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, §§7.102(c)(4), 28.002, 28.0021(a)(1), and 28.008, unless otherwise noted.

§111.25. Implementation of Texas Essential Knowledge and Skills for Mathematics, Middle School, Adopted 2012.

(a) The provisions of §§111.26–111.28 of this subchapter shall be implemented by school districts.

(b) No later than August 31, 2013, the commissioner of education shall determine whether instructional materials funding has been made available to Texas public schools for materials that cover the essential knowledge and skills for mathematics as adopted in §§111.26–111.28 of this subchapter.

(c) If the commissioner makes the determination that instructional materials funding has been made available under subsection (b) of this section, §§111.26–111.28 of this subchapter shall be implemented beginning with the 2014–2015 school year and apply to the 2014–2015 and subsequent school years.

(d) If the commissioner does not make the determination that instructional materials funding has been made available under subsection (b) of this section, the commissioner shall determine no later than August 31 of each subsequent school year whether instructional materials funding has been made available. If the commissioner determines that instructional materials funding has been made available, the commissioner shall notify the State Board of Education and school districts that §§111.26–111.28 of this subchapter shall be implemented for the following school year.

Source: The provisions of this §111.25 adopted to be effective September 10, 2012, 37 TexReg 7109; amended to be effective December 31, 2014, 39 TexReg 10470.

§111.26. Grade 6, Adopted 2012.

(a) Introduction.

(1) The desire to achieve educational excellence is the driving force behind the Texas essential knowledge and skills for mathematics, guided by the college and career readiness standards. By embedding statistics, probability, and finance, while focusing on computational thinking, mathematical fluency, and solid understanding, Texas will lead the way in mathematics education and prepare all Texas students for the challenges they will face in the 21st century.

(2) The process standards describe ways in which students are expected to engage in the content. The placement of the process standards at the beginning of the knowledge and skills listed for each grade and course is intentional. The process standards weave the other knowledge and skills together so that students may be successful problem solvers and use mathematics efficiently and effectively in daily life. The process standards are integrated at every grade level and course. When possible, students will apply mathematics to problems arising in everyday life, society, and the workplace. Students will use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution. Students will select appropriate tools such as real objects, manipulatives, algorithms, paper and pencil, and technology and techniques such as mental math, estimation, number sense, and generalization and abstraction to solve problems. Students will effectively communicate mathematical ideas, reasoning, and their implications using multiple representations such as symbols, diagrams, graphs, computer programs, and language. Students will use mathematical relationships to generate solutions and make connections and predictions. Students will analyze mathematical relationships to connect and communicate mathematical ideas. Students will display, explain, or justify mathematical ideas and arguments using precise mathematical language in written or oral communication.

(3) The primary focal areas in Grade 6 are number and operations; proportionality; expressions, equations, and relationships; and measurement and data. Students use concepts, algorithms, and properties of rational numbers to explore mathematical relationships and to describe increasingly complex situations. Students use concepts of proportionality to explore, develop, and communicate mathematical relationships. Students use algebraic thinking to describe how a change in one quantity in a relationship results in a change in the other. Students connect verbal, numeric, graphic, and symbolic representations of relationships, including equations and

(B)

(C) determine if two expressions are equivalent using concrete models, pictorial models, and algebraic representations; and

(D) generate equivalent expressions using the properties of operations: inverse, identity, commutative, associative, and distributive properties.

(8) Expressions, equations, and relationships. The student applies mathematical process standards to use geometry to represent relationships and solve problems. The student is expected to:

(A) extend previous knowledge of triangles and their properties to include the sum of angles of a triangle, the relationship between the lengths of sides and measures of angles in a triangle, and determining when three lengths form a triangle;

(B) model area formulas for parallelograms, trapezoids, and triangles by decomposing and rearranging parts of these shapes;

(C) write equations that represent problems related to the area of rectangles, parallelograms, trapezoids, and triangles and volume of right rectangular prisms where dimensions are positive rational numbers; and

(D) determine solutions for problems involving the area of rectangles, parallelograms, trapezoids, and triangles and volume of right rectangular prisms where dimensions are positive rational numbers.

(9) Expressions, equations, and relationships. The student applies mathematical process standards to use equations and inequalities to represent situations. The student is expected to:

(A) write one-variable, one-step equations and inequalities to represent constraints or conditions within problems;

(B) represent solutions for one-variable, one-step equations and inequalities on number lines; and

(C) write corresponding real-world problems given one-variable, one-step equations or inequalities.

(10) Expressions, equations, and relationships. The student applies mathematical process standards to use equations and inequalities to solve problems. The student is expected to:

(A) model and solve one-variable, one-step equations and inequalities that represent problems, including geometric concepts; and

(B) determine if the given value(s) make(s) one-variable, one-step equations or inequalities true.

(11) Measurement and data. The student applies mathematical process standards to use coordinate geometry to identify locations on a plane. The student is expected to graph points in all four quadrants using ordered pairs of rational numbers.

(12) Measurement and data. The student applies mathematical process standards to use numerical or graphical representations to analyze problems. The student is expected to:

(A) represent numeric data graphically, including dot plots, stem-and-leaf plots, histograms, and box plots;

(B) use the graphical representation of numeric data to describe the center, spread, and shape of the data distribution;

(C) summarize numeric data with numerical summaries, including the mean and median (measures of center) and the range and interquartile range (IQR) (measures of spread), and use these summaries to describe the center, spread, and shape of the data distribution; and

(D) summarize categorical data with numerical and graphical summaries, including the mode, the percent of values in each category (relative frequency table), and the percent bar graph, and use these summaries to describe the data distribution.

