PROCLAMATION 2004

OF THE

STATE BOARD OF EDUCATION

ADVERTISING FOR

BIDS ON

INSTRUCTIONAL MATERIALS

CONTAINS AMENDMENTS APPROVED
MAY 7, 2004
JULY 15, 2005
February 10, 2006

ENTIRE DOCUMENT MAY BE ACCESSED AT

http://www.tea.state.tx.us/textbooks/proclamations/index.html

Texas Education Agency

Austin, Texas

PROCLAMATION 2004 OF THE STATE BOARD OF EDUCATION ADVERTISING FOR BIDS ON INSTRUCTIONAL MATERIALS

Proclamation 2004 Schedule of Adoption Procedures

February 2004 ***SBOE Meeting***	--	Commissioner of Education presents the preliminary Proclamation 2004 (for 2006 state adoption and for implementation in the 2007-2008 school year) to State Board of Education (SBOE) committees for discussion.
May 2004 ***SBOE Meeting***	--	SBOE issues Proclamation 2004.
	--	Proclamation 2004 and procedures relating to instructional materials adoption program made available to interested publishers and persons.

October - December 2005	--	Receipt and review of nominations to state review panels that will be appointed to review instructional materials submitted under Proclamation 2004.
	--	Nominees to state review panels, upon initial contact by a representative of the Texas Education Agency, begin a period of no-contact (either directly or indirectly) with any person having an interest in the content of instructional materials to be evaluated by the panel.
December 2, 2005	--	Final date for publishers to file Statements of Intent to Bid Instructional Materials. Statements of Intent shall be filed with the Texas Education Agency, Division of Instructional Materials and Educational Technology, by 5:00 p.m. Publishers shall provide detailed specifications regarding price data, hardware, software, and/or special equipment needed to review any item included in an instructional materials submission. **Note: Only publishers who submit a Statement of Intent to Bid by December 2, 2005 will be allowed to participate in the adoption process. Please see State Board of Education rules 19 TAC §66.48 (a-e) for additional information.**

February 10, 2006	--	Each regional education service center designates the person who will supervise sample shipments, the address at which sample instructional materials will be received, and a schedule designating hours and dates sample materials may be reviewed by the public.

-- Each regional education service center publishes a news release and notifies area schools concerning sample instructional materials. The notice shall include the person to be contacted regarding sample instructional materials and the hours and dates samples will be available for review by the public.

April 14, 2006

-- With the exception of Spanish submissions, final date for publishers to file two complete official sample copies of instructional materials submitted for adoption; price data requested by the Texas Education Agency; correlations to Texas Essential Knowledge and Skills; and Forms B and Warranty. Samples, price data, correlations, and Forms B and Warranty shall be filed with designated representatives of the Texas Education Agency by 5:00 p.m. All samples submitted shall be complete as to content and representative of the finished product.

-- Final date for publishers to submit to the Texas Education Agency a signed affidavit certifying that each individual whose name is listed as an author or contributor of an instructional material contributed to the development of the textbook. The affidavit shall also state in general terms each author's involvement in the development of the textbook.

Note: The Texas Education Agency may require additional samples for use by contracted reviewers, members of the State Board of Education, and others.

-- With the exception of Spanish submissions, final date for publishers to file two complete official sample copies of instructional materials submitted for adoption and correlations to Texas Essential Knowledge and Skills with each of the twenty regional education service centers (RESCs). All samples submitted shall be complete as to content and representative of the finished product.

April 28, 2006

-- Information provided to publishers regarding delivery of official sample copies of instructional materials submitted for adoption and correlations to Texas Essential Knowledge and Skills for state review panel members. All samples submitted shall be complete as to content and representative of the finished product. A publisher whose instructional materials require hardware or special equipment for review may also be required to loan appropriate hardware or equipment to state review panel members by this date.

May 1, 2006

-- Final date for publishers to withdraw an instructional materials submission without SBOE approval. Requests to withdraw an instructional materials submission shall be filed with the Texas Education Agency, Division of Instructional Materials and Educational Technology, by 5:00 p.m.

-- Beginning date for sample instructional materials to be available for review at the regional education service centers.

May 14, 2006	--	Final date for publishers to file three complete official sample copies of Spanish instructional materials submitted for adoption; price data requested by the Texas Education Agency; correlations to Texas Essential Knowledge and Skills; and Forms B and Warranty. Samples, price data, correlations, and Forms B and Warranty shall be filed with designated representatives of the Texas Education Agency by 5:00 p.m. All samples submitted shall be complete as to content and representative of the finished product.
	--	Final date for publishers to file complete official sample copies of Spanish instructional materials submitted for adoption and correlations to Texas Essential Knowledge and Skills with each of the twenty regional education service centers (RESCs). All samples submitted shall be complete as to content and representative of the finished product.
June – July, 2006	--	Orientation and training sessions for state review panels. Panel members conduct evaluation of instructional materials submitted for consideration for adoption.
	--	Preliminary recommendations on conforming/nonconforming will be provided to publishers as soon as possible after adjournment of each panel.
10 calendar days following receipt of preliminary reports by publishers.	--	Publishers have 10 calendar days to submit new content to address missing TEKS only. Publishers may also choose to submit documentation disputing the findings of the state review panels. New content may be submitted shall only to address missing TEKS or to correct factual or editorial errors.
July 2006 SBOE Meeting	--	SBOE may hold public hearing on instructional materials submitted for adoption.
July 3, 2006	--	Final date for publishers to file lists of corrections necessary in instructional materials submitted for adoption. Lists of corrections shall be filed with the Texas Education Agency, Division of Instructional Materials and Educational Technology, by 5:00 p.m.
August 25, 2006	--	Final date for Texas residents to request to appear at the public hearing before the SBOE. Requests shall identify subjects, titles, and publishers of instructional materials to be addressed and shall be filed in writing with the Texas Education Agency, Division of Instructional Materials and Educational Technology, by 5:00 p.m.

	--	Date for receipt of official written comments concerning instructional materials submitted for consideration. Official written comments shall be filed with the Texas Education Agency, Division of Instructional Materials and Educational Technology, by 5:00 p.m. Written comments filed with the Texas Education Agency, Division of Instructional Materials and Educational Technology, will be distributed to the SBOE and publishers prior to the September hearing.
	--	Final date for evaluating new content submitted to address missing TEKS as determined by state review panels.
September 1, 2006	--	Final date for publishers who elect to protest the Commissioner of Education's preliminary recommendation that instructional materials be placed on the conforming list, placed on the nonconforming list, or be rejected to file request for show-cause hearings. Requests shall be filed with the Texas Education Agency by 5:00 p.m.
	--	Commissioner of education publishes schedule and procedures for the public hearing before the SBOE.
	--	Copies of official written comments are available for distribution electronically to state review panels, regional education service centers, affected publishers, and to members of the public via the Division of Instructional Materials and Educational Technology website.
	--	Final date for Texas residents to submit lists of alleged factual errors in instructional materials under consideration for adoption. Lists of alleged factual errors shall be filed with the Texas Education Agency, Division of Instructional Materials and Educational Technology, by 5:00 p.m.
September 2006 SBOE Meeting	--	SBOE holds public hearing on instructional materials submitted for adoption.
September 18-22, 2006	--	Show-cause hearings held with publishers who elect to protest the Commissioner's preliminary recommendations.
14 calendar days after receipt of transcript by publishers	--	Final date for receipt of responses to official written comments and to testimony presented at the public hearing. Responses shall be filed with the Texas Education Agency, Division of Instructional Materials and Educational Technology, by 5:00 p.m.
September 29, 2006	--	Publishers file three signed original copies of the Official Bid Form with the Texas Education Agency, Division of Instructional Materials and Educational Technology, by 5:00 p.m.

	--	Final date for publishers to file titles of ancillary materials that will be provided at no cost to school districts to accompany instructional materials adopted under Proclamation 2004. Titles of ancillary materials shall be filed with the Texas Education Agency, Division of Instructional Materials and Educational Technology, by 5:00 p.m. **Note: Publishers will be responsible for providing the titles of ancillary materials to school districts and open-enrollment charter schools at the time information is sent that fully describes the program (January 2, 2007).**
October 2, 2006	--	Final date for publishers to file certification that instructional materials have been edited for accuracy, content, and compliance with requirements of the proclamation. Certification shall be filed by 5:00 p.m. with the Texas Education Agency, Division of Instructional Materials and Educational Technology.
	--	Final date for persons to file complaints of violations of statutes, rules, or procedural irregularities. Complaints shall be filed in writing with the Texas Education Agency, Division of Instructional Materials and Educational Technology, by 5:00 p.m.
	--	Written comments filed with the Texas Education Agency Division of Instructional Materials and Educational Technology, by 5:00 p.m. will be distributed to the SBOE and publishers prior to the November adoption meeting.
October 13, 2006	--	Commissioner of education issues final recommendations that instructional materials under consideration be placed on the conforming list, placed on the nonconforming list, or rejected.
	--	Commissioner of education issues report on required corrections of factual errors in instructional materials under consideration for adoption.
November 2006 SBOE Meeting	--	SBOE committee considers report of the commissioner of education concerning instructional materials under consideration for adoption. SBOE considers adoption of instructional materials.
December 1, 2006	--	Final date for publishers of adopted instructional materials to submit two copies of designated printed student materials and computerized files to be used in production of Braille versions. Printed student materials and computerized files shall be filed with the Texas Education Agency, Division of Instructional Materials and Educational Technology, by 5:00 p.m.
	--	Final date for publishers to provide each school district and open-enrollment charter school with information that fully describes adopted instructional materials.

December 29, 2006 -- Publishers file registers of any contacts with members of the SBOE. Registers shall be filed with the Texas Education Agency, Division of Instructional Materials and Educational Technology, by 5:00 p.m.

January 2, 2007 -- Final date for publishers to provide each school district and open-enrollment charter school with the titles of ancillary materials that will be provided at no cost to school districts to accompany instructional materials adopted under Proclamation 2004.

January 25, 2007 Date for publishers to submit camera ready copy for curriculum approval of instructional materials adopted under Proclamation 2004 that incorporate all required corrections of factual errors. Camera ready copy of instructional materials shall be filed with the Texas Education Agency, Instructional Materials and Educational Technology, by 5:00 p.m.

May 4, 2007 -- Final date for publishers to file for approval two copies of instructional materials adopted under Proclamation 2004 that incorporate all required corrections. Corrected instructional materials shall be filed with the Texas Education Agency, Division of Instructional Materials and Educational Technology, by 5:00 p.m.

-- Final date for publishers to file two corrected copies of student components of adopted instructional materials with Braille producers that incorporate all required corrections. Corrected student components shall be filed with Braille producers designated by the Texas Education Agency.

-- Final date for publishers to file an affidavit verifying that all required corrections have been made. Affidavits shall be filed with the Texas Education Agency, Division of Instructional Materials and Educational Technology, by 5:00 p.m.

-- Final date for publishers to file two corrected copies of adopted instructional materials with each regional education service center and other designated parties by 5:00 p.m.

Notes

Late Submissions

The agency cannot guarantee that submissions of sample copies of instructional materials that are received after the established deadlines will be reviewed. Late submissions that cannot be accommodated will not be recommended for adoption. All late submissions (to the agency, to the Education Service Centers, and/or to state review panel members) will be reported to the board when instructional materials are considered for adoption.

Teacher Systems

If the state calls for a teacher system, the publisher will be paid the maximum cost for that system. If the state does not call for a teacher system, the agency cannot pay a per student price on that system. Publishers who provide teacher systems for classroom instruction will be paid the program price divided by the maximum cost which equals the number of students that must be in the class(es) to be fully funded. If the total cost of the system exceeds the maximum cost, the publisher will be responsible for collecting a portion of the cost from the school district.

Where applicable, publishers will be encouraged to bid an electronic version of instructional materials in addition to print or hard bound instructional materials.

Spanish Instructional Materials

If publishers choose to submit Spanish versions of instructional materials in subjects that are included in Proclamation 2004 but not specifically called in Spanish, the instructional materials will be reviewed for coverage of the TEKS, errors, and manufacturing requirements. Please note, however, that Spanish instructional materials, in subjects where Spanish is not specifically called, will be subject to the same eligibility quotas as their English counterparts. Limited English Proficiency students will be eligible for instructional materials in both English and Spanish.

