REL Technical Brief REL 2008—No. 009

Aligning mathematics assessment standards: Louisiana and the 2009 National Assessment of Educational Progress (NAEP)

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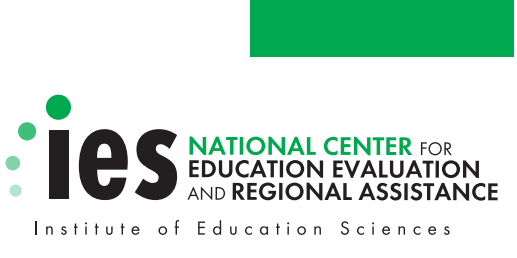
October 2008



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October 2008

After receiving the 2007 REL Southwest alignment study of the Louisiana Educational Assessment Program (LEAP) and the National Assessment of Educational Progress (NAEP) assessment standards in science (http://ies.ed.gov/ncee/edlabs/projects/project.asp?projectID=76&productID=44), the Louisiana Department of Education and the REL Southwest Governing Board requested that REL Southwest conduct a similar alignment study to learn how the LEAP and Graduation Exit Examination (GEE) mathematics assessment standards align with the 2009 NAEP assessment standards in mathematics.

This REL Technical Brief was prepared for IES under Contract ED-06-CO-0017 by Regional Educational Laboratory Southwest administered by Edvance Research. The content of the publication does not necessarily reflect the views or policies of IES or the U.S. Department of Education, nor does mention of trade names, commercial products, or organizations imply endorsement by the U.S. Government.

Shapely, K., and Brite, J. (2008). *Aligning mathematics assessment standards: Louisiana and the 2009 National Assessment of Educational Progress (NAEP)* (REL Technical Brief, REL 2008–No. 009). Washington, DC: U.S. Department of Education, Institute of Education Sciences, National Center for Education Evaluation and Regional Assistance, Regional Educational Laboratory Southwest. Retrieved from http://ies.ed.gov/ncee/edlabs.

This REL Technical Brief is available on the regional educational laboratory web site at http://ies.ed.gov/ncee/edlabs.

Summary

This technical brief examines the current alignment between the Louisiana Educational Assessment Program (LEAP) and Graduation Exit Examination (GEE) mathematics assessment standards and the 2009 National Assessment of Educational Progress (NAEP) mathematics framework. It looks at the extent to which current state assessment standards cover the content on which 2009 NAEP assessments will be based. Applying the methodology used by Regional Educational Laboratory Southwest in 2007 in a similar study that examined the alignment of LEAP and GEE science assessment standards with the 2009 NAEP, this study presents results for areas of full alignment, partial alignment, nonalignment, and areas where the LEAP and GEE assessment standards go beyond the NAEP standards. The study finds that 91 percent of NAEP grade 4, 90 percent of NAEP grade 8, and 72 percent of NAEP grade 12 assessment standards are either fully or partially addressed by the LEAP or GEE mathematics assessment standards.

The study analyzes the alignment of the LEAP and GEE and 2009 NAEP mathematics assessment standards. It does not analyze individual items or the alignment of state standards with the LEAP and GEE assessment items. The study does not make specific recommendations about whether a state should close gaps in alignment to NAEP—a decision for state policymakers. Revising assessments requires substantial time and resources, so policymakers considering such revisions need to weigh the costs of such changes and the benefits they believe such changes will bring to students.

Technical brief

Why this brief?

In 2007 Regional Educational Laboratory Southwest conducted an alignment study of National Assessment of Educational Progress (NAEP) and Louisiana Educational Assessment Program (LEAP) and Graduation Exit Examination (GEE) assessment standards in science (Timms et al. 2007). After receiving the science alignment report, the Louisiana Department of Education and the Regional Educational Laboratory Southwest Governing Board requested a similar alignment study to understand how the LEAP and GEE mathematics assessment standards[1] align with the 2009 NAEP mathematics assessment standards.[2]

One reason for this interest is the No Child Left Behind (NCLB) Act of 2001, which requires states to develop challenging academic content and achievement standards in mathematics and to test public school students in grades 3–8 and 10–12 annually to determine how well they are mastering the subject matter defined in the state standards. States must also participate in the NAEP mathematics assessments in grades 4 and 8 every two years. Because states set their own unique standards, NAEP is increasingly being used as a benchmark for assessing and comparing student achievement countrywide (see, for example, Linn 2005; Linn, Baker, and Herman 2005).

NAEP data are being used increasingly in education research to investigate how the NCLB provisions have played out in different states. For example, the National Center for Education Statistics (NCES) mapped state test scores on the NAEP scale (NAEP equivalent score) and found differences in what is considered proficient. Proficient in some states mapped to NAEP Basic, while in others it mapped to NAEP Proficient, and in still others it mapped to NAEP Advanced. Much of the discrepancy in the percentages of students scoring proficient on state assessments and on NAEP was accounted for by how stringently states defined proficient (U.S. Department of Education, National Center for Education Statistics 2007). But it is unclear how much such discrepancies are also due to other factors, such as a lack of alignment between what is tested on NAEP and on state assessments, differences in the types of items used to test mathematics knowledge and skills (for example, multiple choice questions and short responses), and differences in cutpoints for determining proficiency levels.

The findings from this research will better inform Louisiana policymakers of specific areas in which LEAP or GEE and NAEP assessment standards differ so that they can, if necessary, review and revise their standards. This report describes the results of a systematic alignment study conducted for that purpose.

Traditional alignment studies and methods focus on aligning standards and tests. The objective of this study was to compare one set of assessment standards with another (see box 1 for study methodology).

Results

Results are presented for grades 4, 8, and 12 for the research question: To what extent do current state assessment standards on LEAP and the GEE cover the content on which the 2009 NAEP assessments will be based? Results are presented for areas of full alignment, partial alignment, nonalignment, and areas where the LEAP or GEE assessment standards go beyond the NAEP assessment standards. A NAEP assessment standard is considered to be fully addressed by a LEAP or GEE assessment standard or standards if all of the content of the NAEP assessment standard is contained in one or more LEAP or GEE assessment standard at the same or lower grade level. A NAEP assessment standard is considered to be partially addressed by the LEAP or GEE assessment

BOX 1

Study methodology

This study used the WestEd methodology, which was designed to incorporate eight of the most prominent alignment methodologies (for a detailed discussion of the WestEd methodology see Timms et al. 2007).

The review team consisted of one senior reviewer and six content reviewers. The senior reviewer had 19 years of experience in mathematics education and had worked in public schools, state education agencies, and a university setting. The six content reviewers were elementary, middle, and high school mathematics educators with 4–37 years of teaching experience. Reviewers attended several training sessions.

Each reviewer conducted independent alignment ratings of the National Assessment of Education Progress (NAEP) assessment standards and Louisiana Educational Assessment Program (LEAP) or Graduation Exit Examination (GEE) assessment standards. First, they conducted gap analyses, identifying content in the grade-specific NAEP assessment standards that was absent in the grade-specific LEAP or GEE assessment standards and content in the grade-specific LEAP or GEE assessment standards that was absent in the grade-specific NAEP assessment standards. Second, reviewers examined order to determine whether grade-specific NAEP assessment standards were included at the same grade level as the matching content in the LEAP or GEE assessment standards. The content reviewers then met in pairs to reach ratings consensus, a method designed to result in a single rating per NAEP assessment standard (no disagreement was permitted). The senior reviewer led each consensus meeting.

Content reviewers recorded alignment data in a crosswalk instrument that contained NAEP assessment standards at the appropriate grade level in the first column, then a column to fill in corresponding LEAP or GEE assessment standards, a column for ratings, a column for codes, and a column for reviewers' notes. A coding scheme was used to indicate alignment issues, including whether the assessment standard was covered at a higher or lower grade than the target grade and reason for lack of alignment. A matrix-like format was created to facilitate alignment.

standards if the LEAP or GEE assessment standard or standards address only part of the NAEP assessment standard; the NAEP assessment standard contains more content or more detailed content than the LEAP or GEE assessment standard or standards, or the LEAP or GEE assessment standard or standards imply but do not explicitly state the content found in the NAEP assessment standard; there is a matching LEAP or GEE assessment standard at a higher grade level than the NAEP assessment standard; or there is a matching LEAP or GEE assessment standard at a lower grade level than the NAEP assessment standard, but it does not address all the content addressed by the NAEP assessment standard.

Content alignment at grade 4

The content reviewers compared the NAEP grade 4 assessment standards in the *Mathematics Framework for 2009 National Assessment of Educational Progress* (National Assessment Governing Board 2007) with the assessment standards in the *Bulletin 1955—Louisiana Content Standards, Benchmarks, and Grade Expectations for Mathematics* (Louisiana Department of Education 2005). The NAEP provides 65 assessment standards for grade 4. The number of assessment standards per content area in each alignment rating category is shown in table 1.

Thirteen of the NAEP assessment standards (20 percent) are fully addressed by the LEAP assessment standards, 46 (71 percent) are partially addressed, and 6 (9 percent) are not addressed (figure 1). (See appendix A for more detail on the alignment of the NAEP grade 4 assessment standards and the LEAP assessment standards and on the LEAP grade 4 assessment standards not covered by the

TABLE 1

Number of National Assessment of Educational Progress (NAEP) grade 4 mathematics assessment standards and number of Louisiana Educational Assessment Program assessment standards by alignment with NAEP, by NAEP content area, March 2008

NAEP content area	Number of NAEP assessment standards	Number of Louisiana assessment standards by alignment with NAEP[a]		
		Fully addressed	Partially addressed	Not addressed
Number properties and operations	20	3	15	2
Number sense	6	1	5	0
Estimation	3	0	2	1
Number operations	6	0	6	0
Ratios and proportional reasoning	1	0	0	1
Properties of numbers and operations	3	2	1	0
Mathematical reasoning using numbers	1	0	1	0
Measurement	10	5	5	0
Measuring physical attributes	6	4	2	0
Systems of measurement	4	1	3	0
Geometry	15	0	13	2
Dimension and shape	4	0	4	0
Transformation of shapes and preservation of properties	4	0	4	0
Relationships between geometric figures	4	0	2	2
Position, direction, and coordinate geometry	2	0	2	0
Mathematical reasoning in geometry	1	0	1	0
Data analysis, statistics, and probability	9	2	6	1
Data representation	3	1	2	0
Characteristics of data sets	2	0	2	0
Probability	4	1	2	1
Algebra	11	3	7	1
Patterns, relations, and functions	5	2	3	0
Algebraic representations	2	0	2	0
Variables, expressions, and operations	2	1	1	0
Equations and inequalities	1	0	1	0
Mathematical reasoning in algebra	1	0	0	1
All content	65	13	46	6

a. NAEP has 65 assessment standards at grade 4, and Louisiana has 32. Each Louisiana assessment standard may be mapped to more than one NAEP assessment standard.

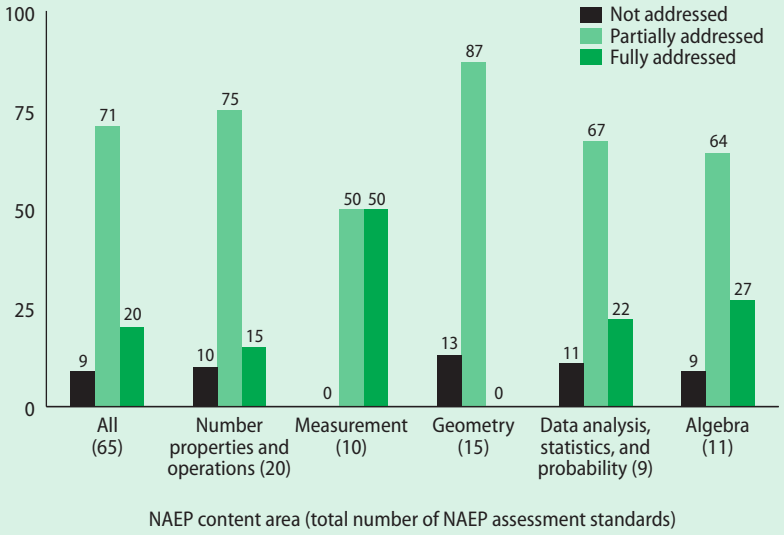
Source: Expert content reviewers' summary analysis of data in appendix table A1.

NAEP grade 4 assessment standards, including details on assessment standards, ratings, codes, and whether a NAEP assessment standard is addressed at a higher or lower grade.)

Areas of full alignment. Thirteen (20 percent) of the NAEP grade 4 assessment standards are fully addressed by the LEAP assessment standards: 3 of 20 number properties and

FIGURE 1

Percentage of National Assessment of Educational Progress (NAEP) grade 4 mathematics assessment standards addressed by Louisiana Educational Assessment Program assessment standards, by NAEP content area, March 2008



Source: Expert content reviewers' summary analysis of data in appendix table A1.

operations; 5 of 10 measurement; 2 of 9 data analysis, statistics, and probability; and 3 of 11 algebra assessment standards. Of these 13 fully addressed NAEP assessment standards, 3 are addressed at a lower grade in the LEAP assessment standards.

Areas of partial alignment. Forty-six (71 percent) of the NAEP grade 4 assessment standards are partially addressed by the Louisiana assessment standards: 15 of 20 number properties and operations; 5 of 10 measurement; 13 of 15 geometry; 6 of 9 data analysis, statistics, and probability; and 7 of 11 algebra assessment standards. Of these 46 partially addressed NAEP grade 4 assessment standards, 5 are addressed at a higher grade in the LEAP assessment standards.

Areas of nonalignment. Six (9 percent) NAEP grade 4 assessment standards are not addressed by the LEAP assessment standards: 2 of 20 number properties and operations; 2 of 15 geometry; 1 of 9 data analysis, statistics, and probability; and 1 of 11 algebra assessment standards.

Areas where Louisiana assessment standards go beyond the NAEP assessment standards. Louisiana has 32 grade 4 assessment standards in the *Bulletin 1955—Louisiana Content Standards, Benchmarks, and Grade Expectations for Mathematics* (Louisiana Department of Education 2005). The NAEP assessment standards do not address 5 of these LEAP assessment standards: 2 of number and number relations; 1 of geometry; 1 of data analysis, probability, and discrete math; and 1 of patterns, relations, and functions.

Content alignment at grade 8

The content reviewers compared the NAEP grade 8 assessment standards in the *Mathematics Framework for 2009 National Assessment of Educational Progress* (National Assessment Governing Board 2007) with the assessment standards in *Bulletin 1955—Louisiana Content Standards, Benchmarks, and Grade Expectations for Mathematics* (Louisiana Department of Education 2005). NAEP provides 100 assessment standards for grade 8. The number of assessment standards per content area in each alignment rating category is shown in table 2.

Fifteen of these assessment standards (15 percent) are fully addressed by the LEAP assessment standards, 75 (75 percent) are partially addressed, and 10 (10 percent) are not addressed (figure 2). (See appendix B for more detail on the NAEP grade 8 assessment standards and LEAP assessment standards and on the LEAP grade 8 assessment standards not covered by NAEP grade 8 assessment standards, including details on assessment standards, ratings, codes, and whether a NAEP assessment standard is addressed at a higher or lower grade.)

