the equation of the line		Implied in Math A – 7E
A.A.40	Determine whether a given point is in the solution set of a system of linear inequalities		Implied in Math A – 7E
A.A.41	Vertex and axis of symmetry of a parabola		Not specifically addressed

## INTEGRATED ALGEBRA

<b>Integrated Algebra Strand</b>			
<b>2005 Core Curriculum</b>		<b>1999 Core Curriculum</b>	
<b>Performance Indicator</b>	<b>Concept/Skill</b>	<b>Key Idea</b>	<b>Concept/Skill</b>
A.A.42	Trigonometric Ratios of an acute angle of a right triangle	Math A – 5E Math 7/8 – 7J	Right triangle trigonometry Explore and develop basic concepts of right triangle trigonometry <ul style="list-style-type: none"> <li>• Understand the relationships of the sides of a right triangle</li> <li>• Develop and apply the formulas for sine, cosine, and tangent</li> </ul>
A.A.43	Find an acute angle of a right triangle given the lengths of its sides	Math A – 5E Math 7/8- 7J	Right triangle trigonometry – Use trigonometry as a method to measure indirectly Develop and apply the formulas for sine, cosine, and tangent
A.A.44	Find the length of a side of a right triangle given the measure of an acute angle and the measure of one side	Math A – 5E Math 7/8 – 7J	Right triangle trigonometry – Use trigonometry as a method to measure indirectly Develop and apply the formulas for sine, cosine, and tangent
A.A.45	Application of Pythagorean theorem	Math 7/8 – 7I	Develop and apply the Pythagorean principle in the solution of problems <ul style="list-style-type: none"> <li>• Use the Pythagorean theorem in the solution of problems</li> </ul>

## INTEGRATED ALGEBRA

<b>Geometry Strand</b>			
<b>2005 Core Curriculum</b>		<b>1999 Core Curriculum</b>	
<b>Performance Indicator</b>	<b>Concept/Skill</b>	<b>Key Idea</b>	<b>Concept/Skill</b>
A.G.1	Area/Perimeter of figures composed of polygons, circles, or sectors of circles	Math A – 5A	Perimeter of polygons and circumference of circles Areas of polygons Sectors of a circle not addressed
A.G.2	Volume and Surface Area of regular solids and cylinders	Math A – 5A	Volume of solids
A.G.3	Determine when a relation is a function	Math B – 7A	Determine if a relation is a function
A.G.4	Identify and graph linear, quadratic (parabola), absolute value, and exponential functions	Math A – 7A	Graphs of linear relations: slope and intercept Graphs of conics: circle and parabola
AG.5	How coefficient change in a function effects its graph	Math B – 6B  Math B 7D  Math B – 4J	Determine the effects of changing the parameters of graphs of linear, quadratic, trigonometric, exponential, and circular functions Analyze the effect of parametric changes on the graphs of functions Determine the effects of changing parameters on the graphs of functions
A.G.6	Graphing linear inequalities		Not directly addressed
A.G.7	Graph and solve systems of linear equations and inequalities (rational coefficients in two variables)	Math A – 7A	Graphic solution of systems of linear equations and inequalities
A.G.8	Graphic solution of a quadratic (parabolic) equation (integral solutions only)	Math A – 7A	Graphs of conics – parabola

## INTEGRATED ALGEBRA

<b>Geometry Strand</b>			
<b>2005 Core Curriculum</b>		<b>1999 Core Curriculum</b>	
<b>Performance Indicator</b>	<b>Concept/Skill</b>	<b>Key Idea</b>	<b>Concept/Skill</b>
A.G.9	Graphic solutions of systems of linear and quadratic equations (solutions whose coordinates are integers)		Not directly addressed
A.G.10	Determine the vertex and axis of symmetry of a parabola given its graph (ordered pair of vertex are integers and integral value for axis of symmetry)		Not directly addressed

## INTEGRATED ALGEBRA

<b>Measurement Strand</b>			
<b>2005 Core Curriculum</b>		<b>1999 Core Curriculum</b>	
<b>Performance Indicator</b>	<b>Concept/Skill</b>	<b>Key Idea</b>	<b>Concept/Skill</b>
A.M.1	Calculations of rate	Math 7/8 – 3G	Determine the unit cost to compare price
A.M.2	Solution of problems involving conversions	Math A – 5B Math A – 5C	Choose and apply appropriate units and tools o measurement situations Converting to equivalent measurements within metric and English measurement systems Dimensional Analysis
A.M.3	Relative error in measuring square and cubic units when error occurs in linear measure	Math A – 5H	Explain the role of error of measurement and its consequence on subsequent calculations Error of measurement and its consequences on calculations of perimeter of polygons and circumference of circles Areas of polygons and circles Volume of solids Percent of error in measurements