Contact Instructional Materials and Educational Technology at 512-463-9601 for more details. All Spanish instructional materials are due by May 14, 2006.

The provisions of this subchapter were adopted by the State Board of Education in February 2005 to be implemented beginning with the 2006-2007 school year.

Chapter 111. Texas Essential Knowledge and Skills for Mathematics
Subchapter B. Middle School

Statutory Authority: The provisions of this Subchapter B issued under the Texas Education Code, §28.002, unless otherwise noted.

§111.21. Implementation of Texas Essential Knowledge and Skills for Mathematics, Grades 6-8.

The provisions of this subchapter shall be implemented by school districts beginning September 1, 1998, and at that time shall supersede §75.27(g) and §75.43(a) and (b) of this title (relating to Mathematics).

Source: The provisions of this §111.21 adopted to be effective September 1, 1998, 22 TexReg 7623; amended to be effective August 1, 2006, 30 TexReg 1930.

§111.22. Mathematics, Grade 6.

(a) Introduction.

(1) Within a well-balanced mathematics curriculum, the primary focal points at Grade 6 are using ratios to describe direct proportional relationships involving number, geometry, measurement, probability, and adding and subtracting decimals and fractions.

(2) Throughout mathematics in Grades 6-8, students build a foundation of basic understandings in number, operation, and quantitative reasoning; patterns, relationships, and algebraic thinking; geometry and spatial reasoning; measurement; and probability and statistics. Students use concepts, algorithms, and properties of rational numbers to explore mathematical relationships and to describe increasingly complex situations. Students use algebraic thinking to describe how a change in one quantity in a relationship results in a change in the other; and they connect verbal, numeric, graphic, and symbolic representations of relationships. Students use geometric properties and relationships, as well as spatial reasoning, to model and analyze situations and solve problems. Students communicate information about geometric figures or situations by quantifying attributes, generalize procedures from measurement experiences, and use the procedures to solve problems. Students use appropriate statistics, representations of data, reasoning, and concepts of probability to draw conclusions, evaluate arguments, and make recommendations.

(3) Problem solving in meaningful contexts, language and communication, connections within and outside mathematics, and formal and informal reasoning underlie all content areas in mathematics. Throughout mathematics in Grades 6-8, students use these processes together with graphing technology and other mathematical tools such as manipulative materials to develop conceptual understanding and solve problems as they do mathematics.

(b) Knowledge and skills.

(6.1) **Number, operation, and quantitative reasoning.** The student represents and uses rational numbers in a variety of equivalent forms. The student is expected to:

(A) compare and order non-negative rational numbers;

(B) generate equivalent forms of rational numbers including whole numbers, fractions, and decimals;

(C) use integers to represent real-life situations;

(D) write prime factorizations using exponents;

(E) identify factors of a positive integer, common factors, and the greatest common factor of a set of positive integers; and

(F) identify multiples of a positive integer and common multiples and the least common multiple of a set of positive integers.

(6.2) **Number, operation, and quantitative reasoning.** The student adds, subtracts, multiplies, and divides to solve problems and justify solutions. The student is expected to:

(A) model addition and subtraction situations involving fractions with objects, pictures, words, and numbers;

(B) use addition and subtraction to solve problems involving fractions and decimals;

(C) use multiplication and division of whole numbers to solve problems including situations involving equivalent ratios and rates;

(D) estimate and round to approximate reasonable results and to solve problems where exact answers are not required; and

(E) use order of operations to simplify whole number expressions (without exponents) in problem solving situations.

(6.3) **Patterns, relationships, and algebraic thinking.** The student solves problems involving direct proportional relationships. The student is expected to:

(A) use ratios to describe proportional situations;

(B) represent ratios and percents with concrete models, fractions, and decimals; and

(C) use ratios to make predictions in proportional situations.

(6.4) **Patterns, relationships, and algebraic thinking.** The student uses letters as variables in mathematical expressions to describe how one quantity changes when a related quantity changes. The student is expected to:

(A) use tables and symbols to represent and describe proportional and other relationships such as those involving conversions, arithmetic sequences (with a constant rate of change), perimeter and area; and

(B) use tables of data to generate formulas representing relationships involving perimeter, area, volume of a rectangular prism, etc.

(6.5) **Patterns, relationships, and algebraic thinking.** The student uses letters to represent an unknown in an equation.

The student is expected to formulate equations from problem situations described by linear relationships.

(6.6) **Geometry and spatial reasoning.** The student uses geometric vocabulary to describe angles, polygons, and circles. The student is expected to:

(A) use angle measurements to classify angles as acute, obtuse, or right;

(B) identify relationships involving angles in triangles and quadrilaterals; and

(C) describe the relationship between radius, diameter, and circumference of a circle.

(6.7) **Geometry and spatial reasoning.** The student uses coordinate geometry to identify location in two dimensions.

The student is expected to locate and name points on a coordinate plane using ordered pairs of non-negative rational numbers.

(6.8) **Measurement.** The student solves application problems involving estimation and measurement of length, area, time, temperature, volume, weight, and angles. The student is expected to:

(A) estimate measurements (including circumference) and evaluate reasonableness of results;

(B) select and use appropriate units, tools, or formulas to measure and to solve problems involving length (including perimeter), area, time, temperature, volume, and weight;

(C) measure angles; and

(D) convert measures within the same measurement system (customary and metric) based on relationships between units.

(6.9) **Probability and statistics.** The student uses experimental and theoretical probability to make predictions. The student is expected to:

(A) construct sample spaces using lists and tree diagrams; and

(B) find the probabilities of a simple event and its complement and describe the relationship between the two.

(6.10) **Probability and statistics.** The student uses statistical representations to analyze data. The student is expected to:

(A) select and use an appropriate representation for presenting and displaying different graphical representations of the same data including line plot, line graph, bar graph, and stem and leaf plot;

(B) identify mean (using concrete objects and pictorial models), median, mode, and range of a set of data;

(C) sketch circle graphs to display data; and

(D) solve problems by collecting, organizing, displaying, and interpreting data.

(6.11) **Underlying processes and mathematical tools.** The student applies Grade 6 mathematics to solve problems connected to everyday experiences, investigations in other disciplines, and activities in and outside of school. The student is expected to:

(A) identify and apply mathematics to everyday experiences, to activities in and outside of school, with other disciplines, and with other mathematical topics;

(B) use a problem-solving model that incorporates understanding the problem, making a plan, carrying out the plan, and evaluating the solution for reasonableness;

(C) select or develop an appropriate problem-solving strategy from a variety of different types, including drawing a picture, looking for a pattern, systematic guessing and checking, acting it out, making a table, working a simpler problem, or working backwards to solve a problem; and

(D) select tools such as real objects, manipulatives, paper/pencil, and technology or techniques such as mental math, estimation, and number sense to solve problems.

(6.12) **Underlying processes and mathematical tools.** The student communicates about Grade 6 mathematics through informal and mathematical language, representations, and models. The student is expected to:

(A) communicate mathematical ideas using language, efficient tools, appropriate units, and graphical, numerical, physical, or algebraic mathematical models; and

(B) evaluate the effectiveness of different representations to communicate ideas.

(6.13) **Underlying processes and mathematical tools.** The student uses logical reasoning to make conjectures and verify conclusions. The student is expected to:

(A) make conjectures from patterns or sets of examples and nonexamples; and

(B) validate his/her conclusions using mathematical properties and relationships.

Source: The provisions of this §111.22 adopted to be effective September 1, 1998, 22 TexReg 7623; amended to be effective August 1, 2006, 30 TexReg 1930.

§111.23. Mathematics, Grade 7.

(a) Introduction.

(4) Within a well-balanced mathematics curriculum, the primary focal points at Grade 7 are using direct proportional relationships in number, geometry, measurement, and probability; applying addition, subtraction, multiplication, and division of decimals, fractions, and integers; and using statistical measures to describe data.

(5) Throughout mathematics in Grades 6-8, students build a foundation of basic understandings in number, operation, and quantitative reasoning; patterns, relationships, and algebraic thinking; geometry and spatial reasoning; measurement; and probability and statistics. Students use concepts, algorithms, and properties of rational numbers to explore mathematical relationships and to describe increasingly complex situations. Students use algebraic thinking to describe how a change in one quantity in a relationship results in a change in the other; and they connect verbal, numeric, graphic, and symbolic representations of relationships. Students use geometric properties and relationships, as well as spatial reasoning, to model and analyze situations and solve problems. Students communicate information about geometric figures or situations by quantifying attributes, generalize procedures from measurement experiences, and use the procedures to solve problems. Students use appropriate statistics, representations of data, reasoning, and concepts of probability to draw conclusions, evaluate arguments, and make recommendations.

(6) Problem solving in meaningful contexts, language and communication, connections within and outside mathematics, and formal and informal reasoning underlie all content areas in mathematics. Throughout mathematics in Grades 6-8, students use these processes together with graphing technology and other mathematical tools such as manipulative materials to develop conceptual understanding and solve problems as they do mathematics.

(b) Knowledge and skills.

(7.1) **Number, operation, and quantitative reasoning.** The student represents and uses numbers in a variety of equivalent forms. The student is expected to:

(A) compare and order integers and positive rational numbers;

(B) convert between fractions, decimals, whole numbers, and percents mentally, on paper, or with a calculator; and

(C) represent squares and square roots using geometric models.

(7.2) **Number, operation, and quantitative reasoning.** The student adds, subtracts, multiplies, or divides to solve problems and justify solutions. The student is expected to:

(A) represent multiplication and division situations involving fractions and decimals with models, including concrete objects, pictures, words, and numbers;

(B) use addition, subtraction, multiplication, and division to solve problems involving fractions and decimals;

(C) use models, such as concrete objects, pictorial models, and number lines, to add, subtract, multiply, and divide integers and connect the actions to algorithms;

(D) use division to find unit rates and ratios in proportional relationships such as speed, density, price, recipes, and student-teacher ratio;

(E) simplify numerical expressions involving order of operations and exponents;

(F) select and use appropriate operations to solve problems and justify the selections; and

(G) determine the reasonableness of a solution to a problem.

(7.3) **Patterns, relationships, and algebraic thinking.** The student solves problems involving direct proportional relationships. The student is expected to:

(A) estimate and find solutions to application problems involving percent; and

(B) estimate and find solutions to application problems involving proportional relationships such as similarity, scaling, unit costs, and related measurement units.

(7.4) **Patterns, relationships, and algebraic thinking.** The student represents a relationship in numerical, geometric, verbal, and symbolic form. The student is expected to:

(A) generate formulas involving unit conversions, perimeter, area, circumference, volume, and scaling;

(B) graph data to demonstrate relationships in familiar concepts such as conversions, perimeter, area, circumference, volume, and scaling; and

(C) use words and symbols to describe the relationship between the terms in an arithmetic sequence (with a constant rate of change) and their positions in the sequence.

(7.5) **Patterns, relationships, and algebraic thinking.** The student uses equations to solve problems. The student is expected to:

(A) use concrete and pictorial models to solve equations and use symbols to record the actions; and

(B) formulate problem situations when given a simple equation and formulate an equation when given a problem situation.

(7.6) **Geometry and spatial reasoning.** The student compares and classifies two- and three-dimensional figures using geometric vocabulary and properties. The student is expected to:

(A) use angle measurements to classify pairs of angles as complementary or supplementary;

(B) use properties to classify triangles and quadrilaterals;

(C) use properties to classify three-dimensional figures, including pyramids, cones, prisms, and cylinders; and

(D) use critical attributes to define similarity.

(7.7) **Geometry and spatial reasoning.** The student uses coordinate geometry to describe location on a plane. The student is expected to:

(A) locate and name points on a coordinate plane using ordered pairs of integers; and

(B) graph reflections across the horizontal or vertical axis and graph translations on a coordinate plane.

(7.8) **Geometry and spatial reasoning.** The student uses geometry to model and describe the physical world. The student is expected to:

(C) sketch three-dimensional figures when given the top, side, and front views;

(D) make a net (two-dimensional model) of the surface area of a three-dimensional figure; and

(E) use geometric concepts and properties to solve problems in fields such as art and architecture.

(7.9) **Measurement.** The student solves application problems involving estimation and measurement. The student is expected to:

(A) estimate measurements and solve application problems involving length (including perimeter and circumference) and area of polygons and other shapes;

(B) connect models for volume of prisms (triangular and rectangular) and cylinders to formulas of prisms (triangular and rectangular) and cylinders; and

(C) estimate measurements and solve application problems involving volume of prisms (rectangular and triangular) and cylinders.

