Chapter 111. Texas Essential Knowledge and Skills for Mathematics
Subchapter A. Elementary

§111.6. Grade 4

(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, and 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) For students to become **_fluent in mathematics_**, students must develop a robust sense of number. The National Research Council's report, "Adding It Up," defines procedural fluency as "skill in carrying out procedures flexibly, accurately, efficiently, and appropriately." As students develop procedural fluency, they must also realize that true problem solving may take time, effort, and perseverance. Students in Grade 4 are expected to perform their work without the use of calculators.

(4) The **_primary focal areas_** in Grade 4 are
- use of operations,
- fractions, and decimals
- and describing and analyzing geometry and measurement.

These focal areas are supported throughout the mathematical strands of number and operations, algebraic reasoning, geometry and measurement, and data analysis. In Grades 3-5, the number set is limited to positive rational numbers. In number and operations, students will apply place value and represent points on a number line that correspond to a given fraction or terminating decimal. In algebraic reasoning, students will represent and solve multi-step problems involving the four operations with whole numbers with expressions and equations and generate and analyze patterns. In geometry and measurement, students will classify two-dimensional figures, measure angles, and convert units of measure. In data analysis, students will represent and interpret data.

(5) 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.

Mathematical Process Standards	Reporting Category 1: Numerical Representations and Relationships	Reporting Category 2: Computations and Algebraic Relationships	Reporting Category 3: Geometry and Measurement	Reporting Category 4: Data Analysis and Personal Financial Literacy
These student expectations will NOT be listed under a separate reporting category. Instead, they will be incorporated into test questions across reporting categories since the application of mathematical process standards is part of each knowledge statement. **4.1** 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 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; (C) *select* tools, including real objects, manipulatives, paper and pencil, and technology as appropriate, and techniques, including	The student will demonstrate an understanding of how to represent and manipulate numbers and expressions. **4.2** The student applies mathematical process standards to represent, compare, and order whole numbers and decimals and understand relationships related to place value. The student is expected to: (A) *interpret* the value of each place-value position as 10 times the position to the right and as one-tenth of the value of the place to its left; (B) *represent* the value of the digit in whole numbers through 1,000,000,000 and decimals to the hundredths *using* expanded notation and numerals; (C) *compare and order* whole numbers to 1,000,000,000 and represent comparisons using the symbols >, <, or =; (D) *round* whole numbers to a given place value through the hundred thousands place; (E) *represent* decimals, including tenths and hundredths, *using* concrete and visual models and money; (F) *compare and order* decimals *using* concrete and visual models to the hundredths;	The student will demonstrate an understanding of how to perform operations and represent algebraic relationships. **4.3** The student applies mathematical process standards to represent and generate fractions to solve problems. The student is expected to: (E) *represent and solve* addition and subtraction of fractions with equal denominators *using* objects and pictorial models that build to the number line and properties of operations; (F) *evaluate* the reasonableness of sums and differences of fractions *using* benchmark fractions 0, 1/4, 1/2, 3/4, and 1, referring to the same whole; and **4.4** The student applies mathematical process standards to develop and use strategies and methods for whole number computations and decimal sums and differences in order to solve problems with efficiency and accuracy. The student is expected to: (A) *add and subtract* whole numbers and decimals to the hundredths place using the standard algorithm; (B) *determine* products of a number and 10 or 100 using properties of operations and place value understandings;	The student will demonstrate an understanding of how to represent and apply geometry and measurement concepts. **4.5** The student applies mathematical process standards to develop concepts of expressions and equations. The student is expected to: (C) *use* models to *determine* the formulas for the perimeter of a rectangle (l + w + l + w or 2l + 2w), including the special form for perimeter of a square (4s) and the area of a rectangle (l x w); and (D) *solve* problems related to perimeter and area of rectangles where dimensions are whole numbers. **4.6** The student applies mathematical process standards to analyze geometric attributes in order to develop generalizations about their properties. The student is expected to: (A) *identify* points, lines, line segments, rays, angles, and perpendicular and parallel lines; (B) *identify and draw* one or more lines of symmetry, if they exist, for a two-dimensional figure; (C) *apply* knowledge of right angles to identify acute, right, and obtuse triangles; and (D) *classify* two-dimensional figures based on the presence or absence of parallel or perpendicular lines or the presence or absence of angles of a specified size.	The student will demonstrate an understanding of how to represent and analyze data and how to describe and apply personal financial concepts. **4.9** The student applies mathematical process standards to solve problems by collecting, organizing, displaying, and interpreting data. The student is expected to: (A) *represent* data on a frequency table, dot plot, or stem-and-leaf plot marked with whole numbers and fractions; and (B) *solve* one- and two-step problems using data in whole number, decimal, and fraction form in a frequency table, dot plot, or stem-and-leaf plot. **4.10** The student applies mathematical process standards to manage one's financial resources effectively for lifetime financial security. The student is expected to: (A) *distinguish* between fixed and variable expenses; (B) *calculate* profit in a given situation;

mental math, estimation, and number sense as appropriate, to *solve* problems;

(D) *communicate* mathematical ideas, reasoning, and their implications *using* multiple representations, including symbols, diagrams, graphs, and language as appropriate;

(E) *create and use* representations to organize, record, and communicate mathematical ideas;

(F) *analyze* mathematical relationships to connect and communicate mathematical ideas; and

(G) *display, explain, and justify* mathematical ideas and arguments *using* precise mathematical language in written or oral communication.