Areas of full alignment. Fifteen (15 percent) of the NAEP grade 8 assessment standards are fully

TABLE 2

Number of National Assessment of Educational Progress (NAEP) grade 8 mathematics assessment standards and number of Louisiana Educational Assessment Program assessment standards by alignment with NAEP, by NAEP content area, March 2008

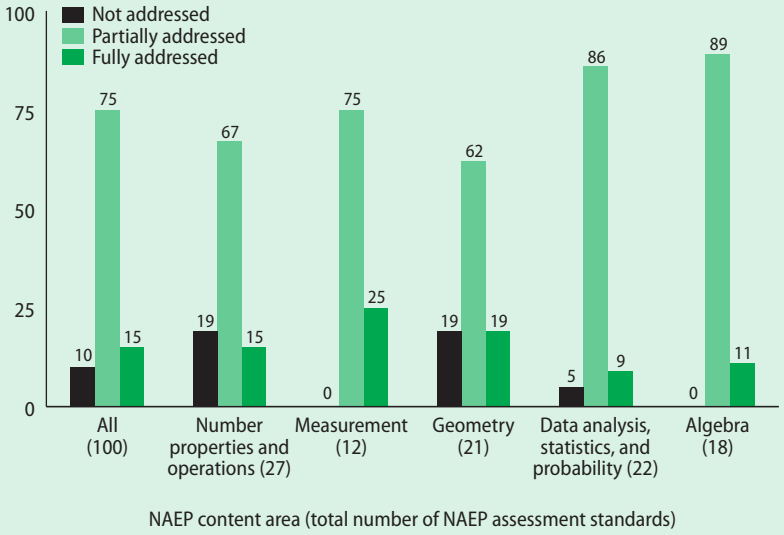
NAEP content area	Number of NAEP assessment standards	Number of Louisiana assessment standards by alignment with NAEP[a]		
		Fully addressed	Partially addressed	Not addressed
Number properties and operations	27	4	18	5
Number sense	8	2	5	1
Estimation	4	0	4	0
Number operations	4	1	2	1
Ratios and proportional reasoning	4	0	4	0
Properties of numbers and operations	5	1	2	2
Mathematical reasoning using numbers	2	0	1	1
Measurement	12	3	9	0
Measuring physical attributes	6	1	5	0
Systems of measurement	5	2	3	0
Measurement in triangles	1	0	1	0
Geometry	21	4	13	4
Dimension and shape	6	1	4	1
Transformation of shapes and preservation of properties	5	1	4	0
Relationships between geometric figures	5	1	3	1
Position, direction, and coordinate geometry	4	0	2	2
Mathematical reasoning in geometry	1	1	0	0
Data analysis, statistics, and probability	22	2	19	1
Data representation	5	1	4	0
Characteristics of data sets	5	0	4	1
Experiments and samples	3	0	3	0
Probability	9	1	8	0
Algebra	18	2	16	0
Patterns, relations, and functions	5	1	4	0
Algebraic representations	5	0	5	0
Variables, expressions, and operations	2	0	2	0
Equations and inequalities	5	1	4	0
Mathematical reasoning in algebra	1	0	1	0
All content	100	15	75	10

a. NAEP has 100 assessment standards at grade 8, and Louisiana has 36. Each Louisiana assessment standard may be mapped to more than one NAEP assessment standard.

Source: Expert content reviewers' summary analysis of data in appendix B1.

FIGURE 2

Percentage of National Assessment of Educational Progress (NAEP) grade 8 mathematics assessment standards addressed by Louisiana Educational Assessment Program assessment standards, by NAEP content area, March 2008



Source: Expert content reviewers' summary analysis of data in appendix table B1.

addressed by the LEAP assessment standards: 4 of 27 number properties and operations; 3 of 12 measurement; 4 of 21 geometry; 2 of 22 data analysis, statistics, and probability; and 2 of 18 algebra assessment standards. Of these 15 fully addressed NAEP grade 8 assessment standards, 4 are addressed at a lower grade in the LEAP assessment standards.

Areas of partial alignment. Seventy-five (75 percent) of the NAEP grade 8 mathematics assessment standards are partially addressed by the LEAP assessment standards: 18 of 27 number properties and operations; 9 of 12 measurement; 13 of 21 geometry; 19 of 22 data analysis, statistics, and probability; and 16 of 18 algebra assessment standards. Of the 75 partially addressed NAEP grade 8 assessment standards, 6 are addressed at a lower grade and 16 at a higher grade in the LEAP assessment standards.

Areas of nonalignment. Ten (10 percent) of the NAEP grade 8 mathematics assessment standards are not addressed in the LEAP assessment standards: 5 of 27 number properties and operations; 4 of 21 geometry; and 1 of 22 data analysis, statistics, and probability assessment standards.

Areas where Louisiana assessment standards go beyond the NAEP assessment standards. Louisiana has 36 assessment standards in the *Bulletin 1955—Louisiana Content Standards, Benchmarks, and Grade Expectations for Mathematics* (Louisiana Department of Education 2005). The NAEP assessment standards do not address 7 of these LEAP assessment standards: 1 of algebra; 1 of measurement; 1 of geometry; 2 of data analysis, probability, and discrete math; and 2 of patterns, relations, and functions.

Content alignment at grade 12

The content reviewers compared the NAEP grade 12 assessment standards in the *Mathematics Framework for 2009 National Assessment of Educational Progress* (National Assessment Governing Board 2007) with the assessment standards in the *Bulletin 1955—Louisiana Content Standards, Benchmarks, and Grade Expectations for Mathematics* (Louisiana Department of Education 2005). The NAEP provides 130 assessment standards for grade 12. The number of assessment standards per content area in each alignment rating category is shown in table 3.

Thirty-three of these assessment standards (25 percent) are fully addressed by the GEE assessment standards, 61 (47 percent) are partially addressed, and 36 (28 percent) are not addressed (figure 3). (See appendix C for more details on the alignment of the NAEP grade 12 assessment standards and the GEE assessment standards and on the GEE assessment standards not covered by the NAEP grade 12 assessment standards, including details on assessment standards, ratings, codes, and whether a NAEP assessment standard is addressed at a lower grade.)

TABLE 3

Number of National Assessment of Educational Progress (NAEP) grade 12 mathematics assessment standards and number of Graduation Exit Examination (GEE) assessment standards by alignment with NAEP, by NAEP content area, March 2008

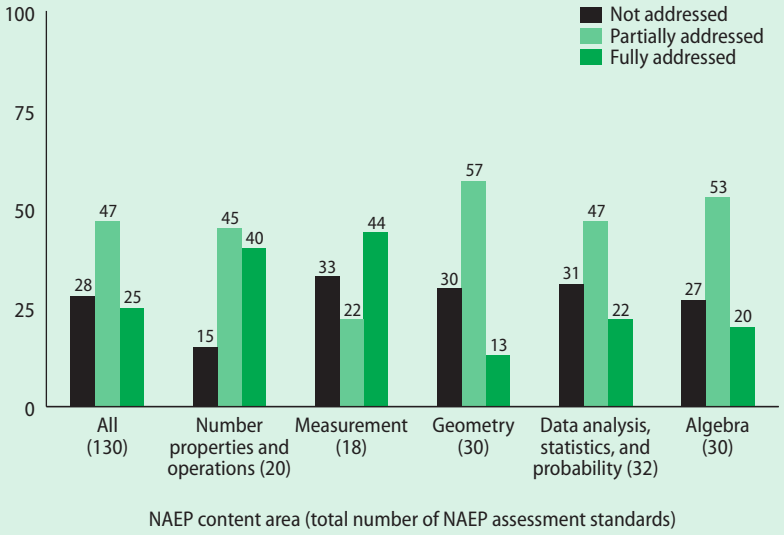
NAEP content area	Number of NAEP assessment standards	Number of GEE assessment standards by alignment with NAEP[a]		
		Fully addressed	Partially addressed	Not addressed
Number properties and operations	20	8	9	3
Number sense	4	1	2	1
Estimation	3	2	1	0
Number operations	5	1	3	1
Ratios and proportional reasoning	2	1	1	0
Properties of numbers and operations	4	3	0	1
Mathematical reasoning using numbers	2	0	2	0
Measurement	18	8	4	6
Measuring physical attributes	6	4	2	0
Systems of measurement	5	3	2	0
Measurement in triangles	7	1	0	6
Geometry	30	4	17	9
Dimension and shape	4	1	3	0
Transformation of shapes and preservation of properties	6	1	5	0
Relationships between geometric figures	7	1	5	1
Position, direction, and coordinate geometry	8	0	2	6
Mathematical reasoning in geometry	5	1	2	2
Data analysis, statistics, and probability	32	7	15	10
Data representation	6	1	2	3
Characteristics of data sets	7	1	4	2
Experiments and samples	5	2	2	1
Probability	9	3	5	1
Mathematical reasoning with data	5	0	2	3
Algebra	30	6	16	8
Patterns, relations, and functions	7	3	3	1
Algebraic representations	7	1	6	0
Variables, expressions, and operations	7	1	5	1
Equations and inequalities	6	1	2	3
Mathematical reasoning in algebra	3	0	0	3
All content	130	33	61	36

a. NAEP has 130 assessment standards at grade 12, and GEE has 35. Each GEE assessment standard may be mapped to more than one NAEP assessment standard.

Source: Expert content reviewers' summary analysis of data in appendix table C1.

FIGURE 3

Percentage of National Assessment of Education Progress (NAEP) grade 12 mathematics assessment standards that are addressed by Graduation Exit Examination assessment standards, by NAEP content area, March 2008



Source: Expert content reviewers' summary analysis of data in appendix table C1.

Areas of full alignment. Thirty-three (25 percent) of the NAEP grade 12 assessment standards are fully addressed by Louisiana assessment standards: 8 of 20 number properties and operations; 8 of 18 measurement; 4 of 30 geometry; 7 of 32 data analysis, statistics, and probability; and 6 of 30 algebra assessment standards. Of these 33 fully addressed NAEP grade 12 assessment standards, 4 are addressed at a lower grade in the GEE assessment standards.

Areas of partial alignment. Sixty-one (47 percent) of the NAEP grade 12 mathematics assessment standards are partially addressed by the GEE assessment standards: 9 of 20 number properties and operations; 4 of 18 measurement; 17 of 30 geometry; 15 of 32 data analysis, statistics, and probability; and 16 of 30 algebra assessment standards. Of the 61 partially addressed NAEP grade 12 assessment standards, 4 are addressed at a lower grade in the GEE assessment standards.

Areas of nonalignment. Thirty-six (28 percent) of the NAEP grade 12 mathematics assessment standards are not addressed by the GEE assessment standards: 3 of 20 number properties and operations; 6 of 18 measurement; 9 of 30 geometry; 10 of 32 data analysis, statistics, and probability; and 8 of 30 algebra assessment standards.

Areas where GEE assessment standards go beyond the NAEP assessment standards. GEE has 35 assessment standards in the *Bulletin 1955—Louisiana Content Standards, Benchmarks, and Grade Expectations for Mathematics* (Louisiana Department of Education 2005). The NAEP assessment standards do not address 9 of these standards: 3 of number and number relations; 1 of measurement; 1 of geometry; 3 of data analysis, probability, and discrete math; and 1 of patterns, relations, and functions.

Limitations

The study analyzed the alignment of the LEAP and GEE mathematics assessment standards and 2009 NAEP mathematics assessment standards. It did not analyze individual items or the alignment of state assessment standards with LEAP and GEE assessment items. The study was not designed to make specific recommendations about whether a state should close gaps in alignment to NAEP—a decision for state policymakers. Revising assessments requires substantial time and resources, so policymakers considering such revisions must weigh the costs of such changes and the benefits they believe the changes will bring to students.

Notes

1. In discussing LEAP or GEE, the term *assessment standard* refers to the LEAP or GEE benchmarks and grade-level expectations outlined in the *Bulletin 1955—Louisiana Content Standards, Benchmarks, and Grade Expectations for Mathematics* (Louisiana Department of Education 2005).
2. In discussing NAEP, the term *assessment standards* refers to the content objectives outlined in the *Mathematics Framework for 2009 National Assessment of Educational Progress, Prepublication Edition* (National Assessment Governing Board 2007).

Appendix A
Details on the alignment of the National Assessment of Educational Progress grade 4 assessment standards and the Louisiana Educational Assessment Program assessment standards

TABLE A1

Alignment of National Assessment of Educational Progress (NAEP) grade 4 mathematics and Louisiana Educational Assessment Program (LEAP) grade 4 assessment standards, March 2008

NAEP assessment standards	Louisiana assessment standards	Overall rating[a]	Code[b]	Notes
Number properties and operations				
4N.1 Number sense				
4N.1(a) Identify the place value and actual value of digits in whole numbers.	N-1-E Constructing number meaning and demonstrating that a number can be expressed in many different forms (e.g., standard notation, number words, number lines, geometrical representation, fractions, and decimals)	2	IC	
4N.1(b) Represent numbers using models such as base 10 representations, number lines, and two-dimensional models.	N-1-E Constructing number meaning and demonstrating that a number can be expressed in many different forms (e.g., standard notation, number words, number lines, geometrical representation, fractions, and decimals)	2	IC	
4N.1(c) Compose or decompose whole quantities by place value (e.g., write whole numbers in expanded notation using place value: 342 = 300 + 40 + 2).	N-1-E Constructing number meaning and demonstrating that a number can be expressed in many different forms (e.g., standard notation, number words, number lines, geometrical representation, fractions, and decimals)	2	IC	
4N.1(d) Write or rename whole numbers (e.g., 10: 5 + 5, 12 – 2, 2 x 5).	N-1-E Constructing number meaning and demonstrating that a number can be expressed in many different forms (e.g., standard notation, number words, number lines, geometrical representation, fractions, and decimals) N-3-E Reading, writing, representing, comparing, ordering, and using whole numbers in a variety of forms (e.g., standard notation, number line, and geometrical representation)	3		
4N.1(e) Connect model, number word, or number using various models and representations for whole numbers, fractions, and decimals.	N-1-E Constructing number meaning and demonstrating that a number can be expressed in many different forms (e.g., standard notation, number words, number lines, geometrical representation, fractions, and decimals)	2	IC	
4N.1(i) Order or compare whole numbers, decimals, or fractions.	N-3-E Reading, writing, representing, comparing, ordering, and using whole numbers in a variety of forms (e.g., standard notation, number line, and geometrical representation)	2	MC	The Louisiana assessment standard does not refer to decimals or fractions

(CONTINUED)

TABLE A1 (CONTINUED)

Alignment of National Assessment of Educational Progress (NAEP) grade 4 mathematics and Louisiana Educational Assessment Program (LEAP) grade 4 assessment standards, March 2008

NAEP assessment standards	Louisiana assessment standards	Overall rating[a]	Code[b]	Notes
Number properties and operations				
4N.2 Estimation				
4N.2(a) Use benchmarks (well-known numbers used as meaningful points for comparison) for whole numbers, decimals, or fractions in contexts (e.g., ½ and .5 may be used as benchmarks for fractions and decimals between 0 and 1.00).	N-2-E Demonstrating number sense and estimation skills, giving particular attention to common equivalent reference points (i.e., ¼ = 25% = .25; ½ = 50% = .5; $1 = 100%, etc.)	2	IC	
4N.2(b) Make estimates appropriate to a given situation with whole numbers, fractions, or decimals by: knowing when to estimate, • selecting the appropriate type of estimate, including overestimate, underestimate, and range of estimate, or • selecting the appropriate method of estimation (e.g., rounding).	N-7-E Constructing, using, and explaining procedures to compute and estimate with whole numbers (e.g., mental math strategies)	2	IC	The Louisiana assessment standard does not refer to decimals or fractions
4N.2(c) Verify solutions or determine the reasonableness of results in meaningful contexts.		1		
4N.3 Number operations				
4N.3(a) Add and subtract: • whole numbers, or • fractions with like denominators, or • decimals through hundredths.	N-4-E Demonstrating a conceptual understanding of the meaning of the basic arithmetic operations (add, subtract, multiply, and divide) and their relationships to each other N-5-E Selecting appropriate operation(s) (add, subtract, multiply, and divide) for a given situation	2	MC	The Louisiana assessment standards do not refer to decimals or fractions
4N.3(b) Multiply whole numbers: • no larger than two-digit by two-digit with paper and pencil computation, or • larger numbers with use of calculator.	N-4-E Demonstrating a conceptual understanding of the meaning of the basic arithmetic operations (add, subtract, multiply, and divide) and their relationships to each other N-5-E Selecting appropriate operation(s) (add, subtract, multiply, and divide) for a given situation	2	IC	The Louisiana assessment standards do not specify use of calculators
4N.3(c) Divide whole numbers: • up to three-digits by one-digit with paper and pencil computation, or • up to five-digits by two-digits with use of calculator.	N-4-E Demonstrating a conceptual understanding of the meaning of the basic arithmetic operations (add, subtract, multiply, and divide) and their relationships to each other N-5-E Selecting appropriate operation(s) (add, subtract, multiply, and divide) for a given situation	2	IC	The Louisiana assessment standards do not specify use of calculators

(CONTINUED)

TABLE A1 (CONTINUED)

Alignment of National Assessment of Educational Progress (NAEP) grade 4 mathematics and Louisiana Educational Assessment Program (LEAP) grade 4 assessment standards, March 2008