(7.10) **Probability and statistics.** The student recognizes that a physical or mathematical model can be used to describe the experimental and theoretical probability of real-life events. The student is expected to:

(A) construct sample spaces for simple or composite experiments; and

(B) find the probability of independent events.

(7.11) **Probability and statistics.** The student understands that the way a set of data is displayed influences its interpretation. The student is expected to:

(A) select and use an appropriate representation for presenting and displaying relationships among collected data, including line plot, line graph, bar graph, stem and leaf plot, circle graph, and Venn diagrams, and justify the selection; and

(B) make inferences and convincing arguments based on an analysis of given or collected data.

(7.12) **Probability and statistics.** The student uses measures of central tendency and range to describe a set of data. The student is expected to:

(A) describe a set of data using mean, median, mode, and range; and

(B) choose among mean, median, mode, or range to describe a set of data and justify the choice for a particular situation.

(7.13) **Underlying processes and mathematical tools.** The student applies Grade 7 mathematics to solve problems connected to everyday experiences, investigations in other disciplines, and activities in and outside of school. The student is expected to:

(A) identify and apply mathematics to everyday experiences, to activities in and outside of school, with other disciplines, and with other mathematical topics;

(B) use a problem-solving model that incorporates understanding the problem, making a plan, carrying out the plan, and evaluating the solution for reasonableness;

(C) select or develop an appropriate problem-solving strategy from a variety of different types, including drawing a picture, looking for a pattern, systematic guessing and checking, acting it out, making a table, working a simpler problem, or working backwards to solve a problem; and

(D) select tools such as real objects, manipulatives, paper/pencil, and technology or techniques such as mental math, estimation, and number sense to solve problems.

(7.14) **Underlying processes and mathematical tools.** The student communicates about Grade 7 mathematics through informal and mathematical language, representations, and models. The student is expected to:

(A) communicate mathematical ideas using language, efficient tools, appropriate units, and graphical, numerical, physical, or algebraic mathematical models; and

(B) evaluate the effectiveness of different representations to communicate ideas.

(7.15) **Underlying processes and mathematical tools.** The student uses logical reasoning to make conjectures and verify conclusions. The student is expected to:

(A) make conjectures from patterns or sets of examples and nonexamples; and

(B) validate his/her conclusions using mathematical properties and relationships.

Source: The provisions of this §111.23 adopted to be effective September 1, 1998, 22 TexReg 7623; amended to be effective August 1, 2006, 30 TexReg 1930.

§111.24. Mathematics, Grade 8.

(a) Introduction.

(1) Within a well-balanced mathematics curriculum, the primary focal points at Grade 8 are using basic principles of algebra to analyze and represent both proportional and non-proportional linear relationships and using probability to describe data and make predictions.

(2) Throughout mathematics in Grades 6-8, students build a foundation of basic understandings in number, operation, and quantitative reasoning; patterns, relationships, and algebraic thinking; geometry and spatial reasoning; measurement; and probability and statistics. Students use concepts, algorithms, and properties of rational numbers to explore mathematical relationships and to describe increasingly complex situations. Students use algebraic thinking to describe how a change in one quantity in a relationship results in a change in the other; and they connect verbal, numeric, graphic, and symbolic representations of relationships. Students use geometric properties and relationships, as well as spatial reasoning, to model and analyze situations and solve problems. Students communicate information about geometric figures or situations by quantifying attributes, generalize procedures from measurement experiences, and use the procedures to solve problems. Students use appropriate statistics, representations of data, reasoning, and concepts of probability to draw conclusions, evaluate arguments, and make recommendations.

(3) Problem solving in meaningful contexts, language and communication, connections within and outside mathematics, and formal and informal reasoning underlie all content areas in mathematics. Throughout mathematics in Grades 6-8, students use these processes together with graphing technology and other mathematical tools such as manipulative materials to develop conceptual understanding and solve problems as they do mathematics.

(b) Knowledge and skills

(8.1) **Number, operation, and quantitative reasoning.** The student understands that different forms of numbers are appropriate for different situations. The student is expected to:

(A) compare and order rational numbers in various forms including integers, percents, and positive and negative fractions and decimals;

(B) select and use appropriate forms of rational numbers to solve real-life problems including those involving proportional relationships;

(C) approximate (mentally and with calculators) the value of irrational numbers as they arise from problem situations (such as π, $\sqrt{2}$); and

(D) express numbers in scientific notation, including negative exponents, in appropriate problem situations.

(8.2) **Number, operation, and quantitative reasoning.** The student selects and uses appropriate operations to solve problems and justify solutions. The student is expected to:

(A) select appropriate operations to solve problems involving rational numbers and justify the selections;

(B) use appropriate operations to solve problems involving rational numbers in problem situations;

(C) evaluate a solution for reasonableness; and

(D) use multiplication by a constant factor (unit rate) to represent proportional relationships.

(8.3) **Patterns, relationships, and algebraic thinking.** The student identifies proportional or non-proportional linear relationships in problem situations and solves problems. The student is expected to:

(A) compare and contrast proportional and non-proportional linear relationships; and

(B) estimate and find solutions to application problems involving percents and other proportional relationships such as similarity and rates.

(8.4) **Patterns, relationships, and algebraic thinking.** The student makes connections among various representations of a numerical relationship.

The student is expected to generate a different representation of data given another representation of data (such as a table, graph, equation, or verbal description).

(8.5) **Patterns, relationships, and algebraic thinking.** The student uses graphs, tables, and algebraic representations to make predictions and solve problems. The student is expected to:

(A) predict, find, and justify solutions to application problems using appropriate tables, graphs, and algebraic equations; and

(B) find and evaluate an algebraic expression to determine any term in an arithmetic sequence (with a constant rate of change).

(8.6) **Geometry and spatial reasoning.** The student uses transformational geometry to develop spatial sense. The student is expected to:

(A) generate similar figures using dilations including enlargements and reductions; and

(B) graph dilations, reflections, and translations on a coordinate plane.

(8.7) **Geometry and spatial reasoning.** The student uses geometry to model and describe the physical world. The student is expected to:

(A) draw three-dimensional figures from different perspectives;

(B) use geometric concepts and properties to solve problems in fields such as art and architecture;

(C) use pictures or models to demonstrate the Pythagorean Theorem; and

(D) locate and name points on a coordinate plane using ordered pairs of rational numbers.

(8.8) **Measurement.** The student uses procedures to determine measures of three-dimensional figures. The student is expected to:

(A) find lateral and total surface area of prisms, pyramids, and cylinders using concrete models and nets (two-dimensional models);

(B) connect models of prisms, cylinders, pyramids, spheres, and cones to formulas for volume of these objects; and

(C) estimate measurements and use formulas to solve application problems involving lateral and total surface area and volume.

(8.9) **Measurement.** The student uses indirect measurement to solve problems. The student is expected to:

(A) use the Pythagorean Theorem to solve real-life problems; and

(B) use proportional relationships in similar two-dimensional figures or similar three-dimensional figures to find missing measurements.

(8.10) **Measurement.** The student describes how changes in dimensions affect linear, area, and volume measures. The student is expected to:

(A) describe the resulting effects on perimeter and area when dimensions of a shape are changed proportionally; and

(B) describe the resulting effect on volume when dimensions of a solid are changed proportionally.

(8.11) **Probability and statistics.** The student applies concepts of theoretical and experimental probability to make predictions. The student is expected to:

(A) find the probabilities of dependent and independent events;

(B) use theoretical probabilities and experimental results to make predictions and decisions; and

(C) select and use different models to simulate an event.

(8.12) **Probability and statistics.** The student uses statistical procedures to describe data. The student is expected to:

(A) select the appropriate measure of central tendency or range to describe a set of data and justify the choice for a particular situation;

(B) draw conclusions and make predictions by analyzing trends in scatterplots; and

(C) select and use an appropriate representation for presenting and displaying relationships among collected data, including line plots, line graphs, stem and leaf plots, circle graphs, bar graphs, box and whisker plots, histograms, and Venn diagrams, with and without the use of technology.

(8.13) **Probability and statistics.** The student evaluates predictions and conclusions based on statistical data. The student is expected to:

(A) evaluate methods of sampling to determine validity of an inference made from a set of data; and

(B) recognize misuses of graphical or numerical information and evaluate predictions and conclusions based on data analysis.

(8.14) **Underlying processes and mathematical tools.** The student applies Grade 8 mathematics to solve problems connected to everyday experiences, investigations in other disciplines, and activities in and outside of school. The student is expected to:

(A) identify and apply mathematics to everyday experiences, to activities in and outside of school, with other disciplines, and with other mathematical topics;

(B) use a problem-solving model that incorporates understanding the problem, making a plan, carrying out the plan, and evaluating the solution for reasonableness;

(C) select or develop an appropriate problem-solving strategy from a variety of different types, including drawing a picture, looking for a pattern, systematic guessing and checking, acting it out, making a table, working a simpler problem, or working backwards to solve a problem; and

(D) select tools such as real objects, manipulatives, paper/pencil, and technology or techniques such as mental math, estimation, and number sense to solve problems.

(8.15) **Underlying processes and mathematical tools.** The student communicates about Grade 8 mathematics through informal and mathematical language, representations, and models. The student is expected to:

(A) communicate mathematical ideas using language, efficient tools, appropriate units, and graphical, numerical, physical, or algebraic mathematical models; and

(B) evaluate the effectiveness of different representations to communicate ideas.

(8.16) **Underlying processes and mathematical tools.** The student uses logical reasoning to make conjectures and verify conclusions. The student is expected to:

(A) make conjectures from patterns or sets of examples and nonexamples; and

(B) validate his/her conclusions using mathematical properties and relationships.

Source: The provisions of this §111.24 adopted to be effective September 1, 1998, 22 TexReg 7623; amended to be effective August 1, 2006, 30 TexReg 1930.

Capítulo 111. Conocimientos y destrezas esenciales en Texas (TEKS) para matemáticas
Subcapítulo B. Escuela Intermedia

Autoridad estatutaria: las estipulaciones de este subcapítulo B publicadas bajo el Código de Educación en Texas, sección §28.002, a menos que de otra manera se especifique.

§111.21. Implementación de los conocimientos y destrezas esenciales en Texas para matemáticas, de 6° a 8° grado.

Las estipulaciones de este subcapítulo serán implementadas por los distritos escolares a partir del 1º de septiembre de 1998, y en esa fecha reemplazarán las secciones §75.27(g) y §75.43 (a) y (b) de este título (relacionado con matemáticas).

Fuente: las estipulaciones de esta sección §111.21 adoptadas para entrar en vigor el 1º de septiembre de 1998, 22 TexReg 762; enmendado para ser vigente el 1º de agosto, 2006, 30 TexReg 1930.

§111.22. Matemáticas, 6° grado

(a) Introducción

(1) Dentro de un plan de estudio de matemáticas balanceado, los principales puntos de enfoque en el 6º grado son el uso de proporciones para describir las relaciones proporcionales directas que incluyen números, geometría, medición y probabilidad, así como el uso de la suma y de la resta de decimales y fracciones.

(2) A través de las matemáticas de 6º a 8º grado, los estudiantes forman una base de conocimientos básicos de números, operaciones y razonamiento cuantitativo; patrones, relaciones y pensamiento algebraico; geometría y ubicación espacial; medición y probabilidad y estadística. Los estudiantes utilizan conceptos, algoritmos y propiedades de números racionales para explorar relaciones matemáticas y para describir situaciones de complejidad creciente. Los estudiantes utilizan pensamiento algebraico para describir como un cambio de una cantidad en una relación resulta en un cambio en la otra, y conectan relaciones y representaciones simbólicas en forma verbal, numérica y gráfica. Los estudiantes utilizan propiedades y relaciones geométricas, así como la ubicación espacial para modelar y analizar situaciones y solucionar problemas. Los estudiantes comunican acerca de información de figuras geométricas o situaciones cuantificando los atributos, generalizan procedimientos basándose en sus experiencias de medición y utilizan procedimientos para solucionar problemas. Los estudiantes utilizan estadística apropiada, representaciones de datos, razonamiento y conceptos de probabilidad para sacar conclusiones, evaluar argumentos y hacer recomendaciones.