(G) *relate* decimals to fractions that name tenths and hundredths; and

(H) *determine* the corresponding decimal to the tenths or hundredths place of a specified point on a number line.

4.3 The student applies mathematical process standards to represent and generate fractions to solve problems. The student is expected to:

(A) *represent* a fraction a/b as a sum of fractions 1/b, where a and b are whole numbers and b > 0, including when a > b;

(B) *decompose* a fraction in more than one way into a sum of fractions with the same denominator *using* concrete and pictorial models and *recording* results with symbolic representations;

(C) *determine* if two given fractions are equivalent using a variety of methods;

(D) *compare* two fractions with different numerators and different denominators and *represent* the comparison using the symbols >, =, or <;

(G) *represent* fractions and decimals to the tenths or hundredths as distances from zero on a number line.

(C) *represent* the product of 2 two-digit numbers *using* arrays, area models, or equations, including perfect squares through 15 by 15;

(D) *use* strategies and algorithms, including the standard algorithm, to *multiply* up to a four-digit number by a one-digit number and to multiply a two-digit number by a two-digit number. Strategies may include mental math, partial products, and the commutative, associative, and distributive properties;

(E) *represent* the quotient of up to a four-digit whole number divided by a one-digit whole number *using* arrays, area models, or equations;

(F) *use* strategies and algorithms, including the standard algorithm, to *divide* up to a four-digit dividend by a one-digit divisor;

(G) *round* to the nearest 10, 100, or 1,000 or *use* compatible numbers, to estimate solutions involving whole numbers; and

(H) *solve with fluency* one- and two-step problems involving multiplication and division, including *interpreting* remainders.

4.5 The student applies mathematical process standards to develop concepts of expressions and equations. The student is expected to:

(A) *represent* multi-step problems involving the four operations with whole numbers using strip diagrams and equations with a letter standing for the unknown quantity;

4.7 The student applies mathematical process standards to solve problems involving angles less than or equal to 180 degrees. The student is expected to:

(A) *illustrate the measure* of an angle as the part of a circle whose center is at the vertex of the angle that is "cut out" by the rays of the angle. Angle measures are limited to whole numbers;

(B) *illustrate* degrees as the units used to measure an angle, where 1/360 of any circle is one degree and an angle that "cuts" *n*/360 out of any circle whose center is at the angle's vertex has a measure of n degrees. Angle measures are limited to whole numbers;

(C) *determine* the approximate measures of angles in degrees to the nearest whole number *using* a protractor;

(D) *draw* an angle with a given measure; and

(E) *determine* the measure of an unknown angle formed by two non-overlapping adjacent angles given one or both angle measures.

4.8 The student applies mathematical process standards to select appropriate customary and metric units, strategies, and tools to solve problems involving measurement. The student is expected to:

(A) *identify* relative sizes of measurement units within the customary and metric systems;

(B) *convert* measurements within the same measurement system, customary or metric, from a smaller unit into a larger unit or a larger unit into a smaller unit when given other equivalent measures represented in a table; and

(C) *compare* the advantages and disadvantages of various savings options;

(D) *describe* how to allocate a weekly allowance among spending, saving, including for college, and sharing; and

(E) *describe* the basic purpose of financial institutions, including keeping money safe, borrowing money, and lending money.

Mathematical Process Standards		(B) *represent* problems using an input-output table and numerical expressions to *generate* a number pattern that follows a given rule to generate a table to represent the relationship of the values in the resulting sequence and their position in the sequence;	(C) *solve* problems that deal with measurements of length, intervals of time, liquid volumes, mass, and money *using* addition, subtraction, multiplication, or division as appropriate.	
		Reporting Category 1: Numerical Representations and Relationships	Reporting Category 2: Computations and Algebraic Reasoning	Reporting Category 3: Geometry and Measurement	Reporting Category 4: Data Analysis and Personal Financial Literacy
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	Supporting Standards 10	Supporting Standards 7	Supporting Standards 7	Supporting Standards 4
	Total Assessment Questions 7-9	Total Assessment Questions 10-12	Total Assessment Questions 8-10	Total Assessment Questions 3-5
	Number of Points 8-12	Number of Points 12-16	Number of Points 9-13	Number of Points 3-6

ITEM TYPES BY POINT	1-point questions (multiple choice and non-multiple-choice items)	24 questions	24 points
	2-point questions (non-multiple-choice items)	8 questions	16 points
	Total	32 questions	40 points

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