NAEP assessment standards	Louisiana assessment standards	Overall rating[a]	Code[b]	Notes
Number properties and operations				
4N.3 Number operations				
4N.3(d) Describe the effect of operations on size (whole numbers).	N-6-E Applying a knowledge of basic math facts and arithmetic operations to real-life situations	2	IC	
4N.3(e) Interpret whole number operations and the relationships between them.	N-6-E Applying a knowledge of basic math facts and arithmetic operations to real-life situations	2	IC	
4N.3(f) Solve application problems involving numbers and operations.	N-5-E Selecting appropriate operation(s) (add, subtract, multiply, and divide) for a given situation	2	IC	
4N.4 Ratios and proportional reasoning				
4N.4 (a) Use simple ratios to describe problem situations.		1		
4N.5 Properties of numbers and operations				
4N.5(a) Identify odd and even numbers.	G-L-EP3.46 Identify and model even and odd numbers with objects, pictures, and words	3	LG	
4N.5(b) Identify factors of whole numbers.	N-4-E Demonstrating a conceptual understanding of the meaning of the basic arithmetic operations (add, subtract, multiply, and divide) and their relationships to each other	2	IC	A conceptual understanding of multiplication implies understanding factors
4N.5(e) Apply basic properties of operations.	N-4-E Demonstrating a conceptual understanding of the meaning of the basic arithmetic operations (add, subtract, multiply, and divide) and their relationships to each other N-5-E Selecting appropriate operation(s) (add, subtract, multiply, and divide) for a given situation)	3		
4N.6 Mathematical reasoning using numbers				
4N.6(a) Explain or justify a mathematical concept or relationship (e.g., explain why 15 is an odd number or why 7–3 is not the same as 3– 7).	N-4-E Demonstrating a conceptual understanding of the meaning of the basic arithmetic operations (add, subtract, multiply, and divide) and their relationships to each other	2	IC	

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TABLE A1 (CONTINUED)

Alignment of National Assessment of Educational Progress (NAEP) grade 4 mathematics and Louisiana Educational Assessment Program (LEAP) grade 4 assessment standards, March 2008

NAEP assessment standards	Louisiana assessment standards	Overall rating[a]	Code[b]	Notes
Measurement				
4M.1 Measuring physical attributes				
4M.1(a) Identify the attribute that is appropriate to measure in a given situation.	M-2-E Selecting and using appropriate standard and non-standard units of measure (e.g., paper clips and Cuisenaire rods) and tools for measuring length, area, capacity, weight/mass, and time for a given situation by considering the purpose and precision required for the task	3		
Measurement				
4M.1 Measuring physical attributes				
4M.1(b) Compare objects with respect to a given attribute, such as length, area, volume, time, or temperature.	M-3-E Using estimation skills to describe, order, and compare measures of length, capacity, weight/mass, time, and temperature	2	MC	The Louisiana assessment standard does not include area or volume
4M.1(c) Estimate the size of an object with respect to a given measurement attribute (e.g., length, perimeter, or area using a grid).	M-3-E Using estimation skills to describe, order, and compare measures of length, capacity, weight/mass, time, and temperature	2	IC	
NAEP assessment standards	Louisiana assessment standards	Overall rating[a]	Code[b]	Notes
4M.1(e) Select or use appropriate measurement instruments such as ruler, meter stick, clock, thermometer, or other scaled instruments.	M-2-E Selecting and using appropriate standard and non-standard units of measure (e.g., paper clips and Cuisenaire rods) and tools for measuring length, area, capacity, weight/mass, and time for a given situation by considering the purpose and precision required for the task	3		
4M.1(f) Solve problems involving perimeter of plane figures.	G-L-EM3.22 Find the perimeter of a geometric shape given the length of its sides	3	LG	
4M.1(g) Solve problems involving area of squares and rectangles.	M-1-E Applying (measure or solve measurement problem) the concepts of length (inches, feet, yards, miles, millimeters, centimeters, decimeters, meters, kilometers), area, volume, capacity (cups, liquid pints and quarts, gallons, milliliters, liters), weight (ounces, pounds, tons, grams, kilograms), mass, time (seconds, minutes, hours, days, weeks, months, years), money, and temperature (Celsius and Fahrenheit) to real-world experiences	3		

(CONTINUED)

TABLE A1 (CONTINUED)

Alignment of National Assessment of Educational Progress (NAEP) grade 4 mathematics and Louisiana Educational Assessment Program (LEAP) grade 4 assessment standards, March 2008

NAEP assessment standards	Louisiana assessment standards	Overall rating[a]	Code[b]	Notes
Measurement				
4M.2 Systems of measurement				
4M.2(a) Select or use appropriate type of unit for the attribute being measured such as length, time, or temperature.	M-1-E Applying (measure or solve measurement problem) the concepts of length (inches, feet, yards, miles, millimeters, centimeters, decimeters, meters, kilometers), area, volume, capacity (cups, liquid pints and quarts, gallons, milliliters, liters), weight (ounces, pounds, tons, grams, kilograms), mass, time (seconds, minutes, hours, days, weeks, months, years), money, and temperature (Celsius and Fahrenheit) to real-world experiences M-2-E Selecting and using appropriate standard and non-standard units of measure (e.g., paper clips and Cuisenaire rods) and tools for measuring length, area, capacity, weight/mass, and time for a given situation by considering the purpose and precision required for the task	3		
4M.2(b) Solve problems involving conversions within the same measurement system such as conversions involving inches and feet or hours and minutes.	M-4-E Converting from one unit of measurement to another within the same system (customary and metric); comparisons between systems should be based on intuitive reference points, not formal computations (e.g., a meter is a little longer than a yard)	2	IC	The Louisiana assessment standard does not specify solving problems involving conversions
4M.2(d) Determine appropriate size of unit of measurement in problem situation involving such attributes as length, time, capacity, or weight.	M-2-E Selecting and using appropriate standard and non-standard units of measure (e.g., paper clips and Cuisenaire rods) and tools for measuring length, area, capacity, weight/mass, and time for a given situation by considering the purpose and precision required for the task	2	IC	
4M.2(e) Determine situations in which a highly accurate measurement is important.	M-5-E Demonstrating the connection of measurement to the other strands and to real-life situations	2	IC	
Geometry				
4G.1 Dimension and shape				
4G.1(a) Explore properties of paths between points.	G-5-E Identifying and drawing lines and angles and describing their relationships to each other and to the real world	2	IC	

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TABLE A1 (CONTINUED)

Alignment of National Assessment of Educational Progress (NAEP) grade 4 mathematics and Louisiana Educational Assessment Program (LEAP) grade 4 assessment standards, March 2008

NAEP assessment standards	Louisiana assessment standards	Overall rating[a]	Code[b]	Notes
Geometry				
4G.1 Dimension and shape				
4G.1(b) Identify or describe (informally) real-world objects using simple plane figures (e.g., triangles, rectangles, squares, and circles) and simple solid figures (e.g., cubes, spheres, and cylinders).	G-2-E Identifying, describing, comparing, constructing, and classifying two-dimensional and three-dimensional geometric shapes using a variety of materials G-6-E Demonstrating the connection of geometry to the other strands and to real-life situations	2	IC	
4G.1(c) Identify or draw angles and other geometric figures in the plane.	G-5-E Identifying and drawing lines and angles and describing their relationships to each other and to the real world	2	IC	
4G.1(f) Describe attributes of two- and three-dimensional shapes.	G-2-E Identifying, describing, comparing, constructing, and classifying two-dimensional and three-dimensional geometric shapes using a variety of materials	2	IC	
4G.2 Transformation of shapes and preservation of properties				
4G.2(a) Identify whether a figure is symmetrical, or draw lines of symmetry.	G-L-EG5.26 Identify shapes that have rotational symmetry	2	HG IC	
4G.2(c) Identify the images resulting from flips (reflections), slides (translations), or turns (rotations).	G-3-E Making predictions regarding combinations, subdivisions, and transformations (slides, flips, turns) of simple plane geometric shapes	2	IC	
4G.2(d) Recognize which attributes (such as shape and area) change or don't change when plane figures are cut up or rearranged.	G-3-E Making predictions regarding combinations, subdivisions, and transformations (slides, flips, turns) of simple plane geometric shape	2	IC	
4G.2(e) Match or draw congruent figures in a given collection.	G-2-E Identifying, describing, comparing, constructing, and classifying two-dimensional and three-dimensional geometric shapes using a variety of materials	2	IC	Compare and construct implies match or draw, but the Louisiana assessment standard did not specify congruent figures
4G.3 Relationships between geometric figures				
4G.3(a) Analyze or describe patterns of geometric figures by increasing number of sides, changing size or orientation (e.g., polygons with more and more sides).		1		

(CONTINUED)

TABLE A1 (CONTINUED)

Alignment of National Assessment of Educational Progress (NAEP) grade 4 mathematics and Louisiana Educational Assessment Program (LEAP) grade 4 assessment standards, March 2008

NAEP assessment standards	Louisiana assessment standards	Overall rating[a]	Code[b]	Notes
Geometry				
4G.3 Relationships between geometric figures				
4G.3(b) Assemble simple plane shapes to construct a given shape.	G-4-E Drawing, constructing models, and comparing geometric shapes, with special attention to developing spatial sense	2	IC	
4G.3(c) Recognize two-dimensional faces of three-dimensional shapes.		1		
4G.3(f) Describe and compare properties of simple and compound figures composed of triangles, squares, and rectangles.	G-4-E Drawing, constructing models, and comparing geometric shapes, with special attention to developing spatial sense	2	IC	
4G.4 Position, direction, and coordinate geometry				
4G.4(a) Describe relative positions of points and lines using the geometric ideas of parallelism or perpendicularity.	G-5-E Identifying and drawing lines and angles and describing their relationships to each other and to the real world	2	IC	
4G.4(d) Construct geometric figures with vertices at points on a coordinate grid.	G-L-EG6.28 Use a rectangular grid and ordered pairs to plot simple shapes and find horizontal and vertical lengths and area	2	HG	
4G.5 Mathematical reasoning in geometry				
4G.5 (a) Distinguish which objects in a collection satisfy a given geometric definition and explain choices.	G-2-E Identifying, describing, comparing, constructing, and classifying two-dimensional and three-dimensional geometric shapes using a variety of materials G-6-E Demonstrating the connection of geometry to the other strands and to real-life situations	2	IC	
Data analysis, statistics, and probability				
4P.1 Data representation				
The following representations of data are indicated for each grade level. Objectives in which only a subset of these representations is applicable are indicated in the parentheses associated with the objective: pictographs, bar graphs, circle graphs, line graphs, line plots, tables, and tallies.				
4P.1(a) Read or interpret a single set of data.	D-2-E Constructing, reading, and interpreting data in charts, graphs, tables, etc.	3		
4P.1(b) For a given set of data, complete a graph (limits of time make it difficult to construct graphs completely).	D-2-E Constructing, reading, and interpreting data in charts, graphs, tables, etc.	2	IC	
4P.1(c) Solve problems by estimating and computing within a single set of data.	D-3-E Formulating and solving problems that involve the use of data	2	MC	The Louisiana assessment standard does not specify estimating

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TABLE A1 (CONTINUED)

Alignment of National Assessment of Educational Progress (NAEP) grade 4 mathematics and Louisiana Educational Assessment Program (LEAP) grade 4 assessment standards, March 2008

NAEP assessment standards	Louisiana assessment standards	Overall rating[a]	Code[b]	Notes
Data analysis, statistics, and probability				
4P.2 Characteristics of data sets				
4P.2(b) Given a set of data or a graph, describe the distribution of the data using median, range, or mode.	D-2-M Analyzing, interpreting, evaluating, drawing inferences, and making estimations, predictions, decisions, and convincing arguments based on organized data (e.g., analyze data using concepts of mean, median, mode, range, random samples, sample size, bias, and data extremes)	2	HG	
4P.2(d) Compare two sets of related data.	G-L-ED5.31 Compare and contrast survey data from two groups relative to the same question	2	HG	
4P.4 Probability				
4P.4(a) Use informal probabilistic thinking to describe chance events (i.e., likely and unlikely, certain and impossible).	D-5-E Predicting outcomes based on probability (e.g., make predictions of same chance, more likely, or less likely; determine fair and unfair games)	3		
4P.4(b) Determine a simple probability from a context that includes a picture.	D-5-E Predicting outcomes based on probability (e.g., make predictions of same chance, more likely, or less likely; determine fair and unfair games) D-6-E Demonstrating the connection of data analysis, probability, and discrete math to other strands and real-life situations	2	MD	The Louisiana assessment standards do not include a picture
4P.4(e) List all possible outcomes of a given situation or event.	D-5-E Predicting outcomes based on probability (e.g., make predictions of same chance, more likely, or less likely; determine fair and unfair games) D-6-E Demonstrating the connection of data analysis, probability, and discrete math to other strands and real-life situations	2	IC	
4P.4(g) Represent the probability of a given outcome using a picture or other graphic.		1		
Algebra				
4A.1 Patterns, relations, and functions				
4A.1(a) Recognize, describe, or extend numerical patterns.	P-1-E Recognizing, describing, extending, and creating a wide variety of numerical (e.g., skip counting of whole numbers), geometrical, and statistical patterns	3		
4A.1(b) Given a pattern or sequence, construct or explain a rule that can generate the terms of the pattern or sequence.	P-2-E Representing and describing mathematical relationships using tables, variables, open sentences, and graphs	2	IC	

(CONTINUED)

TABLE A1 (CONTINUED)

Alignment of National Assessment of Educational Progress (NAEP) grade 4 mathematics and Louisiana Educational Assessment Program (LEAP) grade 4 assessment standards, March 2008

NAEP assessment standards	Louisiana assessment standards	Overall rating[a]	Code[b]	Notes
Algebra				
4A.1 Patterns, relations, and functions				
4A.1(c) Given a description, extend or find a missing term in a pattern or sequence.	P-1-E Recognizing, describing, extending, and creating a wide variety of numerical (e.g., skip counting of whole numbers), geometrical, and statistical patterns	2	IC	
4A.1(d) Create a different representation of a pattern or sequence given a verbal description.	G-L-ED5.28 Use various types of charts and graphs including double bar graphs to organize, display, and interpret data and discuss patterns verbally and in writing	2	HG	
4A.1(e) Recognize or describe a relationship in which quantities change proportionally.	G-L-EA3.17 Analyze and describe situations where proportional trades or correspondences are required (e.g., trade 2 pieces of candy for 3 pieces of gum, make equivalent actions on pans to keep balance scale in equilibrium, plan for the number of pieces of bread needed for *x* sandwiches)	3	LG	
4A.2 Algebraic representations				
4A.2(a) Translate between the different forms of representations (symbolic, numerical, verbal, or pictorial) of whole number relationships (such as from a written description to an equation or from a function table to a written description).	A-3-E Recognizing the connection of algebra to the other strands and to real-life situations (e.g., number sentences or formulas to represent real-world problems)	2	IC	
4A.2(c) Graph or interpret points with whole number or letter coordinates on grids or in the first quadrant of the coordinate plane.	D-2-E Constructing, reading, and interpreting data in charts, graphs, tables, etc.	2	IC	
4A.3 Variables, expressions, and operations				
4A.3(a) Use letters and symbols to represent an unknown quantity in a simple mathematical expression.	A-1-E Demonstrating a conceptual understanding of variables, expressions, equations, and inequalities (for example, use letters or boxes to represent values; understand =, ≠, <, and symbols)	3		
4A.3(b) Express simple mathematical relationships using number sentences.	A-2-E Modeling and developing strategies for solving equations and inequalities	2	IC	
Data analysis, statistics, and probability				
4A.4 Equations and inequalities				
4A.4(a) Find the value of the unknown in a whole number sentence.	A-2-E Modeling and developing strategies for solving equations and inequalities	2	IC	
4A.5 Mathematical reasoning in algebra				
4A.5(a) Verify a conclusion using algebraic properties.		1		

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TABLE A1 (CONTINUED)

Alignment of National Assessment of Educational Progress (NAEP) grade 4 mathematics and Louisiana Educational Assessment Program (LEAP) grade 4 assessment standards, March 2008

a. Rating is based on a scale of 1 to 3, where 1 indicates that the LEAP standard or standards do not address the NAEP assessment standard, 2 that the LEAP standard or standards partially address the NAEP assessment standard, and 3 that the LEAP standard or standards fully address or exceed the NAEP assessment standard at the targeted grade level. A NAEP assessment standard is considered to be *fully addressed* by the LEAP standard or standards if all of the content in the NAEP assessment standard is contained in one or more LEAP assessment standards at the same or lower grade level. A NAEP standard is considered to be *partially addressed* by the LEAP assessment standard or standards if the LEAP assessment standard or standards address only one part of the NAEP standard; the NAEP standard contains more content or more detailed content than the LEAP assessment standard or standards or the LEAP assessment standard or standards imply but do not explicitly state the content found in the NAEP assessment standard; there is a matching LEAP assessment standard at a higher grade level than the NAEP assessment standard; or there is a matching LEAP standard or standards at a lower grade level than the NAEP assessment standard, but it does not address all the content addressed by NAEP assessment standard.

b. Codes: IC = implied content, LG = content covered at a lower grade level, HG = content covered at a higher grade level, MC = more content, MD = more detailed content.