(3) La solución de problemas, el lenguaje y la comunicación, las conexiones dentro y fuera de las matemáticas, así como el razonamiento formal e informal sirven de base para todas las áreas de aprendizaje en matemáticas. A través de las matemáticas de 6° a 8° grado, los estudiantes utilizan estos procesos junto con tecnología en las que se utilizan gráficas y otros instrumentos de matemáticas tales como materiales manipulativos para desarrollar su comprensión de conceptos y de resolver problemas a medida que ellos practican las matemáticas.

(b) Conocimientos y destrezas

(6.1) **Números, operaciones y razonamiento cuantitativo.** El estudiante representa y utiliza números racionales en una variedad de formas equivalentes. Se espera que el estudiante:

(A) compare y ordene números racionales, no negativos;

(B) genere formas equivalentes de números racionales incluyendo números enteros, fracciones y decimales;

(C) utilice enteros para representar situaciones de la vida diaria;

(D) escriba factorizaciones primas utilizando exponentes e

(E) identifique factores de múltiplos, factores comunes y el máximo común divisor de múltiplos; e

(F) identifique múltiplos, múltiplos comunes y el mínimo común múltiplo.

(6.2) **Números, operaciones y razonamiento cuantitativo.** El estudiante suma, resta, multiplica y divide para resolver problemas y justificar soluciones. Se espera que el estudiante:

(A) dé ejemplos de sumar y restar fracciones con objetos, dibujos, palabras y números;

(B) utilice la suma y la resta para resolver problemas que implican fracciones y decimales;

(C) utilice la multiplicación y la división de números enteros para resolver problemas que incluyen situaciones que implican proporciones y porcentajes equivalentes; y

(D) estime y redondee para llegar a resultados razonables y resolver problemas en los cuales no se requieran respuestas exactas.

(E) use el orden de operaciones para simplificar expresiones de números enteros excluyendo exponentes.

(6.3) **Patrones, relaciones y pensamiento algebraico.** El estudiante resuelve problemas que incluyan relaciones de proporción. Se espera que el estudiante:

(A) utilice proporciones para describir situaciones de proporción

(B) represente proporciones y porcentajes con modelos concretos, fracciones y decimales y

(C) utilice proporciones para hacer predicciones en situaciones de proporción.

(6.4) **Patrones, relaciones y pensamiento algebraico.** El estudiante utiliza letras como variables en expresiones matemáticas para describir cómo una cantidad cambia cuando una cantidad relacionada cambia. Se espera que el estudiante:

(A) utilice tablas y símbolos para representar y describir relaciones de proporción y otras relaciones, tales como las que incluyen conversiones, secuencias aritméticas (con un índice de cambio constante), perímetro, y áreas; y

(B) utilice tablas de datos para generar fórmulas que representen relaciones incluyendo perímetro, área, volumen de un prisma rectangular, etc.

(6.5) **Patrones, relaciones y pensamiento algebraico.** El estudiante utiliza letras para representar la incógnita en una ecuación. Se espera que el estudiante formule ecuaciones a partir de problemas contextualizados que muestren relaciones lineares.

(6.6) **Geometría y ubicación espacial.** El estudiante utiliza vocabulario geométrico para describir ángulos, polígonos y círculos. Se espera que el estudiante:

(A) utilice medición de ángulos para clasificar ángulos agudos, obtusos o rectos;

(B) identifique relaciones que incluyan ángulos en triángulos y cuadriláteros y

(C) describa la relación entre radio, diámetro y la circunferencia de un círculo.

(6.7) **Geometría y ubicación espacial.** El estudiante utiliza geometría coordenada para identificar la posición en dos dimensiones. Se espera que el estudiante ubique y nombre puntos en una gráfica de coordenadas utilizando pares ordenados de números racionales positivos.

(6.8) **Medición.** El estudiante resuelve problemas de aplicación incluyendo estimación y medidas de longitud, área, tiempo, temperatura, volumen, peso y ángulos. Se espera que el estudiante:

(A) estime medidas (incluyendo circunferencias) y evalúe lo razonable de los resultados;

(B) seleccione y utilice unidades apropiadas, instrumentos o fórmulas para medir y resolver problemas que involucren longitud (incluyendo perímetro), área, tiempo, temperatura, volumen, y peso;

(C) mida ángulos y

(D) convierta medidas dentro del mismo sistema de medición (el usual y el métrico) basado en relaciones entre unidades.

(6.9) **Probabilidad y estadística.** El estudiante utiliza probabilidad experimental y teórica para hacer predicciones. Se espera que el estudiante:

(A) construya espacios ejemplares utilizando listas, y diagramas de árbol; y

(B) encuentre las probabilidades de un evento simple y su complemento, y describa la relación entre los dos.

(6.10) **Probabilidad y estadística.** El estudiante utiliza representaciones de estadística para analizar datos. Se espera que el estudiante:

(A) seleccione y use una representación apropiada para presentar y mostrar diferentes representaciones gráficas de los mismos datos incluyendo diagramas de acumulación, gráficas lineales, gráficas de barra y diagramas de tallo y hojas;

(B) identifique la media (utilizando objetos concretos y dibujos), la mediana, el modo y el rango de un conjunto de datos;

(C) dibuje gráficas de círculos para mostrar datos y

(D) resuelva problemas reuniendo, organizando, exhibiendo e interpretando datos.

(6.11) **Procesos fundamentales e instrumentos de matemáticas.** El estudiante aplica matemáticas del 6º grado para resolver problemas relacionados con experiencias diarias, investigaciones dentro de otras disciplinas y actividades dentro y fuera de la escuela. Se espera que el estudiante:

(A) identifique y aplique las matemáticas en experiencias diarias, en actividades dentro y fuera de la escuela, con otras disciplinas y con otros temas de matemáticas;

(B) utilice un modelo de resolución de problemas en el cual incorpore la comprensión del problema, hace un plan, lo lleva a cabo y evalúa lo razonable de la solución;

(C) seleccione o desarrolle una estrategia de resolución de problemas apropiada en la que se hace un dibujo, busca un patrón, adivina y comprueba sistemáticamente, hace una dramatización, hace una tabla, resuelve un problema más sencillo o trabaja desde el final hasta el principio para solucionar un problema y

(D) seleccione instrumentos de matemáticas tales como objetos reales, manipulativos, papel y lápiz y tecnología o técnicas como matemática mental, sentido de estimación y número para resolver problemas.

(6.12) **Procesos fundamentales e instrumentos de matemáticas.** El estudiante habla acerca de las matemáticas del 6º grado usando un lenguaje informal y matemático, representaciones y modelos. Se espera que el estudiante:

(A) exprese ideas de matemáticas utilizando lenguaje, instrumentos eficaces, unidades apropiadas y modelos que son gráficos, numéricos, físicos o matemáticos algebraicos y

(B) evalúe la eficacia de diferentes representaciones para expresar ideas.

(6.13) **Procesos fundamentales e instrumentos de matemáticas.** El estudiante utiliza un razonamiento lógico para hacer suposiciones y verificar conclusiones. Se espera que el estudiante:

(A) haga suposiciones de patrones o de grupos de ejemplos y de los que no son ejemplos y

(B) dé validez a sus conclusiones utilizando propiedades y relaciones matemáticas.

Fuente: las estipulaciones de esta sección §111.21 adoptadas para entrar en vigor el 1º de septiembre de 1998, 22 TexReg 762; enmendado para ser vigente el 1º de agosto, 2006, 30 TexReg 1930

Chapter 111. Texas Essential Knowledge and Skills for Mathematics
Subchapter C. High School

Statutory Authority: The provisions of this Subchapter C issued under the Texas Education Code, §28.002, unless otherwise noted.

§111.31. Implementation of Texas Essential Knowledge and Skills for Mathematics, Grades 9-12.

The provisions of this subchapter shall be implemented beginning September 1, 1998, and at that time, shall supersede §75.63(e)-(g) of this title (relating to Mathematics).

Source: The provisions of this §111.31 adopted to be effective September 1, 1998, 22 TexReg 7623; amended to be effective August 1, 2006, 30 TexReg 1930.

§111.32. Algebra I (One Credit).

(a) Basic understandings.

(1) Foundation concepts for high school mathematics. As presented in Grades K-8, the basic understandings of number, operation, and quantitative reasoning; patterns, relationships, and algebraic thinking; geometry; measurement; and probability and statistics are essential foundations for all work in high school mathematics. Students will continue to build on this foundation as they expand their understanding through other mathematical experiences.

(2) Algebraic thinking and symbolic reasoning. Symbolic reasoning plays a critical role in algebra; symbols provide powerful ways to represent mathematical situations and to express generalizations. Students use symbols in a variety of ways to study relationships among quantities.

(3) Function concepts. A function is a fundamental mathematical concept; it expresses a special kind of relationship between two quantities. Students use functions to determine one quantity from another, to represent and model problem situations, and to analyze and interpret relationships.

(4) Relationship between equations and functions. Equations and inequalities arise as a way of asking and answering questions involving functional relationships. Students work in many situations to set up equations and inequalities and use a variety of methods to solve them.

(5) Tools for algebraic thinking. Techniques for working with functions and equations are essential in understanding underlying relationships. Students use a variety of representations (concrete, pictorial, numerical, symbolic, graphical, and verbal), tools, and technology (including, but not limited to, calculators with graphing capabilities, data collection devices, and computers) to model mathematical situations to solve meaningful problems.

(6) Underlying mathematical processes. Many processes underlie all content areas in mathematics. As they do mathematics, students continually use problem-solving, language and communication, and reasoning (justification and proof) to make connections within and outside mathematics. Students also use multiple representations, technology, applications and modeling, and numerical fluency in problem-solving contexts.

(b) Knowledge and skills.

(A.1) **Foundations for functions.** The student understands that a function represents a dependence of one quantity on another and can be described in a variety of ways. The student is expected to:

(A) describe independent and dependent quantities in functional relationships;

(B) gather and record data and use data sets to determine functional relationships between quantities;

(C) describe functional relationships for given problem situations and write equations or inequalities to answer questions arising from the situations;

(D) represent relationships among quantities using concrete models, tables, graphs, diagrams, verbal descriptions, equations, and inequalities; and

(E) interpret and make decisions, predictions, and critical judgments from functional relationships.

(A.2) **Foundations for functions.** The student uses the properties and attributes of functions. The student is expected to:

(A) identify and sketch the general forms of linear ($y = x$) and quadratic ($y = x^2$) parent functions;

(B) identify mathematical domains and ranges and determine reasonable domain and range values for given situations, both continuous and discrete;

(C) interpret situations in terms of given graphs or creates situations that fit given graphs; and

(D) collect and organize data, make and interpret scatterplots (including recognizing positive, negative, or no correlation for data approximating linear situations), and model, predict, and make decisions and critical judgments in problem situations.

(A.3) **Foundations for functions.** The student understands how algebra can be used to express generalizations and recognizes and uses the power of symbols to represent situations. The student is expected to:

(A) use symbols to represent unknowns and variables; and

(B) look for patterns and represent generalizations algebraically.

(A.4) **Foundations for functions.** The student understands the importance of the skills required to manipulate symbols in order to solve problems and uses the necessary algebraic skills required to simplify algebraic expressions and solve equations and inequalities in problem situations. The student is expected to:

(A) find specific function values, simplify polynomial expressions, transform and solve equations, and factor as necessary in problem situations;

(B) use the commutative, associative, and distributive properties to simplify algebraic expressions; and

(C) connect equation notation with function notation, such as $y = x + 1$ and $f(x) = x + 1$.

(A.5) **Linear functions.** The student understands that linear functions can be represented in different ways and translates among their various representations. The student is expected to:

(A) determine whether or not given situations can be represented by linear functions;

(B) determine the domain and range for linear functions in given situations; and

(C) use, translate, and make connections among algebraic, tabular, graphical, or verbal descriptions of linear functions.

(A.6) **Linear functions.** The student understands the meaning of the slope and intercepts of the graphs of linear functions and zeros of linear functions and interprets and describes the effects of changes in parameters of linear functions in real-world and mathematical situations. The student is expected to:

(A) develop the concept of slope as rate of change and determine slopes from graphs, tables, and algebraic representations;

(B) interpret the meaning of slope and intercepts in situations using data, symbolic representations, or graphs;

(C) investigate, describe, and predict the effects of changes in m and b on the graph of $y = mx + b$;

(D) graph and write equations of lines given characteristics such as two points, a point and a slope, or a slope and y-intercept;

(E) determine the intercepts of the graphs of linear functions and zeros of linear functions from graphs, tables, and algebraic representations;

(F) interpret and predict the effects of changing slope and y-intercept in applied situations; and

(G) relate direct variation to linear functions and solve problems involving proportional change.

