

Tennessee Mathematics Standards

Approved July 30, 2010

Senior Finite Math #3182

NOTE: This course is designed to prepare students for both college and the workplace. Students choosing this course would be less likely to enroll in a STEM Calculus course upon entering college. However, this course will provide a foundation for students entering a business application Calculus course or other general education mathematics course.

Standard 1 – Mathematical Processes

Course Level Expectations

CLE 3182.1.1 Use mathematical language, symbols, definitions, proofs and counterexamples correctly and precisely in mathematical reasoning.

CLE 3182.1.2 Apply and adapt a variety of appropriate strategies to problem solving, including testing cases, estimation, and then checking induced errors and the reasonableness of the solution.

CLE 3182.1.3 Develop inductive and deductive reasoning to independently make and evaluate mathematical arguments and construct appropriate proofs; include various types of reasoning, logic, and intuition.

CLE 3182.1.4 Move flexibly between multiple representations (contextual, physical, written, verbal, iconic/pictorial, graphical, tabular, and symbolic), to solve problems, to model mathematical ideas, and to communicate solution strategies.

CLE 3182.1.5 Recognize and use mathematical ideas and processes that arise in different settings, with an emphasis on formulating a problem in mathematical terms, interpreting the solutions, mathematical ideas, and communication of solution strategies.

CLE 3182.1.6 Employ reading and writing to recognize the major themes of mathematical processes, the historical development of mathematics, and the connections between mathematics and the real world.

CLE 3182.1.7 Use technologies appropriately to develop understanding of abstract mathematical ideas, to facilitate problem solving, and to produce accurate and reliable models.

Check for Understanding (Formative/Summative Assessment)

- ✓ 3182.1.1 Use the language and notation of functions to develop models of real-world phenomena.
- ✓ 3182.1.2 Understand the importance of mathematics and its applications in both business and the social sciences.

- ✓ 3182.1.3 Interpret outcomes for solving applications involving Venn diagrams, truth tables, and various statistical graphs.
- ✓ 3182.1.4 Recognize algebra's relationship in business and real-world situations.
- ✓ 3182.1.5 Operate with sets and use set theory to solve problems.
- ✓ 3182.1.6 Recognize, interpret, and develop meaningful scenarios using standard financial vocabulary, including terms such as compound interest, annuitization, amortization, future value, and present value.
- ✓ 3182.1.7 Demonstrate through discussion and examples the connections between economics, finance, and mathematics: in particular, interpret the implications of annuities, amortizations, interest rates, and similar concepts in terms of making personal financial decisions.

Standard 2 – Number & Operations

Course Level Expectations

- CLE 3182.2.1 Operate with and use matrices.
- CLE 3182.2.2 Use Markov Chains to solve problems.
- CLE 3182.2.3 Apply arithmetic and geometric sequences to simple and compound interest, annuities, loans, and amortization.
- CLE 3182.2.4 Solve contextual problems involving financial decision-making.
- CLE 3182.2.5 Use exponents & logarithms to model, predict, and solve contextual problems.
- CLE 3182.2.6 Recognize the importance of applying a financial model to business.

Check for Understanding (Formative/Summative Assessment)

- ✓ 3182.2.1 Perform matrix operations in a variety of ways, including the use of technology.
- ✓ 3182.2.2 Find and use the inverse of a matrix to solve a contextual problem.
- ✓ 3182.2.3 Define interest and compound interest.
- ✓ 3182.2.4 Define annuities and sinking funds.
- ✓ 3182.2.5 Determine future value and present value of an annuity.
- ✓ 3182.2.6 Determine the amortization schedule for an annuity and a home mortgage.
- ✓ 3182.2.7 Apply financial mathematics to depreciation schedules.
- ✓ 3182.2.8 Know when to use transcendental functions to accomplish various application purposes such as predicting population growth.
- ✓ 3182.2.9 Expand and condense logarithmic expressions.
- ✓ 3182.2.10 Solve problems in mathematics of finance involving compound interest using exponential and logarithmic techniques.
- ✓ 3182.2.11 Use orders of magnitude estimates for determining an appropriate model for a contextual situation.

Standard 3 – Algebra

Course Level Expectations

- CLE 3182.3.1 Describe functions through various representations: including words;

equations; tables; and graphs; and discuss how they are used in modeling contextual situations.