Source: Expert content reviewers' analysis based on data from National Assessment Governing Board (2007) and Louisiana Department of Education (2005).

TABLE A2

Louisiana Educational Assessment Program (LEAP) grade 4 assessment standards not covered by the National Assessment of Educational Progress (NAEP) grade 4 assessment standards, March 2008

LEAP strand	LEAP grade 4 assessment standards not covered by NAEP
Number and number relations	N-8-E Selecting and using appropriate computational methods and tools for given situations involving whole numbers (e.g., estimation, mental arithmetic, calculator, and pencil and paper)
	N-9-E Demonstrating the connection of number and number relations to the other strands and to real-life situations
Geometry	G-1-E Determining the relationships among shapes
Data analysis, probability, and discrete math	D-1-E Collecting, organizing, and describing data based on real-life situations
Patterns, relations, and functions	P-3-E Describing and representing relationships using tables, rules, simple equations, and graphs

Source: Louisiana Department of Education (2005).

Appendix B
Details on the alignment of the National Assessment of Educational Progress grade 8 assessment standards and the Louisiana Educational Assessment Program assessment standards

TABLE B1

Alignment of National Assessment of Educational Progress (NAEP) grade 8 mathematics and Louisiana Educational Assessment Program (LEAP) grade 4 assessment standards, March 2008

NAEP assessment standards	Louisiana assessment standards	Overall rating[a]	Code[b]	Notes
Number properties and operations				
8N.1 Number sense				
8N.1(a) Use place value to model and describe integers and decimals.	N-2-M Demonstrating number sense and estimation skills that describe, order, and compare rational numbers (e.g., magnitude, integers, fractions, decimals, and percents)	2	IC	The Louisiana assessment standard does not specify using place value
8N.1(b) Model or describe rational numbers or numerical relationships using number lines and diagrams.	N-1-M Demonstrating that a rational number can be expressed in many forms, and selecting an appropriate form for a given situation (e.g., fractions, decimals, and percents)	2	IC	The Louisiana assessment standard does not specify using number lines and diagrams
8N.1(d) Write or rename rational numbers.	N-1-M Demonstrating that a rational number can be expressed in many forms, and selecting an appropriate form for a given situation (e.g., fractions, decimals, and percents N-3-M Reading, writing, representing, and using rational numbers in a variety of forms (e.g., integers, mixed numbers, and improper fractions)	2	IC	
8N.1(e) Recognize, translate between, or apply multiple representations of rational numbers (fractions, decimals, and percents) in meaningful contexts.	N-1-M Demonstrating that a rational number can be expressed in many forms, and selecting an appropriate form for a given situation (e.g., fractions, decimals, and percents) N-3-M Reading, writing, representing, and using rational numbers in a variety of forms (e.g., integers, mixed numbers, and improper fractions)	3		
8N.1(f) Express or interpret numbers using scientific notation from real-life contexts.	G-L-EN9.3 Apply scientific notation to perform computations, solve problems, and write representations of number	2	HG	
8N.1(g) Find or model absolute value or apply to problem situations.		1		

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TABLE B1 (CONTINUED)

Alignment of National Assessment of Educational Progress (NAEP) grade 8 mathematics and Louisiana Educational Assessment Program (LEAP) grade 4 assessment standards, March 2008

NAEP assessment standards	Louisiana assessment standards	Overall rating[a]	Code[b]	Notes
Number properties and operations				
8N.1 Number sense				
8N.1(h) Order or compare rational numbers (fractions, decimals, percents, or integers) using various models and representations (e.g., number line).	N-2-M Demonstrating number sense and estimation skills that describe, order, and compare rational numbers (e.g., magnitude, integers, fractions, decimals, and percents) N-3-M Reading, writing, representing, and using rational numbers in a variety of forms (e.g., integers, mixed numbers, and improper fractions)	3		
8N.1(i) Order or compare rational numbers including very large and small integers, and decimals and fractions close to zero.	N-2-M Demonstrating number sense and estimation skills that describe, order, and compare rational numbers (e.g., magnitude, integers, fractions, decimals, and percents)	2	IC	
8N.2 Estimation				
8N.2(a) Establish or apply benchmarks for rational numbers and common irrational numbers (e.g., π) in contexts.	N-5-M Applying an understanding of rational numbers and arithmetic operations to real-life situations	2	MC	The Louisiana assessment standard does not include irrational numbers
8N.2(b) Make estimates appropriate to a given situation by: • identifying when estimation is appropriate, • determining the level of accuracy needed, • selecting the appropriate method of estimation, or • analyzing the effect of an estimation method on the accuracy of results.	N-7-M Selecting and using appropriate computational methods and tools for given situations involving rational numbers (e.g., estimation, or exact computation using mental arithmetic, calculator, computer, or paper and pencil) N-6-M Constructing, using, and explaining procedures to compute and estimate with rational numbers employing mental math strategies	2	IC	
8N.2(c) Verify solutions or determine the reasonableness of results in a variety of situations including calculator and computer results.	N-7-M Selecting and using appropriate computational methods and tools for given situations involving rational numbers (e.g., estimation, or exact computation using mental arithmetic, calculator, computer, or paper and pencil)	2	IC	
8N.2(d) Estimate square or cube roots of numbers less than 1,000 between two whole numbers.	G-L-EA7.13 Determine the square root of perfect squares and mentally approximate other square roots by identifying the two whole numbers between which they fall	2	LG	The Louisiana assessment standard does not include cube roots
8N.3 Number operations				
8N.3(a) Perform computations with rational numbers.	N-5-M Applying an understanding of rational numbers and arithmetic operations to real-life situations	2	IC	

(CONTINUED)

TABLE B1 (CONTINUED)

Alignment of National Assessment of Educational Progress (NAEP) grade 8 mathematics and Louisiana Educational Assessment Program (LEAP) grade 4 assessment standards, March 2008

NAEP assessment standards	Louisiana assessment standards	Overall rating[a]	Code[b]	Notes
Number properties and operations				
8N.3 Number operations				
8N.3(d) Describe the effect of multiplying and dividing by numbers including the effect of multiplying or dividing a rational number by: • zero, or • a number less than zero, or • a number between zero and one, • one, or • a number greater than one.		1		
8N.3(e) Interpret rational number operations and the relationships between them.	N-4-M Demonstrating a conceptual understanding of the meaning of the basic arithmetic operations (add, subtract, multiply, and divide) and their relationships to each other	2	IC	
8N.3(f) Solve application problems involving rational numbers and operations using exact answers or estimates as appropriate.	N-7-M Selecting and using appropriate computational methods and tools for given situations involving rational numbers (e.g., estimation, or exact computation using mental arithmetic, calculator, computer, or paper and pencil)	3		
8N.4 Ratios and proportional reasoning				
8N.4(a) Use ratios to describe problem situations.	N-8-M Demonstrating a conceptual understanding and applications of proportional reasoning (e.g., determining equivalent ratios, finding a missing term of a given proportion)	2	IC	
8N.4(b) Use fractions to represent and express ratios and proportions.	N-8-M Demonstrating a conceptual understanding and applications of proportional reasoning (e.g., determining equivalent ratios, finding a missing term of a given proportion)	2	IC	
8N.4(c) Use proportional reasoning to model and solve problems (including rates and scaling).	N-8-M Demonstrating a conceptual understanding and applications of proportional reasoning (e.g., determining equivalent ratios, finding a missing term of a given proportion)	2	IC	
8N.4(d) Solve problems involving percentages (including percent increase and decrease, interest rates, tax, discount, tips, or part/whole relationships).	G-L-EN7.6 Set up and solve simple percent problems using various strategies, including mental math G-L-EN7.7 Select and discuss appropriate operations and solve single- and multi-step real-life problems involving positive fractions, percents, mixed numbers, decimals, and positive and negative integers	2	LG IC	

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TABLE B1 (CONTINUED)

Alignment of National Assessment of Educational Progress (NAEP) grade 8 mathematics and Louisiana Educational Assessment Program (LEAP) grade 4 assessment standards, March 2008

NAEP assessment standards	Louisiana assessment standards	Overall rating[a]	Code[b]	Notes
Number properties and operations				
8N.5 Properties of numbers and operations				
8N.5(a) Describe odd and even integers and how they behave under different operations.		1		
8N.5(b) Recognize, find, or use factors, multiples, or prime factorization.	G-L-EN6.1 Factor whole numbers into primes G-L-EN6.2 Determine common factors and common multiples for pairs of whole numbers	3	LG	
8N.5(c) Recognize or use prime and composite numbers to solve problems.	G-L-EN6.3 Find the greatest common factor (GCF) and least common multiple (LCM) for whole numbers in the context of problem-solving	2	LG IC	
8N.5(d) Use divisibility or remainders in problem settings.		1		
8N.5(e) Apply basic properties of operations.	N-4-M Demonstrating a conceptual understanding of the meaning of the basic arithmetic operations (add, subtract, multiply, and divide) and their relationships to each other	2	IC	
8N.6(a) Explain or justify a mathematical concept or relationship (e.g., explain why 17 is prime).	G-6-H Demonstrating deductive reasoning and mathematical justification (e.g., oral explanation, informal proof, and paragraph proof)	2	HG IC	The Louisiana assessment standard is a geometry standard
8N.6(b) Provide a mathematical argument to explain operations with two or more fractions.		1		
Measurement				
8M.1 Measuring physical attributes				
8M.1(b) Compare objects with respect to length, area, volume, angle measurement, weight, or mass.	M-4-M Using intuition and estimation skills to describe, order, and compare formal and informal measures (e.g., ordering cup, pint, quart, gallon; comparing a meter to a yard)	2	MD	
8M.1(c) Estimate the size of an object with respect to a given measurement attribute (e.g., area).	M-2-M Demonstrating an intuitive sense of measurement (for example, estimating and determining reasonableness of measures) M-4-M Using intuition and estimation skills to describe, order, and compare formal and informal measures (e.g., ordering cup, pint, quart, gallon; comparing a meter to a yard)	2	IC	

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TABLE B1 (CONTINUED)

Alignment of National Assessment of Educational Progress (NAEP) grade 8 mathematics and Louisiana Educational Assessment Program (LEAP) grade 4 assessment standards, March 2008

NAEP assessment standards	Louisiana assessment standards	Overall rating[a]	Code[b]	Notes
Measurement				
8M.1 Measuring physical attributes				
8M.1(e) Select or use appropriate measurement instrument to determine or create a given length, area, volume, angle, weight, or mass.	M-1-M Applying the concepts of length, area, surface area, volume, capacity, weight, mass, money, time, temperature, and rate to real-world experiences M-3-M Selecting appropriate units and tools for tasks by considering the purpose for the measurement and the precision required for the task (e.g., length of a room in feet rather than inches)	3		The Louisiana assessment standards have more content: capacity, money, time, temperature, and rate
8M.1(f) Solve mathematical or real-world problems involving perimeter or area of plane figures such as triangles, rectangles, circles, or composite figures.	M-1-M Applying the concepts of length, area, surface area, volume, capacity, weight, mass, money, time, temperature, and rate to real-world experiences	2	IC	
8M.1(h) Solve problems involving volume or surface area of rectangular solids, cylinders, prisms, or composite shapes.	M-1-M Applying the concepts of length, area, surface area, volume, capacity, weight, mass, money, time, temperature, and rate to real-world experiences	2	MD	The Louisiana assessment standard does not specify rectangular solids, cylinders, prisms, or composite shapes
8M.1(i) Solve problems involving rates such as speed or population density.	M-1-M Applying the concepts of length, area, surface area, volume, capacity, weight, mass, money, time, temperature, and rate to real-world experiences	2	IC	
8M.2 Systems of measurement				
8M.2(a) Select or use appropriate type of unit for the attribute being measured such as length, area, angle, time, or volume.	M-1-M Applying the concepts of length, area, surface area, volume, capacity, weight, mass, money, time, temperature, and rate to real-world experiences M-3-M Selecting appropriate units and tools for tasks by considering the purpose for the measurement and the precision required for the task (e.g., length of a room in feet rather than inches)	3		
8M.2(b) Solve problems involving conversions within the same measurement system such as conversions involving square inches and square feet.	M-5-M Converting from one unit of measurement to another within the same system (Comparisons between systems, customary and metric, should be based on intuitive reference points, not formal computation.)	2	IC	The Louisiana assessment standard does not specify solving problems involving conversions but does mention converting

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TABLE B1 (CONTINUED)

Alignment of National Assessment of Educational Progress (NAEP) grade 8 mathematics and Louisiana Educational Assessment Program (LEAP) grade 4 assessment standards, March 2008

NAEP assessment standards	Louisiana assessment standards	Overall rating[a]	Code[b]	Notes
Measurement				
8M.2 Systems of measurement				
8M.2(c) Estimate the measure of an object in one system given the measure of that object in another system and the approximate conversion factor. For example: • Distance conversion: 1 kilometer is approximately 5/8 of a mile. • Money conversion: U.S. dollar is approximately 1.5 Canadian dollars. • Temperature conversion: Fahrenheit to Celsius	M-4-M Using intuition and estimation skills to describe, order, and compare formal and informal measures (e.g., ordering cup, pint, quart, gallon; comparing a meter to a yard) M-5-M Converting from one unit of measurement to another within the same system (Comparisons between systems, customary and metric, should be based on intuitive reference points, not formal computation.)	3		
8M.2(d) Determine appropriate size of unit of measurement in problem situation involving such attributes as length, area, or volume.	M-3-M Selecting appropriate units and tools for tasks by considering the purpose for the measurement and the precision required for the task (e.g., length of a room in feet rather than inches)	2	IC	
8M.2(e) Determine appropriate accuracy of measurement in problem situations (e.g., the accuracy of each of several lengths needed to obtain a specified accuracy of a total length) and find the measure to that degree of accuracy.	M-2-M Demonstrating an intuitive sense of measurement (e.g., estimating and determining reasonableness of measures) M-3-M Selecting appropriate units and tools for tasks by considering the purpose for the measurement and the precision required for the task (e.g., length of a room in feet rather than inches)	2	IC	
8M.3 Measurement in triangles				
8M.3(a) Solve problems involving indirect measurement such as finding the height of a building by comparing its shadow with the height and shadow of a known object.	G-L-EM9.22 Solve problems using indirect measurement	2	HG	
Geometry				
8G.1 Dimension and shape				
8G.1(a) Draw or describe a path of shortest length between points to solve problems in context.		1		
8G.1(b) Identify a geometric object given a written description of its properties.	G-2-M Identifying, describing, comparing, constructing, and classifying geometric figures and concepts	2	IC	The Louisiana assessment standard is very broad and may or may not include this NAEP standard

(CONTINUED)

TABLE B1 (CONTINUED)

Alignment of National Assessment of Educational Progress (NAEP) grade 8 mathematics and Louisiana Educational Assessment Program (LEAP) grade 4 assessment standards, March 2008

NAEP assessment standards	Louisiana assessment standards	Overall rating[a]	Code[b]	Notes
Geometry				
8G.1 Dimension and shape				
8G.1(c) Identify, define, or describe geometric shapes in the plane and in three-dimensional space given a visual representation.	G-2-M Identifying, describing, comparing, constructing, and classifying geometric figures and concepts	2	IC	The Louisiana assessment standard is very broad and may or may not include this NAEP standard
8G.1(d) Draw or sketch from a written description polygons, circles, or semicircles.	G-2-M Identifying, describing, comparing, constructing, and classifying geometric figures and concepts	2	IC	The Louisiana assessment standard is very broad and may or may not include this NAEP standard
8G.1(e) Represent or describe a three-dimensional situation in a two-dimensional drawing from different views.	G-L-EG6.25 Relate polyhedra to their 2-dimensional shapes by drawing or sketching their faces	2	HG	
8G.1(f) Demonstrate an understanding about the two- and three-dimensional shapes in our world through identifying, drawing, modeling, building, or taking apart.	G-2-M Identifying, describing, comparing, constructing, and classifying geometric figures and concepts G-4-M Constructing two- and three-dimensional models	3		
8G.2 Transformation of shapes and preservation of properties				
8G.2(a) Identify lines of symmetry in plane figures or recognize and classify types of symmetries of plane figures.	G-L-EG3.30 Apply concepts of congruence, similarity, and symmetry in real-life situations G-L-EG5.26 Identify shapes that have rotational symmetry	3	LG	
8G.2 Transformation of shapes and preservation of properties				
8G.2(c) Recognize or informally describe the effect of a transformation on two-dimensional geometric shapes (reflections across lines of symmetry, rotations, translations, magnifications, and contractions).	G-3-M Making predictions regarding transformations of geometric figures (for example, make predictions regarding translations, reflections, and rotations or common figures)	2	IC	
8G.2(d) Predict results of combining, subdividing, and changing shapes of plane figures and solids (e.g., paper folding, tiling, and cutting up and rearranging pieces).	G-3-M Making predictions regarding transformations of geometric figures (for example, make predictions regarding translations, reflections, and rotations or common figures)	2	IC	The Louisiana assessment standard is very broad and may or may not include this NAEP standard