(A.7) **Linear functions.** The student formulates equations and inequalities based on linear functions, uses a variety of methods to solve them, and analyzes the solutions in terms of the situation. The student is expected to:

(A) analyze situations involving linear functions and formulate linear equations or inequalities to solve problems;

(B) investigate methods for solving linear equations and inequalities using concrete models, graphs, and the properties of equality, select a method, and solve the equations and inequalities; and

(C) interpret and determine the reasonableness of solutions to linear equations and inequalities.

(A.8) **Linear functions.** The student formulates systems of linear equations from problem situations, uses a variety of methods to solve them, and analyzes the solutions in terms of the situation. The student is expected to:

(A) analyze situations and formulate systems of linear equations in two unknowns to solve problems;

(B) solve systems of linear equations using concrete models, graphs, tables, and algebraic methods; and

(C) interpret and determine the reasonableness of solutions to systems of linear equations.

(A.9) **Quadratic and other nonlinear functions.** The student understands that the graphs of quadratic functions are affected by the parameters of the function and can interpret and describe the effects of changes in the parameters of quadratic functions. The student is expected to:

(A) determine the domain and range for quadratic functions in given situations;

(B) investigate, describe, and predict the effects of changes in a on the graph of $y = ax^2 + c$;

(C) investigate, describe, and predict the effects of changes in c on the graph of $y = ax^2 + c$; and

(D) analyze graphs of quadratic functions and draw conclusions.

(A.10) **Quadratic and other nonlinear functions.** The student understands there is more than one way to solve a quadratic equation and solves them using appropriate methods. The student is expected to:

(A) solve quadratic equations using concrete models, tables, graphs, and algebraic methods; and

(B) make connections among the solutions (roots) of quadratic equations, the zeros of their related functions, and the horizontal intercepts (x-intercepts) of the graph of the function.

(A.11) **Quadratic and other nonlinear functions.** The student understands there are situations modeled by functions that are neither linear nor quadratic and models the situations. The student is expected to:

(A) use patterns to generate the laws of exponents and apply them in problem-solving situations;

(B) analyze data and represent situations involving inverse variation using concrete models, tables, graphs, or algebraic methods; and

(C) analyze data and represent situations involving exponential growth and decay using concrete models, tables, graphs, or algebraic methods.

Source: The provisions of this §111.32 adopted to be effective September 1, 1998, 22 TexReg 7623; amended to be effective August 1, 2006, 30 TexReg 1930.

§111.33. Algebra II (One-Half to One Credit).

(a) Basic understandings.

(1) Foundation concepts for high school mathematics. As presented in Grades K-8, the basic understandings of number, operation, and quantitative reasoning; patterns, relationships, and algebraic thinking; geometry; measurement; and probability and statistics are essential foundations for all work in high school mathematics. Students continue to build on this foundation as they expand their understanding through other mathematical experiences.

(2) Algebraic thinking and symbolic reasoning. Symbolic reasoning plays a critical role in algebra; symbols provide powerful ways to represent mathematical situations and to express generalizations. Students study algebraic concepts and the relationships among them to better understand the structure of algebra.

(3) Functions, equations, and their relationship. The study of functions, equations, and their relationship is central to all of mathematics. Students perceive functions and equations as means for analyzing and understanding a broad variety of relationships and as a useful tool for expressing generalizations.

(4) Relationship between algebra and geometry. Equations and functions are algebraic tools that can be used to represent geometric curves and figures; similarly, geometric figures can illustrate algebraic relationships. Students perceive the connections between algebra and geometry and use the tools of one to help solve problems in the other.

(5) Tools for algebraic thinking. Techniques for working with functions and equations are essential in understanding underlying relationships. Students use a variety of representations (concrete, pictorial, numerical, symbolic, graphical, and verbal), tools, and technology (including, but not limited to, calculators with graphing capabilities, data collection devices, and computers) to model mathematical situations to solve meaningful problems.

(6) Underlying mathematical processes. Many processes underlie all content areas in mathematics. As they do mathematics, students continually use problem-solving, language and communication, and reasoning (justification and proof) to make connections within and outside mathematics. Students also use multiple representations, technology, applications and modeling, and numerical fluency in problem-solving contexts.

(b) Knowledge and skills.

(2A.1) **Foundations for functions.** The student uses properties and attributes of functions and applies functions to problem situations. The student is expected to:

(A) identify the mathematical domains and ranges of functions and determine reasonable domain and range values for continuous and discrete situations; and

(B) collect and organize data, make and interpret scatterplots, fit the graph of a function to the data, interpret the results, and proceed to model, predict, and make decisions and critical judgments.

(2A.2) **Foundations for functions.** The student understands the importance of the skills required to manipulate symbols in order to solve problems and uses the necessary algebraic skills required to simplify algebraic expressions and solve equations and inequalities in problem situations. The student is expected to:

(A) use tools including factoring and properties of exponents to simplify expressions and to transform and solve equations; and

(B) use complex numbers to describe the solutions of quadratic equations.

(2A.3) **Foundations for functions.** The student formulates systems of equations and inequalities from problem situations, uses a variety of methods to solve them, and analyzes the solutions in terms of the situations. The student is expected to:

(A) analyze situations and formulate systems of equations in two or more unknowns or inequalities in two unknowns to solve problems;

(B) use algebraic methods, graphs, tables, or matrices, to solve systems of equations or inequalities; and

(C) interpret and determine the reasonableness of solutions to systems of equations or inequalities for given contexts.

(2A.4) **Algebra and geometry.** The student connects algebraic and geometric representations of functions. The student is expected to:

(A) identify and sketch graphs of parent functions, including linear ($f(x) = x$), quadratic ($f(x) = x^2$), exponential ($f(x) = a^x$), and logarithmic ($f(x) = \log_a x$) functions, absolute value of x ($f(x) = |x|$), square root of x ($f(x) = \sqrt{x}$), and reciprocal of x ($f(x) = 1/x$);

(B) extend parent functions with parameters such as a in $f(x) = a/x$ and describe the effects of the parameter changes on the graph of parent functions; and

(C) describe and analyze the relationship between a function and its inverse.

(2A.5) **Algebra and geometry.** The student knows the relationship between the geometric and algebraic descriptions of conic sections. The student is expected to:

(A) describe a conic section as the intersection of a plane and a cone;

(B) sketch graphs of conic sections to relate simple parameter changes in the equation to corresponding changes in the graph;

(C) identify symmetries from graphs of conic sections;

(D) identify the conic section from a given equation; and

(E) use the method of completing the square.

(2A.6) **Quadratic and square root functions.** The student understands that quadratic functions can be represented in different ways and translates among their various representations. The student is expected to:

(A) determine the reasonable domain and range values of quadratic functions, as well as interpret and determine the reasonableness of solutions to quadratic equations and inequalities;

(B) relate representations of quadratic functions, such as algebraic, tabular, graphical, and verbal descriptions; and

(C) determine a quadratic function from its roots or a graph.

(2A.7) **Quadratic and square root functions.** The student interprets and describes the effects of changes in the parameters of quadratic functions in applied and mathematical situations. The student is expected to:

(A) use characteristics of the quadratic parent function to sketch the related graphs and connect between the $y = ax^2 + bx + c$ and the $y = a(x - h)^2 + k$ symbolic representations of quadratic functions; and

(B) use the parent function to investigate, describe, and predict the effects of changes in a, h, and k on the graphs of $y = a(x - h)^2 + k$ form of a function in applied and purely mathematical situations.

(2A.8) **Quadratic and square root functions.** The student formulates equations and inequalities based on quadratic functions, uses a variety of methods to solve them, and analyzes the solutions in terms of the situation. The student is expected to:

(A) analyze situations involving quadratic functions and formulate quadratic equations or inequalities to solve problems;

(B) analyze and interpret the solutions of quadratic equations using discriminants and solve quadratic equations using the quadratic formula;

(C) compare and translate between algebraic and graphical solutions of quadratic equations; and

(D) solve quadratic equations and inequalities using graphs, tables, and algebraic methods.

(2A.9) **Quadratic and square root functions.** The student formulates equations and inequalities based on square root functions, uses a variety of methods to solve them, and analyzes the solutions in terms of the situation. The student is expected to:

(A) use the parent function to investigate, describe, and predict the effects of parameter changes on the graphs of square root functions and describe limitations on the domains and ranges;

(B) relate representations of square root functions, such as algebraic, tabular, graphical, and verbal descriptions;

(C) determine the reasonable domain and range values of square root functions, as well as interpret and determine the reasonableness of solutions to square root equations and inequalities;

(D) determine solutions of square root equations using graphs, tables, and algebraic methods;

(E) determine solutions of square root inequalities using graphs and tables;

(F) analyze situations modeled by square root functions, formulate equations or inequalities, select a method, and solve problems; and

(G) connect inverses of square root functions with quadratic functions.

(2A.10) **Rational functions.** The student formulates equations and inequalities based on rational functions, uses a variety of methods to solve them, and analyzes the solutions in terms of the situation. The student is expected to:

(A) use quotients of polynomials to describe the graphs of rational functions, predict the effects of parameter changes, describe limitations on the domains and ranges, and examine asymptotic behavior;

(B) analyze various representations of rational functions with respect to problem situations;

(C) determine the reasonable domain and range values of rational functions, as well as interpret and determine the reasonableness of solutions to rational equations and inequalities;

(D) determine the solutions of rational equations using graphs, tables, and algebraic methods;

(E) determine solutions of rational inequalities using graphs and tables;

(F) analyze a situation modeled by a rational function, formulate an equation or inequality composed of a linear or quadratic function, and solve the problem; and

(G) use functions to model and make predictions in problem situations involving direct and inverse variation.

(2A.11) **Exponential and logarithmic functions.** The student formulates equations and inequalities based on exponential and logarithmic functions, uses a variety of methods to solve them, and analyzes the solutions in terms of the situation. The student is expected to:

(A) develop the definition of logarithms by exploring and describing the relationship between exponential functions and their inverses;

(B) use the parent functions to investigate, describe, and predict the effects of parameter changes on the graphs of exponential and logarithmic functions, describe limitations on the domains and ranges, and examine asymptotic behavior;

(C) determine the reasonable domain and range values of exponential and logarithmic functions, as well as interpret and determine the reasonableness of solutions to exponential and logarithmic equations and inequalities;

(D) determine solutions of exponential and logarithmic equations using graphs, tables, and algebraic methods;

(E) determine solutions of exponential and logarithmic inequalities using graphs and tables; and

(F) analyze a situation modeled by an exponential function, formulate an equation or inequality, and solve the problem.

Source: The provisions of this §111.33 adopted to be effective September 1, 1998, 22 TexReg 7623; amended to be effective August 1, 2006, 30 TexReg 1930.

§111.34. Geometry (One Credit).

(a) Basic understandings.

(1) Foundation concepts for high school mathematics. As presented in Grades K-8, the basic understandings of number, operation, and quantitative reasoning; patterns, relationships, and algebraic thinking; geometry; measurement; and probability and statistics are essential foundations for all work in high school mathematics. Students continue to build on this foundation as they expand their understanding through other mathematical experiences.

(2) Geometric thinking and spatial reasoning. Spatial reasoning plays a critical role in geometry; geometric figures provide powerful ways to represent mathematical situations and to express generalizations about space and spatial relationships. Students use geometric thinking to understand mathematical concepts and the relationships among them.

(3) Geometric figures and their properties. Geometry consists of the study of geometric figures of zero, one, two, and three dimensions and the relationships among them. Students study properties and relationships having to do with size, shape, location, direction, and orientation of these figures.

(4) The relationship between geometry, other mathematics, and other disciplines. Geometry can be used to model and represent many mathematical and real-world situations. Students perceive the connection between geometry and the real and mathematical worlds and use geometric ideas, relationships, and properties to solve problems.

(5) Tools for geometric thinking. Techniques for working with spatial figures and their properties are essential in understanding underlying relationships. Students use a variety of representations (concrete, pictorial, numerical, symbolic, graphical, and verbal), tools, and technology (including, but not limited to, calculators with graphing capabilities, data collection devices, and computers) to solve meaningful problems by representing and transforming figures and analyzing relationships.