## INTEGRATED ALGEBRA

<b>Statistics and Probability Strand</b>			
<b>2005 Core Curriculum</b>		<b>1999 Core Curriculum</b>	
<b>Performance Indicator</b>	<b>Concept/Skill</b>	<b>Key Idea</b>	<b>Concept/Skill</b>
A.S.1	Categorize data as qualitative or quantitative		Not addressed
A.S.2	Determine whether the data to be analyzed is univariate or bivariate		Not addressed
A.S.3	Determine when collected data or display of data may be biased	Math B – 5I	Bias
A.S.4	Compare and contrast the appropriateness of different measures of central tendency for a given data set	Math B – 5I	Choose appropriate statistical measures
A.S.5	Construct a histogram, cumulative frequency histogram, and a box-and-whisker plot, given a set of data	Math A – 5D	Collect and organize data: histogram, cumulative frequency histogram, box-and-whisker plot
A.S.6	Understand how the five statistical summary (minimum, maximum, and the three quartiles) is used to construct a box-and-whisker plot	Math A -5D	Organize data using a box-and-whisker plot
A.S.7	Create a scatter plot of bivariate data	Math A -5D	Collect and organize data: scatter plots
A.S.8	Line of best fit for a scatter plot and its equation	Math B – 5J	Use statistical methods, including scatter plots and lines of best fit, to make predictions <ul style="list-style-type: none"> <li>• Given data, produce scatter plots and lines of best fit</li> </ul>
A.S.9	Analyze and interpret a frequency distribution table or histogram, a cumulative frequency distribution table or histogram, or a box-and-whisker plot	Math A – 5D	Use statistical methods including measures of central tendency to describe and compare data

## INTEGRATED ALGEBRA

<b>Statistics and Probability Strand</b>			
<b>2005 Core Curriculum</b>		<b>1999 Core Curriculum</b>	
<b>Performance Indicator</b>	<b>Concept/Skill</b>	<b>Key Idea</b>	<b>Concept/Skill</b>
A.S.10	Evaluate published reports and graphs that are based on data by considering: experimental design, appropriateness of the data analysis, and the soundness of the conclusions		Not specifically addressed
A.S.11	Find the percentile rank of an item in a data set and identify the point values for the first, second, and third quartiles	Math A – 5D	Use statistical methods including the measures of central tendency to describe and compare data <ul style="list-style-type: none"> <li>• Percentiles</li> </ul>
A.S.12	Identify the relationship between the independent and dependent variables from a scatter plot (positive, negative, or none)		Implied in Math B – 5J Use statistical methods, including scatter plots and lines of best fit, to make predictions
A.S.13	Understand the difference between correlation and causation		Not addressed
A.S.14	Identify variables that might have a correlation but not a causal relationship		Not addressed
A.S.15	Identify and describe sources of bias and its effect, drawing conclusion from data	Math B – 5I	Design a statistical experiment to study a problem and communicate the outcome, including dispersion <ul style="list-style-type: none"> <li>• Bias</li> </ul>
A.S.16	Recognize how linear transformations of one-variable data affect the data’s mean, median, mode, and range		Not directly addressed

## INTEGRATED ALGEBRA

<b>Statistics and Probability Strand</b>			
<b>2005 Core Curriculum</b>		<b>1999 Core Curriculum</b>	
<b>Performance Indicator</b>	<b>Concept/Skill</b>	<b>Key Idea</b>	<b>Concept/Skill</b>
A.S.17	Use a reasonable line of best fit to make a prediction involving interpolation or extrapolation	Math A- 6G Math B – 5J	Make predictions based on interpolations and extrapolations of data Use statistical methods, including scatter plots and lines of best fit, to make predictions
A.S.18	Conditional probability		
A.S.19	Sample space and favorable events	Math A – 6C	Use the concept of random variable in computing probabilities <ul style="list-style-type: none"> <li>• Sample space</li> </ul>
A.S.20	Probability of an event and its complement	Math A – 6B	Probability of the complement of an event
A.S.21	Determine empirical probabilities based on specific sample data	Math A – 6A	Theoretical versus empirical probability
A.S.22	Determine, based on calculated probability of a set of events, if: <ul style="list-style-type: none"> <li>• Some or all are equally likely to occur</li> <li>• One is more likely to occur than another</li> <li>• Whether or not an event is certain to happen or not to happen</li> </ul>		Not addressed as specifically as this – might be implied