(CONTINUED)

TABLE B1 (CONTINUED)

Alignment of National Assessment of Educational Progress (NAEP) grade 8 mathematics and Louisiana Educational Assessment Program (LEAP) grade 4 assessment standards, March 2008

NAEP assessment standards	Louisiana assessment standards	Overall rating[a]	Code[b]	Notes
Geometry				
8G.2 Transformation of shapes and preservation of properties				
8G.2(e) Justify relationships of congruence and similarity, and apply these relationships using scaling and proportional reasoning.	G-5-H Classifying figures in terms of congruence and similarity and applying these relationships	2	HG	
8G.2(f) For similar figures, identify and use the relationships of conservation of angle and of proportionality of side length and perimeter.	G-5-H Classifying figures in terms of congruence and similarity and applying these relationships	2	HG	
8G.3 Relationships between geometric figures				
8G.3(b) Apply geometric properties and relationships in solving simple problems in two and three dimensions.	G-L-EG6.26 Apply concepts, properties, and relationships of points, lines, line segments, rays, diagonals, circles, and right, acute, and obtuse angles and triangles in real-life situations, including estimating sizes of angles	2	LG MC	The Louisiana assessment standard does not include three dimensions
8G.3(c) Represent problem situations with simple geometric models to solve mathematical or real-world problems.		1		
8G.3(d) Use the Pythagorean theorem to solve problems.	G-7-M Demonstrating the connection of geometry to the other strands and to real-life situations (for example, applications of the Pythagorean Theorem)	3		
8G.3(f) Describe or analyze simple properties of, or relationships between, triangles, quadrilaterals, and other polygonal plane figures.	G-2-M Identifying, describing, comparing, constructing, and classifying geometric figures and concepts	2	IC	
8G.3(g) Describe or analyze properties and relationships of parallel or intersecting lines.	G-L-EG6.26 Apply concepts, properties, and relationships of points, lines, line segments, rays, diagonals, circles, and right, acute, and obtuse angles and triangles in real-life situations, including estimating sizes of angles	2	LG IC	
8G.4 Position, direction, and coordinate geometry				
8G.4(a) Describe relative positions of points and lines using the geometric ideas of midpoint, points on common line through a common point, parallelism, or perpendicularity.	G-L-EG6.26 Apply concepts, properties, and relationships of points, lines, line segments, rays, diagonals, circles, and right, acute, and obtuse angles and triangles in real-life situations, including estimating sizes of angles	2	LG IC	
8G.4(b) Describe the intersection of two or more geometric figures in the plane (e.g., intersection of a circle and a line).		1		

(CONTINUED)

TABLE B1 (CONTINUED)

Alignment of National Assessment of Educational Progress (NAEP) grade 8 mathematics and Louisiana Educational Assessment Program (LEAP) grade 4 assessment standards, March 2008

NAEP assessment standards	Louisiana assessment standards	Overall rating[a]	Code[b]	Notes
Geometry				
8G.4 Position, direction, and coordinate geometry				
8G.4(c) Visualize or describe the cross section of a solid.		1		
8G.4(d) Represent geometric figures using rectangular coordinates on a plane.	G-6-M Demonstrating an understanding of the coordinate system (e.g., locate points, identify coordinates, and graph points in a coordinate plane to represent real-world situations)	2	IC	
8G.5 Mathematical reasoning in geometry				
8G.5(a) Make and test a geometric conjecture about regular polygons.	G-5-M Making and testing conjectures about geometric shapes and their properties	3		
Data analysis, statistics, and probability				
8P.1 Data representation The following representations of data are indicated for each grade level. Objectives in which only a subset of these representations is applicable are indicated in the parentheses associated with the objective: histograms, line graphs, scatterplots, box plots, circle graphs, stem and leaf plots, frequency distributions, tables, and bar graphs.				
8P.1(a) Read or interpret data, including interpolating or extrapolating from data.	D-2-M Analyzing, interpreting, evaluating, drawing inferences, and making estimations, predictions, decisions, and convincing arguments based on organized data (e.g., analyze data using concepts of mean, median, mode, range, random samples, sample size, bias, and data extremes)	3		
8P.1(b) For a given set of data, complete a graph and then solve a problem using the data in the graph (histograms, line graphs, scatterplots, circle graphs, and bar graphs).	D-1-M Systematically collecting, organizing, describing, and displaying data in charts, tables, plots, graphs, and/or spreadsheets	2	IC	
8P.1(c) Solve problems by estimating and computing with data from a single set or across sets of data.	D-2-M Analyzing, interpreting, evaluating, drawing inferences, and making estimations, predictions, decisions, and convincing arguments based on organized data (e.g., analyze data using concepts of mean, median, mode, range, random samples, sample size, bias, and data extremes)	2	IC	The Louisiana assessment standard is very broad and may or may not include this NAEP standard

(CONTINUED)

TABLE B1 (CONTINUED)

Alignment of National Assessment of Educational Progress (NAEP) grade 8 mathematics and Louisiana Educational Assessment Program (LEAP) grade 4 assessment standards, March 2008

NAEP assessment standards	Louisiana assessment standards	Overall rating[a]	Code[b]	Notes
Data analysis, statistics, and probability				
8P.1 Data representation				
8P.1(d) Given a graph or a set of data, determine whether information is represented effectively and appropriately (histograms, line graphs, scatterplots, circle graphs, and bar graphs).	D-2-M Analyzing, interpreting, evaluating, drawing inferences, and making estimations, predictions, decisions, and convincing arguments based on organized data (e.g., analyze data using concepts of mean, median, mode, range, random samples, sample size, bias, and data extremes)	2	IC	The Louisiana assessment standard is very broad and may or may not include this NAEP standard
8P.1(e) Compare and contrast the effectiveness of different representations of the same data.	D-2-M Analyzing, interpreting, evaluating, drawing inferences, and making estimations, predictions, decisions, and convincing arguments based on organized data (e.g., analyze data using concepts of mean, median, mode, range, random samples, sample size, bias, and data extremes)	2	IC	The Louisiana assessment standard is very broad and may or may not include this NAEP standard
8P.2 Characteristics of data sets				
8P.2(a) Calculate, use, or interpret mean, median, mode, or range.	D-2-M Analyzing, interpreting, evaluating, drawing inferences, and making estimations, predictions, decisions, and convincing arguments based on organized data (e.g., analyze data using concepts of mean, median, mode, range, random samples, sample size, bias, and data extremes)	2	IC	
8P.2(b) Describe how mean, median, mode, range, or interquartile ranges relate to the shape of the distribution.	G-L-ED9.27 Determine the most appropriate measure of central tendency for a set of data based on its distribution	2	HG MC	
8P.2(c) Identify outliers and determine their effect on mean, median, mode, or range.	D-2-M Analyzing, interpreting, evaluating, drawing inferences, and making estimations, predictions, decisions, and convincing arguments based on organized data (e.g., analyze data using concepts of mean, median, mode, range, random samples, sample size, bias, and data extremes)	2	IC	
8P.2(d) Using appropriate statistical measures, compare two or more data sets describing the same characteristic for two different populations or subsets of the same population.		1		
8P.2(e) Visually choose the line that best fits given a scatter plot and informally explain the meaning of the line. Use the line to make predictions.	G-L-ED9.29 Create a scatter plot from a set of data and determine if the relationship is linear or nonlinear	2	HG IC	

(CONTINUED)

TABLE B1 (CONTINUED)

Alignment of National Assessment of Educational Progress (NAEP) grade 8 mathematics and Louisiana Educational Assessment Program (LEAP) grade 4 assessment standards, March 2008

NAEP assessment standards	Louisiana assessment standards	Overall rating[a]	Code[b]	Notes
Data analysis, statistics, and probability				
8P.3 Experiments and samples				
8P.3(a) Given a sample, identify possible sources of bias in sampling.	D-2-M Analyzing, interpreting, evaluating, drawing inferences, and making estimations, predictions, decisions, and convincing arguments based on organized data (e.g., analyze data using concepts of mean, median, mode, range, random samples, sample size, bias, and data extremes)	2	IC	The Louisiana assessment standard is very broad and may or may not include this NAEP standard
8P.3(b) Distinguish between a random and non-random sample.	D-2-M Analyzing, interpreting, evaluating, drawing inferences, and making estimations, predictions, decisions, and convincing arguments based on organized data (e.g., analyze data using concepts of mean, median, mode, range, random samples, sample size, bias, and data extremes)	2	IC	The Louisiana assessment standard is very broad and may or may not include this NAEP standard
8P.3(d) Evaluate the design of an experiment.	D-1-H Designing and conducting statistical experiments that involve the collection, representation, and analysis of data in various forms (Analysis should reflect an understanding of factors such as: sampling, bias, accuracy, and reasonableness of data.)	2	HG	
8P.4 Probability				
8P.4(a) Analyze a situation that involves probability of an independent event.	D-4-M Analyzing various counting and enumeration procedures with and without replacement (e.g., find the total number of possible outcomes or possible choices in a given situation)	2	IC	
8P.4(b) Determine the theoretical probability of simple and compound events in familiar contexts.	D-5-M Comparing experimental probability results with theoretical probability (e.g., representing probabilities of concrete situations as common fractions, investigating single-event and multiple-event probability, using sample spaces, geometric figures, tables, and/or graphs)	2	IC	
8P.4(c) Estimate the probability of simple and compound events through experimentation or simulation.	D-5-M Comparing experimental probability results with theoretical probability (e.g., representing probabilities of concrete situations as common fractions, investigating single-event and multiple-event probability, using sample spaces, geometric figures, tables, and/or graphs)	2	IC	

(CONTINUED)

TABLE B1 (CONTINUED)

Alignment of National Assessment of Educational Progress (NAEP) grade 8 mathematics and Louisiana Educational Assessment Program (LEAP) grade 4 assessment standards, March 2008

NAEP assessment standards	Louisiana assessment standards	Overall rating[a]	Code[b]	Notes
Data analysis, statistics, and probability				
8P.4 Probability				
8P.4(d) Use theoretical probability to evaluate or predict experimental outcomes.	D-5-M Comparing experimental probability results with theoretical probability (e.g., representing probabilities of concrete situations as common fractions, investigating single-event and multiple-event probability, using sample spaces, geometric figures, tables, and/or graphs)	2	IC	
8P.4(e) Determine the sample space for a given situation.	D-5-M Comparing experimental probability results with theoretical probability (e.g., representing probabilities of concrete situations as common fractions, investigating single-event and multiple-event probability, using sample spaces, geometric figures, tables, and/or graphs)	2	IC	
8P.4(f) Use a sample space to determine the probability of the possible outcomes of an event.	D-5-M Comparing experimental probability results with theoretical probability (e.g., representing probabilities of concrete situations as common fractions, investigating single-event and multiple-event probability, using sample spaces, geometric figures, tables, and/or graphs)	2	IC	
8P.4(g) Represent probability of a given outcome using fractions, decimals, and percents.	D-5-M Comparing experimental probability results with theoretical probability (e.g., representing probabilities of concrete situations as common fractions, investigating single-event and multiple-event probability, using sample spaces, geometric figures, tables, and/or graphs)	2	IC	
8P.4(h) Determine the probability of independent and dependent events. (Dependent events should be limited to linear functions with a small sample size.)	D-5-H Recognizing events as dependent or independent in nature and demonstrating techniques for computing multiple-event probabilities	2	HG	
8P.4(j) Interpret probabilities within a given context.	G-L-ED7.37 Determine probability from experiments and from data displayed in tables and graphs	3	LG	

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TABLE B1 (CONTINUED)

Alignment of National Assessment of Educational Progress (NAEP) grade 8 mathematics and Louisiana Educational Assessment Program (LEAP) grade 4 assessment standards, March 2008

NAEP assessment standards	Louisiana assessment standards	Overall rating[a]	Code[b]	Notes
Algebra				
8A.1 Patterns, relations, and functions				
8A.1(a) Recognize, describe, or extend numerical and geometric patterns using tables, graphs, words, or symbols.	P-1-M Describing, extending, analyzing, and creating a wide variety of numerical, geometrical, and statistical patterns (e.g., skip counting of rational numbers, and simple exponential number patterns) P-2-M Describing and representing relationships using tables, rules, simple equations, and graphs	2	IC	
8A.1(b) Generalize a pattern appearing in a numerical sequence or table or graph using words or symbols.	A-3-M Representing situations and number patterns with tables, graphs, and verbal and written statements, while exploring the relationships among these representations (e.g., multiple representations for the same situation) P-1-M Describing, extending, analyzing, and creating a wide variety of numerical, geometrical, and statistical patterns (e.g., skip counting of rational numbers, and simple exponential number patterns)	3		
8A.1(c) Analyze or create patterns, sequences, or linear functions given a rule.	P-1-M Describing, extending, analyzing, and creating a wide variety of numerical, geometrical, and statistical patterns (e.g., skip counting of rational numbers, and simple exponential number patterns) P-2-M Describing and representing relationships using tables, rules, simple equations, and graphs	2	IC	
8A.1(e) Identify functions as linear or nonlinear or contrast distinguishing properties of functions from tables, graphs, or equations.	A-3-H Using tables and graphs as tools to interpret algebraic expressions, equations, and inequalities	2	HG IC	The Louisiana assessment standard does not specify nonlinear functions
8A.1(f) Interpret the meaning of slope or intercepts in linear functions.	G-L-EA9.13 Translate between the characteristics defining a line (i.e., slope, intercepts, points) and both its equation and graph G-L-EP9.39 Compare and contrast linear functions algebraically in terms of their rates of change and intercepts	2	HG	

(CONTINUED)

TABLE B1 (CONTINUED)

Alignment of National Assessment of Educational Progress (NAEP) grade 8 mathematics and Louisiana Educational Assessment Program (LEAP) grade 4 assessment standards, March 2008

NAEP assessment standards	Louisiana assessment standards	Overall rating[a]	Code[b]	Notes
Algebra				
8A.2 Algebraic representations				
8A.2(a) Translate between different representations of linear expressions using symbols, graphs, tables, diagrams, or written descriptions.	A-3-M Representing situations and number patterns with tables, graphs, and verbal and written statements, while exploring the relationships among these representations (e.g., multiple representations for the same situation)	2	IC	
8A.2(b) Analyze or interpret linear relationships expressed in symbols, graphs, tables, diagrams, or written descriptions.	A-3-M Representing situations and number patterns with tables, graphs, and verbal and written statements, while exploring the relationships among these representations (e.g., multiple representations for the same situation) P-2-M Describing and representing relationships using tables, rules, simple equations, and graphs	2	IC	
8A.2(c) Graph or interpret points that are represented by ordered pairs of numbers on a rectangular coordinate system.	G-6-M Demonstrating an understanding of the coordinate system (e.g., locate points, identify coordinates, and graph points in a coordinate plane to represent real-world situations)	2	IC	
8A.2(d) Solve problems involving coordinate pairs on the rectangular coordinate system.	G-6-M Demonstrating an understanding of the coordinate system (e.g., locate points, identify coordinates, and graph points in a coordinate plane to represent real-world situations)	2	IC	
8A.2(f) Identify or represent functional relationships in meaningful contexts including proportional, linear, and common nonlinear (e.g., compound interest, bacterial growth) in tables, graphs, words, or symbols.	A-1-H Demonstrating the ability to translate real-world situations (e.g., distance versus time relationships, population growth, growth functions for diseases, growth of minimum wage, auto insurance tables) into algebraic expressions, equations, and inequalities and vice versa	2	HG	
8A.3 Variables, expressions, and operations				
8A.3(b) Write algebraic expressions, equations, or inequalities to represent a situation.	A-1-M Demonstrating a conceptual understanding of variables, expressions, equations, and inequalities (e.g., symbolically represent real-world problems as linear terms, equations, or inequalities)	2	IC	

(CONTINUED)

TABLE B1 (CONTINUED)

Alignment of National Assessment of Educational Progress (NAEP) grade 8 mathematics and Louisiana Educational Assessment Program (LEAP) grade 4 assessment standards, March 2008