(6) Underlying mathematical processes. Many processes underlie all content areas in mathematics. As they do mathematics, students continually use problem-solving, language and communication, connections within and outside mathematics, and reasoning (justification and proof). Students also use multiple representations, technology, applications and modeling, and numerical fluency in problem solving contexts.

(b) Knowledge and skills.

(G.1) **Geometric structure.** The student understands the structure of, and relationships within, an axiomatic system. The student is expected to:

(A) develop an awareness of the structure of a mathematical system, connecting definitions, postulates, logical reasoning, and theorems;

(B) recognize the historical development of geometric systems and know mathematics is developed for a variety of purposes; and

(C) compare and contrast the structures and implications of Euclidean and non-Euclidean geometries.

(G.2) **Geometric structure.** The student analyzes geometric relationships in order to make and verify conjectures. The student is expected to:

(A) use constructions to explore attributes of geometric figures and to make conjectures about geometric relationships; and

(B) make conjectures about angles, lines, polygons, circles, and three-dimensional figures and determine the validity of the conjectures, choosing from a variety of approaches such as coordinate, transformational, or axiomatic.

(G.3) **Geometric structure.** The student applies logical reasoning to justify and prove mathematical statements. The student is expected to:

(A) determine the validity of a conditional statement, its converse, inverse, and contrapositive;

(B) construct and justify statements about geometric figures and their properties;

(C) use logical reasoning to prove statements are true and find counter examples to disprove statements that are false;

(D) use inductive reasoning to formulate a conjecture; and

(E) use deductive reasoning to prove a statement.

(G.4) **Geometric structure.** The student uses a variety of representations to describe geometric relationships and solve problems. The student is expected to select an appropriate representation (concrete, pictorial, graphical, verbal, or symbolic) in order to solve problems.

(G.5) **Geometric patterns.** The student uses a variety of representations to describe geometric relationships and solve problems. The student is expected to:

(A) use numeric and geometric patterns to develop algebraic expressions representing geometric properties;

(B) use numeric and geometric patterns to make generalizations about geometric properties, including properties of polygons, ratios in similar figures and solids, and angle relationships in polygons and circles;

(C) use properties of transformations and their compositions to make connections between mathematics and the real world, such as tessellations; and

(D) identify and apply patterns from right triangles to solve meaningful problems, including special right triangles (45-45-90 and 30-60-90) and triangles whose sides are Pythagorean triples.

(G.6) **Dimensionality and the geometry of location.** The student analyzes the relationship between three-dimensional geometric figures and related two-dimensional representations and uses these representations to solve problems. The student is expected to:

(A) describe and draw the intersection of a given plane with various three-dimensional geometric figures;

(B) use nets to represent and construct three-dimensional geometric figures; and

(C) use orthographic and isometric views of three-dimensional geometric figures to represent and construct three-dimensional geometric figures and solve problems.

(G.7) **Dimensionality and the geometry of location.** The student understands that coordinate systems provide convenient and efficient ways of representing geometric figures and uses them accordingly. The student is expected to:

(A) use one- and two-dimensional coordinate systems to represent points, lines, rays, line segments, and figures;

(B) use slopes and equations of lines to investigate geometric relationships, including parallel lines, perpendicular lines, and special segments of triangles and other polygons; and

(C) derive and use formulas involving length, slope, and midpoint.

(G.8) **Congruence and the geometry of size.** The student uses tools to determine measurements of geometric figures and extends measurement concepts to find perimeter, area, and volume in problem situations. The student is expected to:

(A) find areas of regular polygons, circles, and composite figures;

(B) find areas of sectors and arc lengths of circles using proportional reasoning;

(C) derive, extend, and use the Pythagorean Theorem; and

(D) find surface areas and volumes of prisms, pyramids, spheres, cones, cylinders, and composites of these figures in problem situations.

(G.9) **Congruence and the geometry of size.** The student analyzes properties and describes relationships in geometric figures. The student is expected to:

(A) formulate and test conjectures about the properties of parallel and perpendicular lines based on explorations and concrete models;

(B) formulate and test conjectures about the properties and attributes of polygons and their component parts based on explorations and concrete models;

(C) formulate and test conjectures about the properties and attributes of circles and the lines that intersect them based on explorations and concrete models; and

(D) analyze the characteristics of polyhedra and other three-dimensional figures and their component parts based on explorations and concrete models.

(G.10) **Congruence and the geometry of size.** The student applies the concept of congruence to justify properties of figures and solve problems. The student is expected to:

(A) use congruence transformations to make conjectures and justify properties of geometric figures including figures represented on a coordinate plane; and

(B) justify and apply triangle congruence relationships.

(G.11) **Similarity and the geometry of shape.** The student applies the concepts of similarity to justify properties of figures and solve problems. The student is expected to:

(A) use and extend similarity properties and transformations to explore and justify conjectures about geometric figures;

(B) use ratios to solve problems involving similar figures;

(C) develop, apply, and justify triangle similarity relationships, such as right triangle ratios, trigonometric ratios, and Pythagorean triples using a variety of methods; and

(D) describe the effect on perimeter, area, and volume when one or more dimensions of a figure are changed and apply this idea in solving problems.

Source: The provisions of this §111.34 adopted to be effective September 1, 1998, 22 TexReg 7623; amended to be effective August 1, 2006, 30 TexReg 1930.

§111.35. Precalculus (One-Half to One Credit).

(a) General requirements. The provisions of this section shall be implemented beginning September 1, 1998, and at that time shall supersede §75.63(bb) of this title (relating to Mathematics). Students can be awarded one-half to one credit for successful completion of this course. Recommended prerequisites: Algebra II, Geometry.

(b) Introduction.

(1) In Precalculus, students continue to build on the K-8, Algebra I, Algebra II, and Geometry foundations as they expand their understanding through other mathematical experiences. Students use symbolic reasoning and analytical methods to represent mathematical situations, to express generalizations, and to study mathematical concepts and the relationships among them. Students use functions, equations, and limits as useful tools for expressing generalizations and as means for analyzing and understanding a broad variety of mathematical relationships. Students also use functions as well as symbolic reasoning to represent and connect ideas in geometry, probability, statistics, trigonometry, and calculus and to model physical situations. Students use a variety of representations (concrete, pictorial, numerical, symbolic, graphical, and verbal), tools, and technology (including, but not limited to, calculators with graphing capabilities, data collection devices, and computers) to model functions and equations and solve real-life problems.

(2) As students do mathematics, they continually use problem-solving, language and communication, connections within and outside mathematics, and reasoning (justification and proof). Students also use multiple representations, technology, applications and modeling, and numerical fluency in problem-solving contexts.

(c) Knowledge and skills.

(P.1) The student defines functions, describes characteristics of functions, and translates among verbal, numerical, graphical, and symbolic representations of functions, including polynomial, rational, power (including radical), exponential, logarithmic, trigonometric, and piecewise-defined functions. The student is expected to:

(A) describe parent functions symbolically and graphically, including $f(x) = x^n$, $f(x) = ln\ x$, $f(x) = \log_a x$, $f(x) = 1/x$, $f(x) = e^x$, $f(x) = |x|$, $f(x) = a^x$, $f(x) = \sin x$, $f(x) = \arcsin x$, etc.;

(B) determine the domain and range of functions using graphs, tables, and symbols;

(C) describe symmetry of graphs of even and odd functions;

(D) recognize and use connections among significant values of a function (zeros, maximum values, minimum values, etc.), points on the graph of a function, and the symbolic representation of a function; and

(E) investigate the concepts of continuity, end behavior, asymptotes, and limits and connect these characteristics to functions represented graphically and numerically.

(P.2) The student interprets the meaning of the symbolic representations of functions and operations on functions to solve meaningful problems. The student is expected to:

(A) apply basic transformations, including a • f(x), f(x) + d, f(x - c), f(b • x), and compositions with absolute value functions, including |f(x)|, and f(|x|), to the parent functions;

(B) perform operations including composition on functions, find inverses, and describe these procedures and results verbally, numerically, symbolically, and graphically; and

(C) investigate identities graphically and verify them symbolically, including logarithmic properties, trigonometric identities, and exponential properties.

(P.3) The student uses functions and their properties, tools and technology, to model and solve meaningful problems. The student is expected to:

(A) investigate properties of trigonometric and polynomial functions;

(B) use functions such as logarithmic, exponential, trigonometric, polynomial, etc. to model real-life data;

(C) use regression to determine the appropriateness of a linear function to model real-life data (including using technology to determine the correlation coefficient);

(D) use properties of functions to analyze and solve problems and make predictions; and

(E) solve problems from physical situations using trigonometry, including the use of Law of Sines, Law of Cosines, and area formulas and incorporate radian measure where needed.

(P.4) The student uses sequences and series as well as tools and technology to represent, analyze, and solve real-life problems. The student is expected to:

(A) represent patterns using arithmetic and geometric sequences and series;

(B) use arithmetic, geometric, and other sequences and series to solve real-life problems;

(C) describe limits of sequences and apply their properties to investigate convergent and divergent series; and

(D) apply sequences and series to solve problems including sums and binomial expansion.

(P.5) The student uses conic sections, their properties, and parametric representations, as well as tools and technology, to model physical situations. The student is expected to:

(A) use conic sections to model motion, such as the graph of velocity vs. position of a pendulum and motions of planets;

(B) use properties of conic sections to describe physical phenomena such as the reflective properties of light and sound;

(C) convert between parametric and rectangular forms of functions and equations to graph them; and

(D) use parametric functions to simulate problems involving motion.

(P.6) The student uses vectors to model physical situations. The student is expected to:

(A) use the concept of vectors to model situations defined by magnitude and direction; and

(B) analyze and solve vector problems generated by real-life situations.

Source: The provisions of this §111.35 adopted to be effective September 1, 1998, 22 TexReg 7623; amended to be effective August 1, 2006, 30 TexReg 1930.

§111.36. Mathematical Models with Applications (One-Half to One Credit).

(a) General requirements. The provisions of this section shall be implemented beginning September 1, 1998. Students can be awarded one-half to one credit for successful completion of this course. Recommended prerequisite: Algebra I.

(b) Introduction.

(1) In Mathematical Models with Applications, students continue to build on the K-8 and Algebra I foundations as they expand their understanding through other mathematical experiences. Students use algebraic, graphical, and geometric reasoning to recognize patterns and structure, to model information, and to solve problems from various disciplines. Students use mathematical methods to model and solve real-life applied problems involving money, data, chance, patterns, music, design, and science. Students use mathematical models from algebra, geometry, probability, and statistics and connections among these to solve problems from a wide variety of advanced applications in both mathematical and nonmathematical situations. Students use a variety of representations (concrete, pictorial, numerical, symbolic, graphical, and verbal), tools, and technology (including, but not limited to, calculators with graphing capabilities, data collection devices, and computers) to link modeling techniques and purely mathematical concepts and to solve applied problems.

(2) As students do mathematics, they continually use problem-solving, language and communication, connections within and outside mathematics, and reasoning (justification and proof). Students also use multiple representations, technology, applications and modeling, and numerical fluency in problem-solving contexts.

(c) Knowledge and skills.

(M.1) The student uses a variety of strategies and approaches to solve both routine and non-routine problems. The student is expected to:

(A) compare and analyze various methods for solving a real-life problem;

(B) use multiple approaches (algebraic, graphical, and geometric methods) to solve problems from a variety of disciplines; and

(C) select a method to solve a problem, defend the method, and justify the reasonableness of the results.

(M.2) The student uses graphical and numerical techniques to study patterns and analyze data. The student is expected to:

(A) interpret information from various graphs, including line graphs, bar graphs, circle graphs, histograms, scatterplots, line plots, stem and leaf plots, and box and whisker plots to draw conclusions from the data;

(B) analyze numerical data using measures of central tendency, variability, and correlation in order to make inferences;

(C) analyze graphs from journals, newspapers, and other sources to determine the validity of stated arguments; and

(D) use regression methods available through technology to describe various models for data such as linear, quadratic, exponential, etc., select the most appropriate model, and use the model to interpret information.