CLE 3182.3.2 Read, interpret and solve linear programming problems graphically and by computational methods.

CLE 3182.3.3 Examine linear systems and matrices and their applications.

CLE 3182.3.4 Use mathematical models involving equations and systems of equations to represent, interpret and analyze quantitative relationships, change in various contexts, and other real-world phenomena.

CLE 3182.3.5 Understand the basic principles of linear modeling.

Check for Understanding (Formative/Summative Assessment)

- ✓ 3182.3.1 Analyze the effect of changing various parameters on functions and their graphs.
- ✓ 3182.3.2 Graph systems of linear inequalities with multiple constraints and identify vertices of the feasible region.
- ✓ 3182.3.3 Interpret the meaning of the maximum or minimum value in terms of the objective function.
- ✓ 3182.3.4 Use matrices to solve systems of linear equations, with or without technology, including the Echelon Method and the Gauss-Jordan Method.
- ✓ 3182.3.5 Use linear programming to solve optimization problems.
- ✓ 3182.3.6 Determine the best regression model for a variety of data, including linear, quadratic, and exponential.
- ✓ 3182.3.7 Recognize the existence of infinite solutions to systems of linear equations; be able to express these solutions in parametric form.
- ✓ 3182.3.8 Be able to correctly identify and write the general solution to a system of linear equations; in the case of infinite solution set, select various particular solutions given specific properties.

Standard 4 – Geometry & Measurement

Course Level Expectations:

CLE 3182.4.1 Investigate logic.

CLE 3182.4.2 Perform set operations such as union, intersection, complement, and negation.

CLE 3182.4.3 Use a truth table to draw conclusions about a statement

CLE 3182.4.4 Judge the validity of arguments and give counterexamples to disprove statements.

CLE 3182.4.5 Understand the mathematical basis of apportionment principles and paradoxes.

CLE 3182.4.6 Analyze arguments with quantifiers through the use of Venn diagrams.

Check for Understanding (Formative/Summative Assessment)

- ✓ 3182.4.1 Define conjunction, disjunction, negation, conditional, and biconditional.
- ✓ 3182.4.2 Analyze and compare sets.
- ✓ 3182.4.3 Construct truth tables for the logical operators.
- ✓ 3182.4.4 Define the order of operation for the logical operators.

- ✓ 3182.4.5 Apply the laws of logic.
- ✓ 3182.4.6 Represent logical statements with networks.
- ✓ 3182.4.7 Work with logic puzzles.
- ✓ 3182.4.8 Compare apportionments between states and the validity of the resulting representations.
- ✓ 3182.4.9 Discuss the differences between two different types of apportionment and construct an example illustrating them.
- ✓ 3182.4.10 Analyze survey data using Venn diagrams.

Standard 5 – Data Analysis, Statistics, & Probability

Course Level Expectations

- CLE 3182.5.1 Develop concepts in probability, including sample spaces and event probabilities.
- CLE 3182.5.2 Distinguish between and use permutations and combinations to solve problems.
- CLE 3182.5.3 Organize data for problem solving.
- CLE 3182.5.4 Calculate and interpret statistical problems using measures of central tendencies and graphs.

Check for Understanding (Formative/Summative Assessment)

- ✓ 3182.5.1 Understand and apply the relationship between conditional probabilities and the probabilities of the individual events.
- ✓ 3182.5.2 Calculate conditional probabilities using Bayes Theorem.
- ✓ 3182.5.3 Define the relationship between permutations and the multiplication principle.
- ✓ 3182.5.4 Differentiate between permutations and combinations.
- ✓ 3182.5.5 Determine and interpret measures of variation of a data set, with or without technology.
- ✓ 3182.5.6 Evaluate expressions indicating permutations or combinations.
- ✓ 3182.5.7 Use a variety of counting methods to organize information, determine probabilities, and solve problems.
- ✓ 3182.5.8 Interpret pie charts and bar graphs.
- ✓ 3182.5.9 Calculate expected value, e.g. to determine the fair price of an investment.
- ✓ 3182.5.10 Evaluate and compare two investments or strategies, where one investment or strategy is safer but has lower expected value. Include large and small investments, and situations with serious consequences