NAEP assessment standards	Louisiana assessment standards	Overall rating[a]	Code[b]	Notes
Algebra				
8A.3 Variables, expressions, and operations				
8A.3(c) Perform basic operations, using appropriate tools, on linear algebraic expressions (including grouping and order of multiple operations involving basic operations, exponents, roots, simplifying, and expanding).	A-1-M Demonstrating a conceptual understanding of variables, expressions, equations, and inequalities (e.g., symbolically represent real-world problems as linear terms, equations, or inequalities) A-2-M Modeling and developing methods for solving equations and inequalities (e.g., using charts, graphs, manipulatives, and/or standard algebraic procedures)	2	IC	
8A.4 Equations and inequalities				
8A.4(a) Solve linear equations or inequalities (e.g., $ax + b = c$ or $ax + b = cx + d$ or $ax + b > c$).	G-L-EA7.16 Solve one- and two-step equations and inequalities (with one variable) in multiple ways	3	LG	
8A.4(b) Interpret "=" as an equivalence between two expressions and use this interpretation to solve problems.	A-1-M Demonstrating a conceptual understanding of variables, expressions, equations, and inequalities (e.g., symbolically represent real-world problems as linear terms, equations, or inequalities)	2	IC	
8A.4(c) Analyze situations or solve problems using linear equations and inequalities with rational coefficients symbolically or graphically (e.g., $ax + b = c$ or $ax + b = cx + d$).	G-L-EA9.9 Model real-life situations using linear expressions, equations, and inequalities G-L-EA9.14 Graph and interpret linear inequalities in one or two variables and systems of linear inequalities P-4-H Analyzing the effects of changes in parameters (e.g., coefficients and constants) on the graphs of functions, using technology whenever possible G-L-EP9.39 Compare and contrast linear functions algebraically in terms of their rates of change and intercepts G-L-EP9.40 Explain how the graph of a linear function changes as the coefficients or constants are changed in the function's symbolic representation	2	HG	

(CONTINUED)

TABLE B1 (CONTINUED)

Alignment of National Assessment of Educational Progress (NAEP) grade 8 mathematics and Louisiana Educational Assessment Program (LEAP) grade 4 assessment standards, March 2008

NAEP assessment standards	Louisiana assessment standards	Overall rating[a]	Code[b]	Notes
Algebra				
8A.4 Equations and inequalities				
8A.4(d) Interpret relationships between symbolic linear expressions and graphs of lines by identifying and computing slope and intercepts (e.g., know in $y = ax + b$, that a is the rate of change and b is the vertical intercept of the graph).	G-L-EA9.13 Translate between the characteristics defining a line (i.e., slope, intercepts, points) and both its equation and graph G-L-EG9.25 Explain slope as a representation of "rate of change" G-L-EP9.39 Compare and contrast linear functions algebraically in terms of their rates of change and intercepts G-L-EP9.40 Explain how the graph of a linear function changes as the coefficients or constants are changed in the function's symbolic representation A-1-H Demonstrating the ability to translate real-world situations (e.g., distance versus time relationships, population growth, growth functions for diseases, growth of minimum wage, auto insurance tables) into algebraic expressions, equations, and inequalities and vice versa	2	HG	
8A.4(e) Use and evaluate common formulas [e.g., relationship between a circle's circumference and diameter (C = pi d), distance and time under constant speed].	G-2-H Representing and solving problems using geometric models and the properties of those models (e.g., Pythagorean Theorem or formulas involving radius, diameter, and circumference)	2	HG IC	
8A.5 Mathematical reasoning in algebra				
8A.5(a) Make, validate, and justify conclusions and generalizations about linear relationships.	A-4-M Analyzing tables and graphs to identify relationships exhibited by the data and making generalizations based upon these relationships	2	IC	

a. Rating is based on a scale of 1 to 3, where 1 indicates that the LEAP standard or standards do not address the NAEP assessment standard, 2 that the LEAP standard or standards partially address the NAEP assessment standard, and 3 that the LEAP standard or standards fully address or exceed the NAEP assessment standard at the targeted grade level. A NAEP assessment standard is considered to be *fully addressed* by the LEAP standard or standards if all of the content in the NAEP assessment standard is contained in one or more LEAP assessment standards at the same or lower grade level. A NAEP standard is considered to be *partially addressed* by the LEAP assessment standard or standards if the LEAP assessment standard or standards address only one part of the NAEP standard; the NAEP standard contains more content or more detailed content than the LEAP assessment standard or standards or the LEAP assessment standard or standards imply but do not explicitly state the content found in the NAEP assessment standard; there is a matching LEAP assessment standard at a higher grade level than the NAEP assessment standard; or there is a matching LEAP standard or standards at a lower grade level than the NAEP assessment standard, but it does not address all the content addressed by NAEP assessment standard.

b. Codes: IC = implied content, LG = content covered at a lower grade level, HG = content covered at a higher grade level, MC = more content, MD = more detailed content.

Source: Expert content reviewers' analysis based on data from National Assessment Governing Board (2007) and Louisiana Department of Education (2005).

TABLE B2

Louisiana Educational Assessment Program (LEAP) grade 8 assessment standards not covered by the National Assessment of Educational Progress (NAEP) grade 8 assessment standards, March 2008

LEAP strand	LEAP grade 8 assessment standards not covered by NAEP
Algebra	A-5-M Demonstrating the connection of algebra to the other strands and to real-life situations
Measurement	M-6-M Demonstrating the connection of measurement to the other strands and to real-life situations
Geometry	G-1-M Using estimation skills to describe, order, and compare geometric measures
Data analysis, probability, and discrete math	D-3-M Describing informal thinking procedures (e.g., solving elementary logic problems using Venn diagrams, tables, charts, and/or elementary logic operatives to solve logic problems in real-life situations; reach valid conclusions in elementary logic problems involving "and, or, not, if/then")
	D-6-M Demonstrating the connection of data analysis, probability, and discrete math to other strands and to real-life situations
Patterns, relations, and functions	P-3-M Analyzing relationships to explain how a change in one quantity results in a change in another (e.g., change in the dimensions of a rectangular solid affects the volume)
	P-4-M Demonstrating the pervasive use of patterns, relations, and functions in other strands and in real-life situations

Source: Louisiana Department of Education (2005).

Appendix C
Details on the alignment of the National Assessment of Educational Progress grade 12 assessment standards and the Graduation Exit Examination (GEE) assessment standards

TABLE C1

Alignment of the National Assessment of Educational Progress (NAEP) grade 12 mathematics and Graduation Exit Examination (GEE) grade 12 assessment standards, March 2008

NAEP assessment standards	Louisiana assessment standards	Overall rating[a]	Code[b]	Notes
Number properties and operations				
12N.1 Number sense				
12N.1(d) Represent, interpret or compare expressions for real numbers, including expressions utilizing exponents and logarithms.	A-1-H Demonstrating the ability to translate real-world situations (e.g., distance versus time relationships, population growth, growth functions for diseases, growth of minimum wage, auto insurance tables) into algebraic expressions, equations, and inequalities and vice versa	2	IC	
12N.1(f) Represent or interpret expressions involving very large or very small numbers in scientific notation.	G-L-EN9.3 Apply scientific notation to perform computations, solve problems, and write representations of numbers	3		
12N.1(g) Represent, interpret or compare expressions or problem situations involving absolute values.		1		The Louisiana assessment standards do not specify absolute value
12N.1(i) Order or compare real numbers, including very large and very small real numbers.	G-L-EN9.1 Identify and describe differences among natural numbers, whole numbers, integers, rational numbers, and irrational numbers	2	IC	This Louisiana assessment standard does not specify very large or small real numbers
12N.2 Estimation				
12N.2(b) Identify situations where estimation is appropriate, determine the needed degree of accuracy, and analyze* the effect of the estimation method on the accuracy of results.	N-3-H Using number sense to estimate and determine if solutions are reasonable N-4-H Determining whether an exact or approximate answer is necessary G-L-EN9.4 Distinguish between an exact and an approximate answer, and recognize errors introduced by the use of approximate numbers with technology	3		

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TABLE C1 (CONTINUED)

Alignment of the National Assessment of Educational Progress (NAEP) grade 12 mathematics and Graduation Exit Examination (GEE) grade 12 assessment standards, March 2008

NAEP assessment standards	Louisiana assessment standards	Overall rating[a]	Code[b]	Notes
Number properties and operations				
12N.2 Estimation				
12N.2(c) Verify solutions or determine the reasonableness of results in a variety of situations.	N-3-H Using number sense to estimate and determine if solutions are reasonable N-7-H Justifying reasonableness of solutions and verifying results G-L-EN9.4 Distinguish between an exact and an approximate answer, and recognize errors introduced by the use of approximate numbers with technology	3		
12N.2(d) Estimate square or cube roots of numbers less than 1,000 between two whole numbers.	G-L-EA7.13 Determine the square root of perfect squares and mentally approximate other square roots by identifying the two whole numbers between which they fall	2	LG MC	This Louisiana assessment standard does not address cube roots
12N.3 Number operations				
12N.3(a) Find integral or simple fractional powers of real numbers.	G-L-EN9.2 Evaluate and write numerical expressions involving integer exponents	2	MC	This Louisiana assessment standard does not address fractional powers
12N.3(b) Perform arithmetic operations with real numbers, including common irrational numbers.	G-L-EN9.5 Demonstrate computational fluency with all rational numbers (e.g., estimation, mental math, technology, paper/pencil) G-L-EN9.6 Simplify and perform basic operations on numerical expressions involving radicals (e.g.,$2\sqrt{3} + 5\sqrt{3} = 7\sqrt{3}$)	3		
12N.3(c) Perform arithmetic operations with expressions involving absolute value.		1		The Louisiana assessment standards do not specify absolute value

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TABLE C1 (CONTINUED)

Alignment of the National Assessment of Educational Progress (NAEP) grade 12 mathematics and Graduation Exit Examination (GEE) grade 12 assessment standards, March 2008

NAEP assessment standards	Louisiana assessment standards	Overall rating[a]	Code[b]	Notes
Number properties and operations				
12N.3 Number operations				
12N.3(d) Describe the effect of multiplying and dividing by numbers including the effect of multiplying or dividing a real number by: • Zero, or • A number less than zero, or • A number between zero and one, or • One, or • A number greater than one.	G-L-EN9.5 Demonstrate computational fluency with all rational numbers (e.g., estimation, mental math, technology, paper/pencil)	2	IC	
12N.3(f) Solve application problems involving numbers, including rational and common irrationals.	G-L-EN9.7 Use proportional reasoning to model and solve real-life problems involving direct and inverse variation	2	IC	
12N.4 Ratios and proportional reasoning				
12N.4(c) Use proportions to solve problems (including rates of change).	G-L-EN9.7 Use proportional reasoning to model and solve real-life problems involving direct and inverse variation	3		
12N.4(d) Solve multi-step problems involving percentages, including compound percentages.	G-L-EN7.6 Set up and solve simple percent problems using various strategies, including mental math G-L-EN7.7 Select and discuss appropriate operations and solve single- and multi-step real-life problems involving positive fractions, percents, mixed numbers, decimals, and positive and negative integers	2	LG MC	These Louisiana assessment standards do not include compound percentages
12N.5 Properties of numbers and operations				
12N.5(c) Solve problems using factors, multiples, or prime factorization.	G-L-EN6.1 Factor whole numbers into primes G-L-EN6.2 Determine common factors and common multiples for pairs of whole numbers G-L-EN6.3 Find the greatest common factor (GCF) and least common multiple (LCM) for whole numbers in the context of problem-solving	3	LG	
12N.5(d) Use divisibility or remainders in problem settings.		1		This NAEP skill seems out of place in high school

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TABLE C1 (CONTINUED)

Alignment of the National Assessment of Educational Progress (NAEP) grade 12 mathematics and Graduation Exit Examination (GEE) grade 12 assessment standards, March 2008

NAEP assessment standards	Louisiana assessment standards	Overall rating[a]	Code[b]	Notes
Number properties and operations				
12N.5 Properties of numbers and operations				
12N.5(e) Apply basic properties of operations, including conventions about the order of operations.	N-4-M Demonstrating a conceptual understanding of the meaning of the basic arithmetic operations (add, subtract, multiply and divide) and their relationships to each other G-L-EN7.3 Solve order of operations problems involving grouping symbols and multiple operations G-L-EN7.4 Model and apply the distributive property in real-life applications	3	LG	
12N.5(f) Recognize properties of the number system—whole numbers, integers, rational numbers, real numbers, and complex numbers—recognize how they are related to each other, and identify examples of each type of number.	G-L-EN9.1 Identify and describe differences among natural numbers, whole numbers, integers, rational numbers, and irrational numbers N-1-H Demonstrating an understanding of the real number system	3		
12N.6 Mathematical reasoning using numbers				
12N.6(a) Give a mathematical argument to establish the validity of a simple numerical property or relationship.	G-6-H Demonstrating deductive reasoning and mathematical justification (e.g., oral explanation, informal proof, and paragraph proof)	2	IC	
12N.6(b) * Analyze or interpret a proof by mathematical induction of a simple numerical relationship.	G-4-H Using inductive reasoning to predict, discover, and apply geometric properties and relationships (e.g., patty paper constructions, sum of the angles in a polygon)	2	IC	This Louisiana assessment standard addresses geometric properties and relationships, not necessarily numerical relationships
Measurement				
12M.1 Measuring physical attributes				
12M.1(b) Determine the effect of proportions and scaling on length, areas and volume.	G-L-EN9.7 Use proportional reasoning to model and solve real-life problems involving direct and inverse variation G-L-EG7.27 Model and explain the relationship between perimeter and area (how scale change in a linear dimension affects perimeter and area) and between circumference and area of a circle	2	MC	These Louisiana assessment standards do not include volume

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TABLE C1 (CONTINUED)

Alignment of the National Assessment of Educational Progress (NAEP) grade 12 mathematics and Graduation Exit Examination (GEE) grade 12 assessment standards, March 2008

NAEP assessment standards	Louisiana assessment standards	Overall rating[a]	Code[b]	Notes
Measurement				
12M.1 Measuring physical attributes				
12M.1(c) Estimate, or compare perimeters or areas of two-dimensional geometric figures.	M-3-H Estimating, computing, and applying physical measurement using suitable units (e.g., calculate perimeter and area of plane figures, surface area and volume of solids presented in real-world situations) G-L-EG7.27 Model and explain the relationship between perimeter and area (how scale change in a linear dimension affects perimeter and area) and between circumference and area of a circle	3		
12M.1(d) Solve problems of angle measure, including those involving triangles or other polygons or parallel lines cut by a transversal.	G-4-H Using inductive reasoning to predict, discover, and apply geometric properties and relationships (e.g., patty paper constructions, sum of the angles in a polygon)	2	IC	
12M.1(f) Solve problems involving perimeter or area of plane figures such as polygons, circles, or composite figures.	M-3-H Estimating, computing, and applying physical measurement using suitable units (e.g., calculate perimeter and area of plane figures, surface area and volume of solids presented in real-world situations)	3		
12M.1(h) Solve problems by determining, estimating, or comparing volumes or surface areas of three-dimensional figures.	M-3-H Estimating, computing, and applying physical measurement using suitable units (e.g., calculate perimeter and area of plane figures, surface area and volume of solids presented in real-world situations)	3		
12M.1(i) Solve problems involving rates such as speed, density, population density, or flow rates.	G-L-EM6.20 Calculate, interpret, and compare rates such as $/lb., mpg, and mph	3	LG	
12M.2 Systems of measurement				
12M.2(a) Recognize that geometric measurements (length, area, perimeter, and volume) depend on the choice of a unit, and apply such units in expressions, equations, and problem solutions.	M-3-H Estimating, computing, and applying physical measurement using suitable units (e.g., calculate perimeter and area of plane figures, surface area and volume of solids presented in real-world situations) G-L-EM9.21 Determine appropriate units and scales to use when solving measurement problems	3		

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TABLE C1 (CONTINUED)

Alignment of the National Assessment of Educational Progress (NAEP) grade 12 mathematics and Graduation Exit Examination (GEE) grade 12 assessment standards, March 2008