(M.3) The student develops and implements a plan for collecting and analyzing data in order to make decisions. The student is expected to:

(A) formulate a meaningful question, determine the data needed to answer the question, gather the appropriate data, analyze the data, and draw reasonable conclusions;

(B) communicate methods used, analyses conducted, and conclusions drawn for a data-analysis project by written report, visual display, oral report, or multi-media presentation; and

(C) determine the appropriateness of a model for making predictions from a given set of data.

(M.4) The student uses probability models to describe everyday situations involving chance. The student is expected to:

(A) compare theoretical and empirical probability; and

(B) use experiments to determine the reasonableness of a theoretical model such as binomial, geometric, etc.

(M.5) The student uses functional relationships to solve problems related to personal income. The student is expected to:

(A) use rates, linear functions, and direct variation to solve problems involving personal finance and budgeting, including compensations and deductions;

(B) solve problems involving personal taxes; and

(C) analyze data to make decisions about banking.

(M.6) The student uses algebraic formulas, graphs, and amortization models to solve problems involving credit. The student is expected to:

(A) analyze methods of payment available in retail purchasing and compare relative advantages and disadvantages of each option;

(B) use amortization models to investigate home financing and compare buying and renting a home; and

(C) use amortization models to investigate automobile financing and compare buying and leasing a vehicle.

(M.7) The student uses algebraic formulas, numerical techniques, and graphs to solve problems related to financial planning. The student is expected to:

(A) analyze types of savings options involving simple and compound interest and compare relative advantages of these options;

(B) analyze and compare coverage options and rates in insurance; and

(C) investigate and compare investment options including stocks, bonds, annuities, and retirement plans.

(M.8) The student uses algebraic and geometric models to describe situations and solve problems. The student is expected to:

(A) use geometric models available through technology to model growth and decay in areas such as population, biology, and ecology;

(B) use trigonometric ratios and functions available through technology to calculate distances and model periodic motion; and

(C) use direct and inverse variation to describe physical laws such as Hook's, Newton's, and Boyle's laws.

(M.9) The student uses algebraic and geometric models to represent patterns and structures. The student is expected to:

(A) use geometric transformations, symmetry, and perspective drawings to describe mathematical patterns and structure in art and architecture; and

(B) use geometric transformations, proportions, and periodic motion to describe mathematical patterns and structure in music.

Source: The provisions of this §111.36 adopted to be effective September 1, 1998, 22 TexReg 7623; amended to be effective August 1, 2006, 30 TexReg 1930.

Subchapter D. Other High School Mathematics Courses

Statutory Authority: The provisions of this Subchapter D issued under the Texas Education Code, §28.002, unless otherwise noted.

§111.51. Implementation of Texas Essential Knowledge and Skills for Mathematics, Other High School Mathematics Courses.

The provisions of this subchapter shall be implemented by school districts beginning September 1, 1998, and at that time shall supersede §75.63(o), (q)-(u), and (cc) of this title (relating to Mathematics).

Source: The provisions of this §111.51 adopted to be effective September 1, 1998, 22 TexReg 7623.

§111.53. Advanced Placement (AP) Statistics (One-Half to One Credit).

(a) General requirements. Students can be awarded one-half to one credit for successful completion of this course. Recommended prerequisites: Algebra II, Geometry.

(b) Content requirements. Content requirements for Advanced Placement (AP) Statistics are prescribed in the College Board Publication Advanced Placement Course Description: Statistics, published by The College Board. This publication may be obtained from the College Board Advanced Placement Program.

Source: The provisions of this §111.53 adopted to be effective September 1, 1998, 22 TexReg 7623.

§111.54. Advanced Placement (AP) Calculus AB (One-Half to One Credit).

(a) General requirements. Students can be awarded one-half to one credit for successful completion of this course. Recommended prerequisite: Precalculus.

(b) Content requirements. Content requirements for Advanced Placement (AP) Calculus AB are prescribed in the College Board Publication Advanced Placement Course Description Mathematics: Calculus AB, Calculus BC, published by The College Board. This publication may be obtained from the College Board Advanced Placement Program.

Source: The provisions of this §111.54 adopted to be effective September 1, 1998, 22 TexReg 7623.

§111.55. Advanced Placement (AP) Calculus BC (One-Half to One Credit).

(a) General requirements. Students can be awarded one-half to one credit for successful completion of this course. Recommended prerequisite: Precalculus.

(b) Content requirements. Content requirements for Advanced Placement (AP) Calculus BC are prescribed in the College Board Publication Advanced Placement Course Description: Calculus AB, Calculus BC, published by The College Board. This publication may be obtained from the College Board Advanced Placement Program.

Source: The provisions of this §111.55 adopted to be effective September 1, 1998, 22 TexReg 7623.

§111.56. IB Mathematical Studies Subsidiary Level (One-Half to One Credit).

(a) General requirements. Students can be awarded one-half to one credit for successful completion of IB Mathematical Studies Subsidiary Level. To offer this course, the district must meet all requirements of the International Baccalaureate Organization, including teacher training/certification and IB assessment. Recommended prerequisites: Algebra II, Geometry.

(b) Content requirements. Content requirements for IB Mathematical Studies Subsidiary Level are prescribed by the International Baccalaureate Organization. Curriculum guides may be obtained from International Baccalaureate of North America.

Source: The provisions of this §111.56 adopted to be effective September 1, 1998, 22 TexReg 7623.

§111.57. IB Mathematical Methods Subsidiary Level (One-Half to One Credit).

(a) General requirements. Students can be awarded one-half to one credit for successful completion of IB Mathematical Methods Subsidiary Level. To offer this course, the district must meet all requirements of the International Baccalaureate Organization, including teacher training/certification and IB assessment. Recommended prerequisites: Algebra II, Geometry.

(b) Content requirements. Content requirements for IB Mathematical Methods Subsidiary Level are prescribed by the International Baccalaureate Organization. Curriculum guides may be obtained from International Baccalaureate of North America.

Source: The provisions of this §111.57 adopted to be effective September 1, 1998, 22 TexReg 7623.

§111.58. IB Mathematics Higher Level (One-Half to One Credit).

(a) General requirements. Students can be awarded one-half to one credit for successful completion of IB Mathematics Higher Level. To offer this course, the district must meet all requirements of the International Baccalaureate Organization, including teacher training/certification and IB assessment. Recommended prerequisite: IB Mathematical Studies Subsidiary Level or IB Mathematical Methods Subsidiary Level.

(b) Content requirements. Content requirements for IB Mathematics Higher Level are prescribed by the International Baccalaureate Organization. Curriculum guides may be obtained from International Baccalaureate of North America.

Source: The provisions of this §111.58 adopted to be effective September 1, 1998, 22 TexReg 7623.

§111.59. IB Advanced Mathematics Subsidiary Level (One-Half to One Credit).

(a) General requirements. Students can be awarded one-half to one credit for successful completion of IB Advanced Mathematics Subsidiary Level. To offer this course, the district must meet all requirements of the International Baccalaureate Organization, including teacher training/certification and IB assessment. Recommended prerequisite: IB Mathematics Higher Level.

(b) Content requirements. Content requirements for IB Advanced Mathematics Subsidiary Level are prescribed by the International Baccalaureate Organization. Curriculum guides may be obtained from International Baccalaureate of North America.

Source: The provisions of this §111.59 adopted to be effective September 1, 1998, 22 TexReg 7623.

Accessibility Information for Proclamation 2004

I. Electronic Instructional Materials

Publishing companies that offer electronic instructional materials (e.g., CD-ROMs, DVDs or Web-based instructional materials) for adoption are requested to offer these materials in an accessible format in accordance with the technical standards of the Federal Rehabilitation Act, Section 508, as shown at the following web page: www.section508.gov/index.cfm?FuseAction+Content&ID=12. These technical standards are as follows:

Accessibility Standards For Web-Based Instructional Materials

a. A text equivalent for every non-text element shall be provided (e.g., via "alt", "longdesc", or in element content).

b. Equivalent alternatives for any multimedia presentation shall be synchronized with the presentation.

c. Web pages shall be designed so that all information conveyed with color is also available without color, for example from context or markup.

d. Documents shall be organized so they are readable without requiring an associated style sheet.

e. Redundant text links shall be provided for each active region of a server-side image map.

f. Client-side image maps shall be provided instead of server-side image maps except where the regions cannot be defined with an available geometric shape.

g. Row and column headers shall be identified for data tables.

h. Markup shall be used to associate data cells and header cells for data tables that have two or more logical levels of row or column headers.

i. Frames shall be titled with text that facilitates frame identification and navigation.

j. Pages shall be designed to avoid causing the screen to flicker with a frequency greater than 2 Hz and lower than 55 Hz.

k. A text-only page, with equivalent information or functionality, shall be provided to make a web site comply with the provisions of this part, **when compliance cannot be accomplished in any other way**. The content of the text-only page shall be updated whenever the primary page changes.

l. When pages utilize scripting languages to display content, or to create interface elements, the information provided by the script shall be identified with functional text that can be read by assistive technology.

m. When a web page requires that an applet, plug-in or other application be present on the client system to interpret page content, the page must provide a link to a plug-in or applet that complies with §1194.21(a) through (l).

n. When electronic forms are designed to be completed on-line, the form shall allow people using assistive technology to access the information, field elements, and functionality required for completion and submission of the form, including all directions and cues.

o. A method shall be provided that permits users to skip repetitive navigation links.

p. When a timed response is required, the user shall be alerted and given sufficient time to indicate more time is required.

Accessibility Standards For CD-ROM and DVD-Based Instructional Materials

a. When software is designed to run on a system that has a keyboard, product functions shall be executable from a keyboard where the function itself or the result of performing a function can be discerned textually.

b. Applications shall not disrupt or disable activated features of other products that are identified as accessibility features, where those features are developed and documented according to industry standards. Applications also shall not disrupt or disable activated features of any operating system that are identified as accessibility features where the application programming interface for those accessibility features has been documented by the manufacturer of the operating system and is available to the product developer.

c. A well-defined on-screen indication of the current focus shall be provided that moves among interactive interface elements as the input focus changes. The focus shall be programmatically exposed so that assistive technology can track focus and focus changes.

d. Sufficient information about a user interface element including the identity, operation and state of the element shall be available to assistive technology. When an image represents a program element, the information conveyed by the image must also be available in text.

e. When bitmap images are used to identify controls, status indicators, or other programmatic elements, the meaning assigned to those images shall be consistent throughout an application's performance.

f. Textual information shall be provided through operating system functions for displaying text. The minimum information that shall be made available is text content, text input caret location, and text attributes.

g. Applications shall not override user selected contrast and color selections and other individual display attributes.

h. When animation is displayed, the information shall be displayable in at least one non-animated presentation mode at the option of the user.

i. Color coding shall not be used as the only means of conveying information, indicating an action, prompting a response, or distinguishing a visual element.

j. When a product permits a user to adjust color and contrast settings, a variety of color selections capable of producing a range of contrast levels shall be provided.

k. Software shall not use flashing or blinking text, objects, or other elements having a flash or blink frequency greater than 2 Hz and lower than 55 Hz.

l. When electronic forms are used, the form shall allow people using assistive technology to access the information, field elements, and functionality required for completion and submission of the form, including all directions and cues.

Accessibility Information Resources For Publishers Of Electronic Instructional Materials

The following web links, publications and conferences offer essential information for publishers that are planning development of accessible electronic instructional materials.

General

1. Section 508: http://www.section508.gov/
2. Resources from the World Wide Web Consortium (W3C) Web Accessibility Initiative (WAI): http://www.w3.org/WAI/Resources/
3. *Making Educational Software and Web Sites Accessible: Design Guidelines Including Math and Science Solutions*, The CPB/WGBH National Center for Accessible Media, January 2003: http://ncam.wgbh.org/cdrom/guideline/
4. Conference Proceedings, Annual Conference on "Technology and Persons with Disabilities," California State University, Northridge (CSUN): http://www.csun.edu/cod/conf/.
5. Texas Administrative Code, Section 206.2, Accessibility and Usability of State Web Sites: http://www.dir.state.tx.us/standards/.