(13) Measurement and data. The student applies mathematical process standards to use numerical or graphical representations to solve problems. The student is expected to:

(A) interpret numeric data summarized in dot plots, stem-and-leaf plots, histograms, and box plots; and

(B) distinguish between situations that yield data with and without variability.

(14) Personal financial literacy. The student applies mathematical process standards to develop an economic way of thinking and problem solving useful in one's life as a knowledgeable consumer and investor. The student is expected to:

(A) compare the features and costs of a checking account and a debit card offered by different

and communicate mathematical ideas. Students will display, explain, or justify mathematical ideas and arguments using precise mathematical language in written or oral communication.

(3) The primary focal areas in Grade 7 are number and operations; proportionality; expressions, equations, and relationships; and measurement and data. Students use concepts, algorithms, and properties of rational numbers to explore mathematical relationships and to describe increasingly complex situations. Students use concepts of proportionality to explore, develop, and communicate mathematical relationships, including number, geometry and measurement, and statistics and probability. Students use algebraic thinking to describe how a change in one quantity in a relationship results in a change in the other. Students connect verbal, numeric, graphic, and symbolic representations of relationships, including equations and inequalities. 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, and reasoning to draw conclusions, evaluate arguments, and make recommendations. While the use of all types of technology is important, the emphasis on algebra readiness skills necessitates the implementation of graphing technology.

(4) Statements that contain the word "including" reference content that must be mastered, while those containing the phrase "such as" are intended as possible illustrative examples.

(b) Knowledge and skills.

(1) Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:

(A) apply mathematics to problems arising in everyday life, society, and the workplace;

(B) use a problem-solving model t use7.422rote-2.8(d)-7(a)-2.17ruc-- g tttd.8(cal)2,Td [(u)8(s)5.5(4.831w)

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(A) represent constant rates of change in mathematical and real-world problems given pictorial, tabular, verbal, numeric, graphical, and algebraic representations, including d = rt;

(B) calculate unit rates from rates in mathematical and real-world problems;

(C) determine the constant of proportionality (k = y/x) within mathematical and real-world problems;

(D) solve problems involving ratios, rates, and percents, including multi-step problems involving percent increase and percent decrease, and financial literacy problems; and

(E) convert between measurement systems, including the use of proportions and the use of unit rates.

(5) Proportionality. The student applies mathematical process standards to use geometry to describe or solve problems involving proportional relationships. The student is expected to:

(A) generalize the critical attributes of similarity, including ratios within and between similar shapes;

(B) describe as the ratio of the circumference of a circle to its diameter; and

(C) solve mathematical and real-world problems involving similar shapes and scale drawings.

(6) Proportionality. The student applies mathematical process standards to use probability and statistics to describe or solve problems involving proportional relationships. The student is expected to:

(A) represent sample spaces for simple and compound events using lists and tree diagrams;

(B) select and use different simulations to represent simple and compound events with and without technology;

(C) make predictions and determine solutions using experimental data for simple and compound events;

(D) make predictions and determine solutions using theoretical probability for simple and compound events;

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

(F)

(B) explain verbally and symbolically the relationship between the volume of a triangular prism and a triangular pyramid having both congruent bases and heights and connect that

(D) use informal arguments to establish facts about the angle sum and exterior angle of triangles, the angles created when parallel lines are cut by a transversal, and the angle-angle criterion for similarity of triangles.

(9) Expressions, equations, and relationships. The student applies mathematical process standards to use multiple representations to develop foundational concepts of simultaneous linear equations. The student is expected to identify and verify values of x and y that simultaneously satisfy two linear equations in the form $y = mx + b$ from the intersections of the graphed equations.

(10) Two-dimensional shapes. The student applies mathematical process standards to develop transformational geometry concepts. The student is expected to:

(A) generalize the properties of orientation and congruence of rotations, reflections, translations, and dilations of two-dimensional shapes on a coordinate plane;

(B) differentiate between transformations that preserve congruence and those that do not;

(C) explain the effect of translations, reflections over the x- or y-axis, and rotations limited to 90°, 180°, 270°, and 360° as applied to two-dimensional shapes on a coordinate plane using an algebraic representation; and

(D) model the effect on linear and area measurements of dilated two-dimensional shapes.

(11) Measurement and data. The student applies mathematical process standards to use statistical procedures to describe data. The student is expected to:

(A) construct a scatterplot and describe the observed data to address questions of association such as linear, nonlinear, and no association between bivariate data;

(B) determine the mean absolute deviation and use this quantity as a measure of the average distance data are from the mean using a data set of no more than 10 data points; and

(C) simulate generating random samples of the same size from a population with known characteristics to develop the notion of a random sample being representative of the population from which it was selected.

(12) Personal financial literacy. The student applies mathematical process standards to develop an economic way of thinking and problem solving useful in one's life as a knowledgeable consumer and investor. The student is expected to:

(A) solve real-world problems comparing how interest rate and loan length affect the cost of credit;

(B) calculate the total cost of repaying a loan, including credit cards and easy access loans, under various rates of interest and over different periods using an online calculator;

(C) explain how small amounts of money invested regularly, including money saved for college and retirement, grow over time;

(D) calculate and compare simple interest and compound interest earnings;

(E) identify and explain the advantages and disadvantages of different payment methods;

(F) analyze situations to determine if they represent financially responsible decisions and identify the benefits of financial responsibility and the costs of financial irresponsibility; and

(G) estimate the cost of a two-year and four-year college education, including family contribution, and devise a periodic savings plan for accumulating the money needed to contribute to the total cost of attendance for at least the first year of college.

Source: The provisions of this §111.28 adopted to be effective September 1, 2017, 42 TexReg 3370.