NAEP assessment standards	Louisiana assessment standards	Overall rating[a]	Code[b]	Notes
Measurement				
12M.2 Systems of measurement				
12M.2(b) Solve problems involving conversions within or between measurement systems, given the relationship between the units.	M-4-H Demonstrating the concept of measurement as it applies to real-world experiences	2	IC	
12M.2(d) Understand that numerical values associated with measurements of physical quantities are approximate, are subject to variation, and must be assigned units of measurement.	M-1-H Selecting and using appropriate units, techniques, and tools to measure quantities in order to achieve specified degrees of precision, accuracy, and error (or tolerance) of measurements M-4-H Demonstrating the concept of measurement as it applies to real-world experiences	3		
12M.2(e) Determine appropriate accuracy of measurement in problem situations (e.g., the accuracy of measurement of the dimensions to obtain a specified accuracy of area) and find the measure to that degree of accuracy.	M-1-H Selecting and using appropriate units, techniques, and tools to measure quantities in order to achieve specified degrees of precision, accuracy, and error (or tolerance) of measurements G-L-EM9.17 Distinguish between precision and accuracy G-L-EM9.19 Use significant digits in computational problems G-L-EM9.20 Demonstrate and explain how relative measurement error is compounded when determining absolute error	3		
12M.2(f) Construct or solve problems involving scale drawings.	G-L-EN9.7 Use proportional reasoning to model and solve real-life problems involving direct and inverse variation	2	IC	
12M.3 Measurement in triangles				
12M.3(a) Solve problems involving indirect measurement.	G-L-EM9.22 Solve problems using indirect measurement	3		
12M.3(b) Solve problems using the fact that trigonometric ratios (sine, cosine, and tangent) stay constant in similar triangles.		1		
12M.3(c) Use the definitions of sine, cosine, and tangent as ratios of sides in a right triangle to solve problems about length of sides and measure of angles.		1		
12M.3(d) Interpret and use the identity $\sin 2q + \cos 2q = 1$ for angles q between 0° and 90°; recognize this identity as a special representation of the Pythagorean theorem.		1		

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TABLE C1 (CONTINUED)

Alignment of the National Assessment of Educational Progress (NAEP) grade 12 mathematics and Graduation Exit Examination (GEE) grade 12 assessment standards, March 2008

NAEP assessment standards	Louisiana assessment standards	Overall rating[a]	Code[b]	Notes
Measurement				
12M.3 Measurement in triangles				
12M.3(e) * Determine the radian measure of an angle and explain how radian measurement is related to a circle of radius 1.		1		
12M.3(f) * Use trigonometric formulas such as addition and double angle formulas.		1		
12M.3(g) * Use the law of cosines and the law of sines to find unknown sides and angles of a triangle.		1		
Geometry				
12G.1 Dimension and shape				
12G.1(c) Give precise mathematical descriptions or definitions of geometric shapes in the plane and in three-dimensional space.	G-1-H Identifying, describing, comparing, constructing, and classifying geometric figures in two and three dimensions using technology where appropriate to explore and make conjectures about geometric concepts and figures	3		
12G.1(d) Draw or sketch from a written description plane figures and planar images of three-dimensional figures.	G-1-H Identifying, describing, comparing, constructing, and classifying geometric figures in two and three dimensions using technology where appropriate to explore and make conjectures about geometric concepts and figures	2	IC MD	
12G.1(e) Use two-dimensional representations of three-dimensional objects to visualize and solve problems.	G-1-H Identifying, describing, comparing, constructing, and classifying geometric figures in two and three dimensions using technology where appropriate to explore and make conjectures about geometric concepts and figures	2	IC MD	
12G.1(f) Analyze properties of three-dimensional figures including spheres and hemispheres.	G-1-H Identifying, describing, comparing, constructing, and classifying geometric figures in two and three dimensions using technology where appropriate to explore and make conjectures about geometric concepts and figures	2	IC MD	
12G.2 Transformation of shapes and preservation of properties				
12G.2(a) Recognize or identify types of symmetries (e.g., point, line, rotational, self-congruence) of two- and three-dimensional figures.	G-L-EG9.26 Perform translations and line reflections on the coordinate plane	2	IC	

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TABLE C1 (CONTINUED)

Alignment of the National Assessment of Educational Progress (NAEP) grade 12 mathematics and Graduation Exit Examination (GEE) grade 12 assessment standards, March 2008

NAEP assessment standards	Louisiana assessment standards	Overall rating[a]	Code[b]	Notes
Geometry				
12G.2 Transformation of shapes and preservation of properties				
12G.2(b) Give or recognize the precise mathematical relationship (e.g., congruence, similarity, orientation) between a figure and its image under a transformation.	G-L-EG9.26 Perform translations and line reflections on the coordinate plane	2	IC	
12G.2(c) Perform or describe the effect of a single transformation on two- and three-dimensional geometric shapes (reflections across lines of symmetry, rotations, translations, and dilations).	G-L-EG9.26 Perform translations and line reflections on the coordinate plane	2	MC	
12G.2(d) Identify transformations, combinations or subdivisions of shapes that preserve the area of two-dimensional figures or the volume of three-dimensional figures.	G-L-EM7.20 Determine the perimeter and area of composite plane figures by subdivision and area addition	2	LG MC	
12G.2(e) Justify relationships of congruence and similarity, and apply these relation-ships using scaling and proportional reasoning.	G-5-H Classifying figures in terms of congruence and similarity and applying these relationships G-6-H Demonstrating deductive reasoning and mathematical justification (e.g., oral explanation, informal proof, and paragraph proof)	3		
12G.2(g) Perform or describe the effects of successive transformations.	G-L-EG9.26 Perform translations and line reflections on the coordinate plane	2	IC	
12G.3 Relationships between geometric figures				
12G.3(b) Apply geometric properties and relationships to solve problems in two and three dimensions.	G-2-H Representing and solving problems using geometric models and the properties of those models (e.g., Pythagorean Theorem or formulas involving radius, diameter, and circumference)	2	MD	
12G.3(c) Represent problem situations with geometric models to solve mathematical or real world problems.	G-2-H Representing and solving problems using geometric models and the properties of those models (e.g., Pythagorean Theorem or formulas involving radius, diameter, and circumference)	3		
12G.3(d) Use the Pythagorean theorem to solve problems in two- or three-dimensional situations.	G-2-H Representing and solving problems using geometric models and the properties of those models (e.g., Pythagorean Theorem or formulas involving radius, diameter, and circumference)	2	MD	

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TABLE C1 (CONTINUED)

Alignment of the National Assessment of Educational Progress (NAEP) grade 12 mathematics and Graduation Exit Examination (GEE) grade 12 assessment standards, March 2008

NAEP assessment standards	Louisiana assessment standards	Overall rating[a]	Code[b]	Notes
Geometry				
12G.3 Relationships between geometric figures				
12G.3(e) Recall and interpret definitions and basic properties of congruent and similar triangles, circles, quadrilaterals, polygons, parallel, perpendicular and intersecting lines, and associated angle relationships.	G-1-H Identifying, describing, comparing, constructing, and classifying geometric figures in two and three dimensions using technology where appropriate to explore and make conjectures about geometric concepts and figures G-5-H Classifying figures in terms of congruence and similarity and applying these relationships	2	MD	These Louisiana assessment standards do not specify parallel, perpendicular, and intersecting lines or associated angle relationships
12G.3(f) Analyze properties or relationships of triangles, quadrilaterals, and other polygonal plane figures.	G-1-H Identifying, describing, comparing, constructing, and classifying geometric figures in two and three dimensions using technology where appropriate to explore and make conjectures about geometric concepts and figures	2	IC	
12G.3(g) Analyze properties and relationships of parallel, perpendicular, or intersecting lines, including the angle relationships that arise in these cases.		1		
12G.3(h) Analyze properties of circles and the intersections of lines and circles (inscribed angles, central angles, tangents, secants, chords).	G-1-H Identifying, describing, comparing, constructing, and classifying geometric figures in two and three dimensions using technology where appropriate to explore and make conjectures about geometric concepts and figures	2	IC	This Louisiana assessment standard does not specify circles or the intersection of lines and circles
12G.4 Position, direction, and coordinate geometry				
12G.4(a) Solve problems involving the coordinate plane such as the distance between two points, the midpoint of a segment, or slopes of perpendicular or parallel lines.	G-L-EG9.23 Use coordinate methods to solve and interpret problems (e.g., slope as rate of change, intercept as initial value, intersection as common solution, midpoint as equidistant)	2	IC	
12G.4(b) Describe the intersections of lines in the plane and in space, intersections of a line and a plane, or of two planes in space.		1		
12G.4(c) Describe or identify conic sections and other cross sections of solids.		1		

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TABLE C1 (CONTINUED)

Alignment of the National Assessment of Educational Progress (NAEP) grade 12 mathematics and Graduation Exit Examination (GEE) grade 12 assessment standards, March 2008

NAEP assessment standards	Louisiana assessment standards	Overall rating[a]	Code[b]	Notes
Geometry				
12G.4 Position, direction, and coordinate geometry				
12G.4(d) Represent two-dimensional figures algebraically using coordinates and/or equations.	G-L-EG9.23 Use coordinate methods to solve and interpret problems (e.g., slope as rate of change, intercept as initial value, intersection as common solution, midpoint as equidistant) G-L-EA9.13 Translate between the characteristics defining a line (i.e., slope, intercepts, points) and both its equation and graph	2	IC	
12G.4(e) * Use vectors to represent velocity and direction; multiply a vector by a scalar and add vectors both algebraically and graphically.		1		
12G.4(f) Find an equation of a circle given its center and radius and, given an equation of a circle, find its center and radius.		1		
12G.4(g) *Graph ellipses and hyperbolas whose axes are parallel to the coordinate axes and demonstrate understanding of the relationship between their standard algebraic form and their graphical characteristics.		1		
12G.4(h) * Represent situations and solve problems involving polar coordinates.		1		
12G.5 Mathematical reasoning in geometry				
12G.5(a) Make, test, and validate geometric conjectures using a variety of methods including deductive reasoning and counterexamples.	G-6-H Demonstrating deductive reasoning and mathematical justification (e.g., oral explanation, informal proof, and paragraph proof)	3		
12G.5(b) Determine the role of hypotheses, logical implications, and conclusion, in proofs of geometric theorems.	G-6-H Demonstrating deductive reasoning and mathematical justification (e.g., oral explanation, informal proof, and paragraph proof)	2	IC	
12G.5(c) Analyze or explain a geometric argument by contradiction	G-6-H Demonstrating deductive reasoning and mathematical justification (e.g., oral explanation, informal proof, and paragraph proof)	2	IC	
12G.5(d) Analyze or explain a geometric proof of the Pythagorean theorem.		1		
12G.5(e) Prove basic theorems about congruent and similar triangles and circles.		1		

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TABLE C1 (CONTINUED)

Alignment of the National Assessment of Educational Progress (NAEP) grade 12 mathematics and Graduation Exit Examination (GEE) grade 12 assessment standards, March 2008

NAEP assessment standards	Louisiana assessment standards	Overall rating[a]	Code[b]	Notes
Data analysis, statistics, and probability				
12P.1 Data representation The following representations of data are indicated for each grade level. Objectives in which only a subset of these representations is applicable are indicated in the parentheses associated with the objective: histograms, line graphs, scatterplots, box plots, bar graphs, circle graphs, stem and leaf plots, frequency distributions, and tables, including two-way tables.				
12P.1(a) Read or interpret graphical or tabular representations of data.	D-7-H Making inferences from data that are organized in charts, tables, and graphs (e.g., pictograph; bar, line, or circle graph; stem-and-leaf plot or scatter plot)	3		
12P.1(b) For a given set of data, complete a graph and solve a problem using the data in the graph (histograms, scatterplots, line graphs)	D-7-H Making inferences from data that are organized in charts, tables, and graphs (e.g., pictograph; bar, line, or circle graph; stem-and-leaf plot or scatter plot) G-L-ED9.29 Create a scatter plot from a set of data and determine if the relationship is linear or nonlinear	2	IC	
12P.1(c) Solve problems involving univariate or bivariate data.	D-7-H Making inferences from data that are organized in charts, tables, and graphs (e.g., pictograph; bar, line, or circle graph; stem-and-leaf plot or scatter plot) G-L-ED9.29 Create a scatter plot from a set of data and determine if the relationship is linear or nonlinear	2	IC	
12P.1(d) Given a graphical or tabular representation of a set of data, determine whether information is represented effectively and appropriately.		1		
12P.1(e) Compare and contrast different graphical representations of univariate and bivariate data.		1		
12P.1(f) Organize and display data in a spreadsheet in order to recognize patterns and solve problems.		1		
12P.2 Characteristics of data sets				
12P.2(a) Calculate, interpret, or use summary statistics for distributions of data including measures of typical value (mean, median), position (quartiles, percentiles), and spread (range, interquartile range, variance, standard deviation).	G-L-ED9.27 Determine the most appropriate measure of central tendency for a set of data based on its distribution	2	MC	

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TABLE C1 (CONTINUED)

Alignment of the National Assessment of Educational Progress (NAEP) grade 12 mathematics and Graduation Exit Examination (GEE) grade 12 assessment standards, March 2008

NAEP assessment standards	Louisiana assessment standards	Overall rating[a]	Code[b]	Notes
Data analysis, statistics, and probability				
12P.2 Characteristics of data sets				
12P.2(b) Recognize how linear transformations of one-variable data affect mean, median, mode, range, interquartile range, and standard deviation.	G-L-ED9.27 Determine the most appropriate measure of central tendency for a set of data based on its distribution G-L-ED9.28 Identify trends in data and support conclusions by using distribution characteristics such as patterns, clusters, and outliers	2	MD	
12P.2(c) Determine the effect of outliers on mean, median, mode, range, interquartile range, or standard deviation.	G-L-ED9.28 Identify trends in data and support conclusions by using distribution characteristics such as patterns, clusters, and outliers	2	MD	
12P.2(d) Compare data sets using summary statistics (mean, median, mode, range, interquartile range, or standard deviation) describing the same characteristic for two different populations or subsets of the same population.		1		
12P.2(e) Approximate a trend line if a linear pattern is apparent in a scatterplot or use a graphing calculator to determine a least-squares regression line, and use the line or equation to make predictions.	G-L-ED9.29 Create a scatter plot from a set of data and determine if the relationship is linear or nonlinear	2	MC	
12P.2(f) Recognize that the correlation coefficient is a number from –1 to +1 that measures the strength of the linear relationship between two variables; visually estimate the correlation coefficient (e.g., positive or negative, closer to 0, .5, or 1.0) of a scatterplot.		1		
12P.2(g) Know and interpret the key characteristics of a normal distribution such as shape, center (mean), and spread (standard deviation).	D-6-H Recognizing and answering questions about data that are normally or non-normally distributed	3		
12P.3 Experiments and samples				
12P.3(a) Identify possible sources of bias in sample surveys, and describe how such bias can be controlled and reduced.	D-1-H Designing and conducting statistical experiments that involve the collection, representation, and analysis of data in various forms (Analysis should reflect an understanding of factors such as: sampling, bias, accuracy, and reasonableness of data.)	3		

(CONTINUED)

TABLE C1 (CONTINUED)

Alignment of the National Assessment of Educational Progress (NAEP) grade 12 mathematics and Graduation Exit Examination (GEE) grade 12 assessment standards, March 2008

NAEP assessment standards	Louisiana assessment standards	Overall rating[a]	Code[b]	Notes
Data analysis, statistics, and probability				
12P.3 Experiments and samples				
12P.3(b) Recognize and describe a method to select a simple random sample.	D-1-H Designing and conducting statistical experiments that involve the collection, representation, and analysis of data in various forms (Analysis should reflect an understanding of factors such as: sampling, bias, accuracy, and reasonableness of data.)	3		
12P.3(c) * Draw inferences from samples, such as estimates of proportions in a population, estimates of population means, or decisions about differences in means for two "treatments".	D-1-H Designing and conducting statistical experiments that involve the collection, representation, and analysis of data in various forms (Analysis should reflect an understanding of factors such as: sampling, bias, accuracy, and reasonableness of data.)	2	IC	
12P.3(d) Identify or evaluate the characteristics of a good survey or of a well-designed experiment.	D-1-H Designing and conducting statistical experiments that involve the collection, representation, and analysis of data in various forms (Analysis should reflect an understanding of factors such as: sampling, bias, accuracy, and reasonableness of data.)	2	IC	
12P.3(e) * Recognize the differences in design and in conclusions between randomized experiments and observational studies.		1		
12P.4 Probability				
12P.4(a) Recognize whether two events are independent or dependent.	D-5-H Recognizing events as dependent or independent in nature and demonstrating techniques for computing multiple-event probabilities	3		
12P.4(b) Determine the theoretical probability of simple and compound events in familiar or unfamiliar contexts.	D-5-H Recognizing events as dependent or independent in nature and demonstrating techniques for computing multiple-event probabilities	2	IC	
12P.4(c) Given the results of an experiment or simulation, estimate the probability of simple or compound events in familiar or unfamiliar contexts.	G-L-ED9.30 Use simulations to estimate probabilities	2	MD	