Resources for Designing Accessible Web Sites

1. Web Content Accessibility Guidelines (WCAG 1.0) – W3C: http://www.w3.org/TR/WCAG10/
2. Curriculum for WCAG 1.0: http://www.w3.org/WAI/wcag-curric/

3. Accessible Web Authoring Resources and Education (AWARE) Center for the HTML Writers Guild: http://aware.hwg.org/
4. Evaluation, Repair, and Transformation Tools for Web Content Accessibility: http://www.w3.org/WAI/ER/existingtools.html
5. HTML Kit (editor, validator, Word 2000 cleanup): http://www.chami.com/html-kit/
6. IBM Accessibility Checklist and Tutorial: http://www-3.ibm.com/able/guidelines/web/accessweb.html
7. Microsoft IE 5.x Developer Accessories (View partial source, view DOM, more): http://www.microsoft.com/windows/ie/previous/webaccess/default.asp
8. Microsoft IE 5.x Web Accessories (links list, toggle images, more): http://www.microsoft.com/windows/ie/previous/webaccess/ie5wa.asp
9. WGBH's National Center for Accessible Media: http://www.wgbh.org/wgbh/pages/ncam/
10. CAST's Bobby Application (analyzes web sites for accessibility): http://www.cast.org/bobby/
11. Trace Research and Development Center's Developing More Usable Web Sites: http://www.trace.wisc.edu/world/web/

Resources for Closed Captioning and Audio Description

1. A directory of captioning service providers is available at: http://www.captions.org/services.cfm
2. Media Access Group at WGBH, The Caption Center: http://www.wgbh.org/caption
3. National Captioning Institute: http://www.ncicap.org
4. VITAC: http://www.vitac.com
5. Media Access Group at WGBH, Descriptive Video Service: http://main.wgbh.org/wgbh/pages/mag/services/description/
6. Metropolitan Washington Ear, Inc.: http://www.washear.org
7. Narrative Television Network: http://www.narrativetv.com

Lists of additional resources are available from the Instructional Materials and Educational Technology Division.

II. Printed Instructional Materials

Electronic Files and Instructional Materials Required For Automated Production of Braille

Computerized files of printed instructional materials as well as the printed instructional materials are needed to ensure the timely production of Braille versions of the materials. Some publisher formatting commands help speed the conversion of text to Braille. Others have the opposite effect. The agency seeks to help publishers provide text data in a format which will be useful to Braille producers while at the same time minimizing additional work on the part of publishers.

Quark, Apple and Macintosh files will not be accepted. Publishers must convert them to IBM compatible Windows files in order for them to be usable to Texas Braille producers.

Computer files and printed instructional materials are required for all subjects for automated Braille instructional materials production under Proclamation 2004.

Schedule Of Procedures For Providing Electronic Files And Printed Materials To Braille Producers

(1) **September 14, 2006**: Publishers provide to the Instructional Materials and Educational Technology Division the name, address and telephone number of the production manager of each instructional material being prepared for submission. This information should be sent to Mrs. Pat Hatcher, at e-mail address: pat.hatcher@tea.state.tx.us, fax number (512) 463-9832, or regular address: 1701 North Congress Avenue, Austin, Texas 78701.

(2) **October 13, 2006**: Publishers send a small test file and associated print pages to the Instructional Materials and Educational Technology Division, Attention: Assistant Director. Please indicate in writing the file format in which the file was created. In the past, this procedure has proven to be extremely beneficial to publishers and Braille producers. It has significantly facilitated communication between publishers and Braille producers. After receipt of the test files, Braille producers designated by the Agency will need at least two weeks to evaluate the files and respond to publisher inquiries about usability.

(3) **November 13-17, 2006**: Publishers of adopted printed instructional materials are informed of the designated Braille producers by Instructional Materials and Educational Technology Division.

(4) **December 1, 2006**:

(a) Publishers provide three printed copies of all adopted instructional materials to the designated Braille producer. These will be used to assist Braille producers in rendering graphics and pictures included in the adopted instructional materials. The printed copies should reflect the student components as they exist at the time of adoption.

Publishers are NOT required to provide printed copies or computer files of materials that are designed for use by teachers. If a teacher who is blind requires a Braille version during the adoption period, a publisher will be requested to provide the agency with two printed teacher editions, if applicable. Publishers are requested to provide two copies of printed items, such as blackline masters, that are clearly intended for student use even though they are included in the teacher component.

(b) Deliver usable instructional material computer files to designated Braille producers in accordance with the following specifications.

(5) **May 4, 2007**: Submit three copies of the corrected student components to the designated Braille producer.

Specifications For Publisher Electronic Files

1. FORMAT (Four Options)	**A.**	Rich Text Format (RTF) with: 1. Accurately labeled disks to identify the title and chapters. 2. Sequentially numbered disks. 3. Full text, including glossaries, indices, and front/back matter. 4. Each page in the files should be numbered sequentially at the top of the page to correspond to the page numbers in the printed instructional material. 5. Each chapter must be formatted as a separate file and located in only one file. 6. Recurring subsections of chapters, such as exercises, should be integrated into the appropriate chapters. 7. Include marginal notes, footnotes, words within captions, and artwork/pictures, illustrations, maps, and charts included in the files in the locations where they would naturally be found. 8. Files must be free of all extraneous characters. Only "clean" files can be used to produce Braille. 9. Provide a file named CODELIST.TXT which gives a complete listing and description of all codes used.
	B.	Extensible Markup Language (XML) with: 1. Accurately labeled disks to identify the title and chapters. 2. Sequentially numbered disks. 3. Full text, including glossaries, indices, and front/back matter. 4. Each page in the files should be numbered sequentially at the top of the page to correspond to the page numbers in the printed instructional material. 5. Each chapter must be formatted as a separate file and located in only one file. 6. Recurring subsections of chapters, such as exercises, should be integrated into the appropriate chapters. 7. Include marginal notes, footnotes, words within captions and artwork/pictures, illustrations, maps, and charts included in the files in the locations where they would naturally be found. 8. Files must be free of all extraneous characters. Only "clean" files can be used to produce Braille. 9. Provide a file named CODELIST.TXT which gives a complete listing and description of all codes used.
	C.	The International Committee for Accessible Document Design (ICADD) 22 Tag Set with: 1. Accurately labeled disks to identify the title and chapters.

		2. Sequentially numbered disks. 3. Full text, including glossaries, indices, and front/back matter. 4. Each page in the files should be numbered sequentially to correspond to the page numbers in the printed instructional material. Also, the print page number should be inserted at the top of each page. 5. Each chapter formatted as a separate file and located in only one file. 6. Recurring subsections of chapters, such as exercises, should be integrated into the appropriate chapters. 7. Include marginal notes, footnotes, words within captions and artwork/pictures, illustrations, maps, and charts included in the files in the locations where they would naturally be found. 8. Files must be free of all extraneous characters. Only "clean" files can be used to produce Braille. A detailed description of this markup system may be obtained from the Division of Instructional Materials and Educational Technology.
	D.	Other formats which may be agreed to jointly by the Instructional Materials and Educational Technology Division, publishers and Braille producers under contract to TEA.
2. OPERATING SYSTEM		WINDOWS or MS-DOS
3. REMOVABLE STORAGE MEDIA(Three Options)	**A.** **B.** **C.**	3.5 Inch Diskette, Double-sided/High density CD-ROMS Zip disks
4. DISKETTE/ CARTRIDGE LABELING		a. Sequence number b. Book Title c. File Name d. Name of Publisher e. Name of Typesetting Company
5. REQUIRED CONTENTS		a. Title Page b. List of Consultants and Reviewers (If appropriate) c. Table of Contents d. All Instructional Material Chapters (including boxed information and tables) e. All Appendices f. All Glossaries g. Indices h. Front/Back Matter

6. FILE LIST		A separate file listing the structure of the primary files must be provided. This file should be labeled DISKLIST.TXT or other format in which the file was created. In addition, all special instructions should be noted in this file.
7. CORRECTIONS AND CHANGES		A conscientious effort should be made to update files to exactly duplicate the adopted printed version of the instructional materials (including corrections and changes). If this cannot be accomplished in a timely and cost effective manner, the publisher will coordinate with the Assistant Director of Instructional Materials and Educational Technology by calling (512) 463-9606 or by sending an e-mail message to charles.mayo@tea.state.tx.us, and provide the Braille producer one set of marked tearsheets of all corrections and changes not included in the files.

Before sending files to designated Braille producers, use the following File Quality Checklist to ensure that the final revisions of the publisher-requested electronic files are usable. Files that are not found to be usable will be returned to publishers for conversion into usable files at publisher expense.

File Quality Checklist

1. Are the instructional material files in one of the four optional formats listed in the specifications?

2. Are the instructional material files Quark, Apple or Macintosh files? If the answer is yes to any of these questions, the publisher must convert them to IBM compatible Windows files in order for them to be usable to Texas Braille producers.

3. Has the beginning (top) of each page in the files been numbered to correspond to the page numbers in the printed instructional materials? If the answer is no, then the pages should be numbered at the beginning (top) of each page so that Braille producers are able to navigate through the data and produce usable Braille pages.

4. Has each chapter been placed in a separate file and is each chapter located in only one file? If either answer is no, the files should be modified to reflect a one-to-one correspondence between chapters and files.

5. Have paragraphs been clearly delineated? If the answer is no, the files should be partitioned into separate paragraphs.

6. Are recurring subsections of chapters, such as exercises, all included in one file? All subsections should be integrated into the appropriate chapters.

7. Are marginal notes, footnotes, words within captions, and artwork/pictures, illustrations, maps, and charts included in the files in the locations where they would naturally be found? If the answer is no, then these captions should be included.

8. Are special symbols used consistently throughout the instructional material files? Only **one** symbol should be used for a single purpose. As indicated in the specifications, a separate file named CODELIST.TXT or other format in which the file is created should list and describe all codes used.

9. Have all materials that are bolded or in italics been tagged throughout the instructional material? If the answer is no, the file should be appropriately tagged for emphasis.

10. Are the files free of all extraneous characters? Only "clean" files can be used to produce Braille.

11. Are all parts of the instructional material including glossaries, indices and front/back matter included in the electronic files?

12. Are disks accurately labeled and sequentially numbered to identify the title and chapters?

13. Do the files include all corrections and changes requested by the State Board of Education? If the answer is no, you should contact the Braille Section at (512) 463-9601 concerning preparation of an updated electronic file or a set of marked tearsheets as deemed appropriate for the situation.

Proclamation 2004

Maximum Cost Estimated First-Year Purchases

CONTENT AREA	PROJECTED UNITS	MAXIMUM COST PER UNIT	MAXIMUM COST
Chapter 111. Mathematics			
Subchapter B. Middle School			
§111.22. Mathematics, Grade 6	432,375	$52.87	$22,859,666
§111.23. Mathematics, Grade 7	435,163	$56.30	$24,499,677
§111.24. Mathematics, Grade 8	423,981	$56.70	$24,039,723
Subtotal, Math, Middle School	**1,291,519**		**$71,399,066**
Capítulo 111. Matemáticas			
Subcapítulo B. Escuela Intermedia			
§111.22. Matemáticas, 6° grado	13,904	$57.73	$802,678
Parcial, Matemáticas, Escuela Intermedia	**13,904**		**$802,678**
Chapter 111. Mathematics			
Subchapter C. High School			
§111.32. Algebra I	267,664	$62.07	$16,613,904
§111.33. Algebra II	254,280	$65.73	$16,713,824
§111.34. Geometry	314,504	$63.73	$20,043,340
§111.35. Precalculus	107,065	$72.87	$7,801,827
§111.36. Mathematical Models with Applications	73,608	$70.30	$5,174,642
Subtotal, Math, High School	**1,017,121**		**$66,347,537**
Subchapter D. Other High School Mathematics Courses			
§111.53. Advanced Placement (AP) Statistics	8,086	$83.77	$677,364
§111.54. Advanced Placement (AP) Calculus AB	27,500	$84.49	$2,323,475
§111.55. Advanced Placement (AP) Calculus BC	7,500	$95.79	$718,425
§111.56. IB Mathematical Studies Subsidiary Level	4,000	$98.58	$394,320
§111.57. IB Mathematical Methods Subsidiary Level	1,000	$98.58	$98,580
§111.58. IB Mathematics Higher Level	1,000	$98.58	$98,580
§111.59. IB Advanced Mathematics Subsidiary Level	1,000	$98.58	$98,580
Subtotal, Math, Other High School Mathematics Courses	**50,086**		**$4,409,324**
Total Instructional Materials-Proclamation 2004	**2,372,630**		**$142,958,605**
Cost of Continuing Contracts, Braille, Large Type, Freight			**$118,513,532**
TOTAL COST FOR SY 2008-2009 (FY 2009)			**$261,472,137**