Math Models- Benito Parra- 2019 to 2020

1) Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:
1A) apply mathematics to problems arising in everyday life, society, and the workplace;
1B) 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;
1C) 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;
1D) communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate;
1E) create and use representations to organize, record, and communicate mathematical ideas;
1F) analyze mathematical relationships to connect and communicate mathematical ideas; and
1G) display, explain, and justify mathematical ideas and arguments using precise mathematical language in written or oral communication.
2) Mathematical modeling in personal finance. The student uses mathematical processes with graphical and numerical techniques to study patterns and analyze data related to personal finance. The student is expected to:
2A) use rates and linear functions to solve problems involving personal finance and budgeting, including compensations and deductions;
2B) solve problems involving personal taxes; and
2C) analyze data to make decisions about banking, including options for online banking, checking accounts, overdraft protection, processing fees, and debit card/ATM fees.
3) Mathematical modeling in personal finance. The student uses mathematical processes with algebraic formulas, graphs, and amortization modeling to solve problems involving credit. The student is expected to:
3A) use formulas to generate tables to display series of payments for loan amortizations resulting from financed purchases;
3B) analyze personal credit options in retail purchasing and compare relative advantages and disadvantages of each option;
3C) use technology to create amortization models to investigate home financing and compare buying a home to renting a home; and
3D) use technology to create amortization models to investigate automobile financing and compare buying a vehicle to leasing a vehicle.
4) Mathematical modeling in personal finance. The student uses mathematical processes with algebraic formulas,

numerical techniques, and graphs to solve problems related to financial planning. The student is expected to:
4A) analyze and compare coverage options and rates in insurance;
4B) investigate and compare investment options, including stocks, bonds, annuities, certificates of deposit, and retirement plans; and
4C) analyze types of savings options involving simple and compound interest and compare relative advantages of these options.
5) Mathematical modeling in science and engineering. The student applies mathematical processes with algebraic techniques to study patterns and analyze data as it applies to science. The student is expected to:
5A) use proportionality and inverse variation to describe physical laws such as Hook's Law, Newton's Second Law of Motion, and Boyle's Law;
5B) use exponential models available through technology to model growth and decay in areas, including radioactive decay; and
5C) use quadratic functions to model motion.
6) Mathematical modeling in science and engineering. The student applies mathematical processes with algebra and geometry to study patterns and analyze data as it applies to architecture and engineering. The student is expected to:
6A) use similarity, geometric transformations, symmetry, and perspective drawings to describe mathematical patterns and structure in architecture;
6B) use scale factors with two-dimensional and three-dimensional objects to demonstrate proportional and non-proportional changes in surface area and volume as applied to fields;
6C) use the Pythagorean Theorem and special right-triangle relationships to calculate distances; and
6D) use trigonometric ratios to calculate distances and angle measures as applied to fields.
7) Mathematical modeling in fine arts. The student uses mathematical processes with algebra and geometry to study patterns and analyze data as it applies to fine arts. The student is expected to:
7A) use trigonometric ratios and functions available through technology to model periodic behavior in art and music;
7B) use similarity, geometric transformations, symmetry, and perspective drawings to describe mathematical patterns and structure in art and photography;
7C) use geometric transformations, proportions, and periodic motion to describe mathematical patterns and structure in music; and
7D) use scale factors with two-dimensional and three-dimensional objects to demonstrate proportional and non-proportional changes in surface area and volume as applied to fields.
8) Mathematical modeling in social sciences. The student applies mathematical processes to determine the number of elements in a finite sample space and compute the probability of an event. The student is expected to:

8A) determine the number of ways an event may occur using combinations, permutations, and the Fundamental Counting Principle;
8B) compare theoretical to empirical probability; and
8C) use experiments to determine the reasonableness of a theoretical model such as binomial or geometric.
9) Mathematical modeling in social sciences. The student applies mathematical processes and mathematical models to analyze data as it applies to social sciences. The student is expected to:
9A) interpret information from various graphs, including line graphs, bar graphs, circle graphs, histograms, scatterplots, dot plots, stem-and-leaf plots, and box and whisker plots, to draw conclusions from the data and determine the strengths and weaknesses of conclusions;
9B) analyze numerical data using measures of central tendency (mean, median, and mode) and variability (range, interquartile range or IQR, and standard deviation) in order to make inferences with normal distributions;
9C) distinguish the purposes and differences among types of research, including surveys, experiments, and observational studies;
9D) use data from a sample to estimate population mean or population proportion;
9E) analyze marketing claims based on graphs and statistics from electronic and print media and justify the validity of stated or implied conclusions; and
9F) use regression methods available through technology to model linear and exponential functions, interpret correlations, and make predictions.
10) Mathematical modeling in social sciences. The student applies mathematical processes to design a study and use graphical, numerical, and analytical techniques to communicate the results of the study. The student is expected to:
10A) formulate a meaningful question, determine the data needed to answer the question, gather the appropriate data, analyze the data, and draw reasonable conclusions; and
10B) communicate methods used, analyses conducted, and conclusions drawn for a data-analysis project through the use of one or more of the following: a written report, a visual display, an oral report, or a multi-media presentation.
Statutory Authority: The provisions of this §111.43 issued under the Texas Education Code, §§7.102(c)(4), 28.002, and 28.025.
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