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TABLE C1 (CONTINUED)

Alignment of the National Assessment of Educational Progress (NAEP) grade 12 mathematics and Graduation Exit Examination (GEE) grade 12 assessment standards, March 2008

NAEP assessment standards	Louisiana assessment standards	Overall rating[a]	Code[b]	Notes
Data analysis, statistics, and probability				
12P.4 Probability				
12P.4(d) Use theoretical probability to evaluate or predict experimental outcomes.	D-5-M Comparing experimental probability results with theoretical probability (e.g., representing probabilities of concrete situations as common fractions, investigating single-event and multiple-event probability, using sample spaces, geometric figures, tables, and/or graphs) G-L-ED7.38 Compare theoretical and experimental probability in real-life situations	2	LG IC	
12P.4(e) Determine the number of ways an event can occur using tree diagrams, formulas for combinations and permutations, or other counting techniques.	D-3-H Using simulations to estimate probabilities (e.g., lists and tree diagrams) G-L-ED9.32 Compute probabilities using geometric models and basic counting techniques such as combinations and permutations	3		
12P.4(h) Determine the probability of independent and dependent events.	D-5-H Recognizing events as dependent or independent in nature and demonstrating techniques for computing multiple-event probabilities G-L-ED9.32 Compute probabilities using geometric models and basic counting techniques such as combinations and permutations	3		
12P.4(i) Determine conditional probability using two-way tables.	G-L-ED9.32 Compute probabilities using geometric models and basic counting techniques such as combinations and permutations	2	MD	
12P.4(j) Interpret and apply probability concepts to practical situations.	G-L-ED9.33 Explain the relationship between the probability of an event occurring, and the odds of an event occurring and compute one given the other	2	IC	
12P.4(k) *Use the binomial theorem to solve problems.		1		
12P.5 Mathematical reasoning with data				
12P.5(a) Identify misleading uses of data in real-world settings and critique different ways of presenting and using information.	D-1-H Designing and conducting statistical experiments that involve the collection, representation, and analysis of data in various forms (Analysis should reflect an understanding of factors such as: sampling, bias, accuracy, and reasonableness of data.)	2	IC	

(CONTINUED)

TABLE C1 (CONTINUED)

Alignment of the National Assessment of Educational Progress (NAEP) grade 12 mathematics and Graduation Exit Examination (GEE) grade 12 assessment standards, March 2008

NAEP assessment standards	Louisiana assessment standards	Overall rating[a]	Code[b]	Notes
Data analysis, statistics, and probability				
12P.5 Mathematical reasoning with data				
12P.5(b) Distinguish relevant from irrelevant information, identify missing information, and either find what is needed or make appropriate approximations.	D-1-H Designing and conducting statistical experiments that involve the collection, representation, and analysis of data in various forms (Analysis should reflect an understanding of factors such as: sampling, bias, accuracy, and reasonableness of data.)	2	IC	
12P.5(c)* Recognize, use, and distinguish between the processes of mathematical (deterministic) and statistical modeling.		1		
12P.5(d) Recognize when arguments based on data confuse correlation with causation.		1		
12P.5(e) * Recognize and explain the potential errors caused by extrapolating from data.		1		
Algebra				
12A.1 Patterns, relations, and functions				
12A.1(a) Recognize, describe, or extend numerical patterns, including arithmetic and geometric progressions.	P-1-M Describing, extending, analyzing, and creating a wide variety of numerical, geometrical, and statistical patterns (e.g., skip counting of rational numbers, and simple exponential number patterns) G-L-EA7.18 Describe linear, multiplicative, or changing growth relationships (e.g., 1, 3, 6, 10, 15, 21, …) verbally and algebraically	3	LG	
12A.1(b) Express linear and exponential functions in recursive and explicit form given a table, verbal description, or some terms of a sequence.	P-2-H Translating between tabular, symbolic, or graphic representations of functions	2	MD	
12A.1(e) Identify or analyze distinguishing properties of linear, quadratic, rational, exponential, or *trigonometric functions from tables, graphs, or equations.	P-3-H Recognizing behavior of families of elementary functions, such as polynomial, trigonometric, and exponential functions and where appropriate, using graphing technologies to represent them G-L-EP9.38 Identify and describe the characteristics of families of linear functions, with and without technology G-L-EA9.15 Translate among tabular, graphical, and algebraic representations of functions and real-life situations	3		

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TABLE C1 (CONTINUED)

Alignment of the National Assessment of Educational Progress (NAEP) grade 12 mathematics and Graduation Exit Examination (GEE) grade 12 assessment standards, March 2008

NAEP assessment standards	Louisiana assessment standards	Overall rating[a]	Code[b]	Notes
Algebra				
12A.1 Patterns, relations, and functions				
12A.1(g) Determine whether a relation, given in verbal, symbolic, tabular, or graphical form, is a function.	G-L-EP9.35 Determine if a relation is a function and use appropriate function notation	2	MD	
12A.1(h) Recognize and analyze the general forms of linear, quadratic, rational, exponential, or *trigonometric functions.	P-4-H Analyzing the effects of changes in parameters (e.g., coefficients and constants) on the graphs of functions, using technology whenever possible P-3-H Recognizing behavior of families of elementary functions, such as polynomial, trigonometric, and exponential functions, and, where appropriate, using graphing technologies to represent them	2	IC	
12A.1(i) Determine the domain and range of functions given in various forms and contexts.	G-L-EP9.36 Identify the domain and range of functions	3		
12A.1(j) * Given a function, determine its inverse if it exists, and explain the contextual meaning of the inverse for a given situation.		1		
12A.2 Algebraic representations				
12A.2(a) Create and translate between different representations of algebraic expressions, equations, and inequalities (e.g., linear, quadratic, exponential, or *trigonometric) using symbols, graphs, tables, diagrams, or written descriptions.	P-2-H Translating between tabular, symbolic, or graphic representations of functions A-3-H Using tables and graphs as tools to interpret algebraic expressions, equations, and inequalities D-2-H Recognizing data that relate two variables as linear, exponential, or otherwise in nature (e.g., match a data set, linear or non-linear, to a graph and vice versa)	2	IC	
12A.2(b) Analyze or interpret relationships expressed in symbols, graphs, tables, diagrams (including Venn diagrams), or written descriptions and evaluate the relative advantages or disadvantages of different representations to answer specific questions.	A-3-H Using tables and graphs as tools to interpret algebraic expressions, equations, and inequalities G-L-EA9.15 Translate among tabular, graphical, and algebraic representations of functions and real-life situations	2	IC	

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TABLE C1 (CONTINUED)

Alignment of the National Assessment of Educational Progress (NAEP) grade 12 mathematics and Graduation Exit Examination (GEE) grade 12 assessment standards, March 2008

NAEP assessment standards	Louisiana assessment standards	Overall rating[a]	Code[b]	Notes
Algebra				
12A.2 Algebraic representations				
12A.2(d) Perform or interpret transformations on the graphs of linear, quadratic, exponential, and *trigonometric functions.	P-4-H Analyzing the effects of changes in parameters (for example, coefficients and constants) on the graphs of functions, using technology whenever possible G-L-EP9.40 Explain how the graph of a linear function changes as the coefficients or constants are changed in the function's symbolic representation G-L-EG9.26 Perform translations and line reflections on the coordinate plan	2	MD	These Louisiana assessment standards do not specify quadratic, exponential, and trigonometric functions
12A.2(e) Make inferences or predictions using an algebraic model of a situation.	P-5-H Analyzing real-world relationships that can be molded by elementary functions G-L-EP9.37 Analyze real-life relationships that can be modeled by linear functions	3		
12A.2(f) Given a real-world situation, determine if a linear, quadratic, rational, exponential, logarithmic, or *trigonometric function fits the situation.	A-1-H Demonstrating the ability to translate real-world situations (e.g., distance versus time relationships, population growth, growth functions for diseases, growth of minimum wage, auto insurance tables) into algebraic expressions, equations, and inequalities and vice versa D-2-H Recognizing data that relate two variables as linear, exponential, or otherwise in nature (e.g., match a data set, linear or non-linear, to a graph and vice versa)	2	MC	These Louisiana assessment standards do not specify logarithmic or trigonometric functions
12A.2(g) Solve problems involving exponential growth and decay.	A-1-H Demonstrating the ability to translate real-world situations (e.g., distance versus time relationships, population growth, growth functions for diseases, growth of minimum wage, auto insurance tables) into algebraic expressions, equations, and inequalities and vice versa	2	IC	
12A.2(h) * Analyze properties of exponential, logarithmic, and rational functions.	P-3-H Recognizing behavior of families of elementary functions, such as polynomial, trigonometric, and exponential functions, and, where appropriate, using graphing technologies to represent them	2	IC MD	This Louisiana assessment standard does not specify logarithmic and rational functions

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TABLE C1 (CONTINUED)

Alignment of the National Assessment of Educational Progress (NAEP) grade 12 mathematics and Graduation Exit Examination (GEE) grade 12 assessment standards, March 2008

NAEP assessment standards	Louisiana assessment standards	Overall rating[a]	Code[b]	Notes
Algebra				
12A.3 Variables, expressions, and operations				
12A.3(b) Write algebraic expressions, equations, or inequalities to represent a situation.	G-L-EA9.9 Model real-life situations using linear expressions, equations, and inequalities	3		
12A.3(c) Perform basic operations, using appropriate tools, on algebraic expressions including polynomial and rational expressions.	G-L-EA9.8 Use order of operations to simplify or rewrite variable expressions A-2-H Recognizing the relationship between operations involving real numbers and operations involving algebraic expressions G-L-EN9.6 Simplify and perform basic operations on numerical expressions involving radicals (e.g.,$2\sqrt{3} + 5\sqrt{3} = 7\sqrt{3}$) G-L-EA9.12 Evaluate polynomial expressions for given values of the variable	2	MC	These assessment standards do not specify rational expressions
12A.3(d) Write equivalent forms of algebraic expressions, equations, or inequalities to represent and explain mathematical relationships.	G-L-EA9.11 Use equivalent forms of equations and inequalities to solve real-life problems G-L-EA9.9 Model real-life situations using linear expressions, equations, and inequalities	2	IC	
12A.3(e) Evaluate algebraic expressions, including polynomials and rational expressions.	G-L-EA9.12 Evaluate polynomial expressions for given values of the variable	2	MD	This assessment standard does not specify rational expressions
12A.3(f) Use function notation to evaluate a function at a specified point in its domain and combine functions by addition, subtraction, multiplication, division, and composition.	G-L-EP9.35 Determine if a relation is a function and use appropriate function notation	2	MC	
12A.3(g) * Determine the sum of finite and infinite arithmetic and geometric series.		1		
12A.3(h) Use basic properties of exponents and *logarithms to solve problems.	G-L-EN9.2 Evaluate and write numerical expressions involving integer exponents	2	MC	

(CONTINUED)

TABLE C1 (CONTINUED)

Alignment of the National Assessment of Educational Progress (NAEP) grade 12 mathematics and Graduation Exit Examination (GEE) grade 12 assessment standards, March 2008

NAEP assessment standards	Louisiana assessment standards	Overall rating[a]	Code[b]	Notes
Algebra				
12A.4 Equations and inequalities				
12A.4(a) Solve linear, rational or quadratic equations or inequalities, including those involving absolute value.	A-4-H Solving algebraic equations and inequalities using a variety of techniques with the appropriate tools (e.g., hand-held manipulatives, graphing calculator, symbolic manipulator, or pencil and paper) G-L-EA9.14 Graph and interpret linear inequalities in one or two variables and systems of linear inequalities	2	MC	The Louisiana assessment standards do not specify rational and quadratic equations or inequalities, including those with absolute value
12A.4(c) Analyze situations, develop mathematical models, or solve problems using linear, quadratic, exponential, or logarithmic equations or inequalities symbolically or graphically.	A-4-H Solving algebraic equations and inequalities using a variety of techniques with the appropriate tools (e.g., hand-held manipulatives, graphing calculator, symbolic manipulator, or pencil and paper) A-1-H Demonstrating the ability to translate real-world situations (e.g., distance versus time relationships, population growth, growth functions for diseases, growth of minimum wage, auto insurance tables) into algebraic expressions, equations, and inequalities and vice versa D-2-H Recognizing data that relate two variables as linear, exponential, or otherwise in nature (e.g., match a data set, linear or non-linear, to a graph and vice versa)	2	MC	
12A.4(d) Solve (symbolically or graphically) a system of equations or inequalities and recognize the relationship between the analytical solution and graphical solution.	G-L-EA9.16 Interpret and solve systems of linear equations using graphing, substitution, elimination, with and without technology, and matrices using technology G-L-EA9.14 Graph and interpret linear inequalities in one or two variables and systems of linear inequalities	3		

(CONTINUED)

TABLE C1 (CONTINUED)

Alignment of the National Assessment of Educational Progress (NAEP) grade 12 mathematics and Graduation Exit Examination (GEE) grade 12 assessment standards, March 2008

NAEP assessment standards	Louisiana assessment standards	Overall rating[a]	Code[b]	Notes
Algebra				
12A.4 Equations and inequalities				
12A.4(e) Solve problems involving special formulas such as: $A = P(I + r)t$, $A = Pert$].		1		
12A.4(f) Solve an equation or formula involving several variables for one variable in terms of the others.		1		
12A.4(g) Solve quadratic equations with complex roots.		1		
12A.5 Mathematical reasoning in algebra				
12A.5(a) Use algebraic properties to develop a valid mathematical argument.		1		
12A.5(b) Determine the role of hypotheses, logical implications, and conclusions in algebraic argument.		1		
12A.5(c) Explain the use of relational conjunctions (and, or) in algebraic arguments.		1		

Note: NAEP grade 12 assessment standards marked with an asterisk (*) include content that is beyond what is usually taught in a standard three-year course of study and are selected less often for inclusion in the NAEP than other assessment standards (National Assessment Governing Board 2007).

a. Rating is based on a scale of 1 to 3, where 1 indicates that the LEAP standard or standards do not address the NAEP assessment standard, 2 that the LEAP standard or standards partially address the NAEP assessment standard, and 3 that the LEAP standard or standards fully address or exceed the NAEP assessment standard at the targeted grade level. A NAEP assessment standard is considered to be *fully addressed* by the LEAP standard or standards if all of the content in the NAEP assessment standard is contained in one or more LEAP assessment standards at the same or lower grade level. A NAEP standard is considered to be *partially addressed* by the LEAP assessment standard or standards if the LEAP assessment standard or standards address only one part of the NAEP standard; the NAEP standard contains more content or more detailed content than the LEAP assessment standard or standards or the LEAP assessment standard or standards imply but do not explicitly state the content found in the NAEP assessment standard; or there is a matching LEAP standard or standards at a lower grade level than the NAEP assessment standard, but it does not address all the content addressed by NAEP assessment standard.

b. Codes: IC = implied content, LG = content covered at a lower grade level, HG = content covered at a higher grade level, MC = more content, MD = more detailed content.

Source: Expert content reviewers' analysis based on data from National Assessment Governing Board (2007) and Louisiana Department of Education (2005).

TABLE C2

Louisiana grades 9–12 Graduation Exit Examination (GEE) assessment standards not covered by the National Assessment of Educational Progress (NAEP) grade 12 assessment standards

GEE strand	GEE grades 9–12 assessment standards not covered by NAEP
Number and number relations	N-2-H Demonstrating that a number can be expressed in many forms, and selecting an appropriate form for a given situation (e.g., fractions, decimals, percents, and scientific notation)
	N-5-H Selecting and using appropriate computational methods and tools for given situations (e.g., estimation, or exact computation using mental arithmetic, calculator, symbolic manipulator, or paper and pencil)
	N-6-H Applying ratios and proportional thinking in a variety of situations (e.g., finding a missing term of a proportion)
Measurement	M-2-H Demonstrating an intuitive sense of measurement (e.g., estimating and determining reasonableness of results as related to area, volume, mass, rate, and distance)
Geometry	G-3-H Solving problems using coordinate methods, as well as synthetic and transformational methods (e.g., transform on a coordinate plane a design found in real life situations)
Data analysis, probability, and discrete math	D-4-H Demonstrating an understanding of the calculation of finite probabilities using permutations, combinations, sample spaces, and geometric figures
	D-8-H Using logical thinking procedures, such as flow charts, Venn diagrams, and truth tables
	D-9-H Using discrete math to model real-life situations
Patterns, relations, and functions	P-1-H Modeling the concepts of variables, functions, and relations as they occur in the real world and using the appropriate notation and terminology

Source: Louisiana Department of Education (2005).

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