ATTACHMENT
Text of Proposed New 19 TAC

Chapter 111. Texas Essential Knowledge and Skills for Mathematics

Subchapter B. Middle School

§111.29.

(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.

(c) 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 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 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.

(2) Numeracy--foundations of rational numbers. The student applies mathematical process standards to represent and use rational numbers in a variety of forms. The student is expected to:

(A) classify sets and subsets using a visual representation such as a Venn diagram or a hierarchy to describe relationships between sets of rational numbers;

(B) identify a number, its opposite, and its absolute value;

(C) represent benchmark fractions and percents such as 1%, 10%, 25%, 33 1/3%, and multiples of these values using 10 by 10 grids, strip diagrams, number lines, and numbers as proportional relationships;

(D) generate equivalent forms of fractions, decimals, and percents using real-world problems as proportional relationships, including problems that involve money;

(E) use equivalent fractions, decimals, and percents to show equal parts of the same whole as proportional relationships;

(F) locate, compare, and order integers and rational numbers using a number line;

(G) order a set of rational numbers arising from mathematical and real-world contexts; and

(H) use coordinate geometry to identify locations on a plane, including graphing points in all four quadrants using ordered pairs of rational numbers.

(3) Numeracy--operations with rational numbers. The student applies mathematical process standards to represent addition, subtraction, multiplication, and division while solving problems and justifying solutions. The student is expected to:

(A) recognize that din5.6 (3 (p)0.5)-55.5 (t-50 Td( )TjEMCbDC -0.025 Tc 086.2 (v)0.5 (i)86. (x)0.5 (p)0.6

(D) represent integer operations with concrete models and connect the actions with the models to standardized algorithms;

(E) add, subtract, multiply, and divide integers fluently;

(F) add, subtract, multiply, and divide rational numbers;

(G) generate equivalent numerical expressions using order of operations, including whole number exponents and prime factorization;

(H) balance a check register that includes deposits, withdrawals, and transfers; and

(I) create and organize a financial assets and liabilities record and construct a net worth statement.

(4) Numeracy--applications of percents. The student applies mathematical process standards to solve problems involving percents as proportional relationships. The student is expected to:

(A) solve real-world problems to find the whole given a part and the percent, to find the part given the whole and the percent, and to find the percent given the part and the whole, including the use of concrete and pictorial models; and

(B) calculate the sales tax for a given purchase and calculate income tax for earned wages.

(5) Proportionality--foundations of ratios and rates. The student applies mathematical process standards to develop an understanding of proportional relationships in problem situations. The student is expected to:

(A) give examples of ratios as multiplicative comparisons of two quantities describing the

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

(B) write corresponding real-world problems given one-variable, one- and two-step equations or inequalities;

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

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

(E) model and solve one-variable, two-step equations and inequalities; and

(F) determine if the given value(s) make(s) one-variable, one- and two-step equations and inequalities true.

(9) Two-variable equations and relationships. Foundations of linear relationships. The student applies mathematical process standards to use multiple representations to describe algebraic relationships. The student is expected to:

(A) identify independent and dependent quantities from tables and graphs;

(B) write an equation that represents the relationship between independent and dependent quantities from a table;

(13) Data science--foundations of measurement and data. The student applies mathematical process standards to represent and analyze data. The student is expected to:

(A) distinguish between situations that yield data with and without variability; and

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

(14) Data science--applications of measurement and data. The student applies mathematical process standards to use numerical or graphical representations to analyze and solve problems. The student is expected to:

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

(B) 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;

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

(D) solve problems using data represented in bar graphs, dot plots, and circle graphs, including part-to-whole and part-to-part comparisons and equivalents;

(E) compare two groups of numeric data using comparative dot plots or box plots by comparing their shapes, centers, and spreads; and

(F) 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.

(15) Personal financial literacy--money management. 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 local financial institutions;

(B) identify and explain the advantages and disadvantages of different payment methods, including distinguishing between debit cards and credit cards;

(C) explain why it is important to establish a positive credit history;

(D) describe the information in a credit report and how long it is retained;

(E) describe the value of credit reports to borrowers and to lenders;

(F) explain various methods to pay for college, including through savings, grants, scholarships, student loans, and work-

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. ÞBT/P ÆMCIk(e)21.5 (v).75 0.1.5 ((.)5fEMC BT/P ov).75 0.1.5 ((.)5fEMC 86.3 (y)0.5 (l)-153.6 (

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

(E)

(D) compare and contrast the attributes of a shape and its dilation(s) on a coordinate plane; and

(E) use an algebraic representation to explain the effect of a given positive rational scale factor applied to two-dimensional figures on a coordinate plane with the origin as the center of dilation.

(6) Proportionality--probability. 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) solve problems using qualitative and quantitative predictions and comparisons from simple experiments; and

(G) determine experimental and theoretical probabilities related to simple and compound events using data and sample spaces.

(7) One-variable expressions, equations, and relationships--applications of one-variable relationships. The student applies mathematical process standards to use one-variable equations or inequalities in problem situations. The student is expected to:

(A) represent solutions for one-variable, two-step inequalities on number lines;

(B) model and solve one-variable, two-step inequalities;

(C) write one-variable equations or inequalities with variables on both sides that(o)0.5 (n)0.5 (s)0v(b)-85.5 (le

The student is expected to represent linear proportional and non-proportional relationships using

evaluating the problem-

(B) write linear equations in two variables in various forms, including $y = mx + b$, $Ax + By = C$, and $y - y_1 = m(x - x_1)$, given one point and the slope and given two points;

(C) write linear equations in two variables given a table of values, a graph, and a verbal description;

(D) write and solve equations involving (v)0.5 0 9.75 180 69nonsn ts

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

(B) contrast bivariate sets of data that suggest a linear relationship with bivariate sets of data that do not suggest a linear relationship from a graphical representation;

(C) use a trend line that approximates the linear relationship between bivariate sets of data to make predictions;

(D) calculate, using technology, the correlation coefficient between two quantitative variables and interpret this quantity as a measure of the strength of the linear association;

(E) compare and contrast association and causation in real-world problems; and

(F) write, with and without technology, linear functions that provide a reasonable fit to data to estimate solutions and make predictions for real-world problems.

(5) Linear functions, equations, and inequalities. The student applies the mathematical process standards to solve, with and without technology, linear equations and evaluate the reasonableness of their solutions. The student is expected to:

(A) solve linear equations in one variable, including those for which the application of the distributive property is necessary and for which variables are included on both sides;

(B) solve linear inequalities in one variable, including those for which the application of the

(B) write, using technology, quadratic functions that provide a reasonable fit to data to estimate solutions and make predictions for real-world problems.

(9) Exponential functions and equations. The student applies the mathematical process standards when using properties of exponential functions and their related transformations to write, graph, and represent in multiple ways exponential equations and evaluate, with and without technology, the reasonableness of their solutions. The student formulates statistical relationships and evaluates their reasonableness based on real-world data. The student is expected to:

(A) determine the domain and range of exponential functions of the form $f(x) = ab^x$ and

(C) evaluate functions, expressed in function notation, given one or more elements in their domains;

(D)