Common Core Georgia Performance Standards
Mathematics of Finance

Mathematics Common Core Georgia Performance Standards

K-12 Mathematics Introduction

The Georgia Mathematics Curriculum focuses on actively engaging the students in the development of mathematical understanding by using manipulatives and a variety of representations, working independently and cooperatively to solve problems, estimating and computing efficiently, and conducting investigations and recording findings. There is a shift towards applying mathematical concepts and skills in the context of authentic problems and for the student to understand concepts rather than merely follow a sequence of procedures. In mathematics classrooms, students will learn to think critically in a mathematical way with an understanding that there are many different ways to a solution and sometimes more than one right answer in applied mathematics. Mathematics is the economy of information. The central idea of all mathematics is to discover how knowing some things well, via reasoning, permit students to know much else—without having to commit the information to memory as a separate fact. It is the connections, the reasoned, logical connections that make mathematics manageable. As a result, implementation of Mathematics Common Core Georgia Performance Standards places a greater emphasis on problem solving, reasoning, representation, connections, and communication.

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The course concentrates on the mathematics necessary to understand and make informed decisions related to personal finance. The mathematics in the course will be based on many topics in prior courses; however, the specific applications will extend the student's understanding of when and how to use these topics.

Instruction and assessment should include the appropriate use of manipulatives and technology. Topics should be represented in multiple ways, such as concrete/pictorial, verbal/written, numeric/data-based, graphical, and symbolic. Concepts should be introduced and used, where appropriate, in the context of realistic phenomena.

NUMBER AND OPERATIONS
Students will explore the applications of ratios, proportions, and percents in financial situations.

MMFN1. **Students will use fractions, percents, and ratios to solve problems related to stock transactions, credit cards, taxes, budgets, automobile purchases, fuel economy, Social Security, Medicare, retirement planning, checking and saving accounts and other related finance applications.**
   a. Apply percent increase and decrease.
   b. Apply ratios and proportions.

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ALGEBRA
Students will explore the applications of functions, their characteristics, their use in modeling and matrices for solving problems in financial situations.

MMFA1. Students will use basic functions to solve and model problems related to stock transactions, banking and credit, employment and taxes, rent and mortgages, retirement planning, and other related finance applications.
    a. Apply linear, quadratic, and cubic functions.
    b. Apply rational and square root functions.
    c. Apply greatest integer and piecewise functions.
    d. Apply exponential and logarithmic functions.

MMFA2. Students will understand the characteristics of these functions as they relate to financial situations.
    a. Understand domain and range when limited to a problem situation.
    b. Understand and apply limits as end behavior of modeling functions.

MMFA3. Students will use formulas to investigate investments in banking and retirement planning.
    a. Apply simple and compound interest formulas.
    b. Apply future and present value formulas.

MMFA4. Students will understand and use matrices to represent data and solve banking and retirement planning problems.

GEOMETRY
Students will use geometry to explore real-world applications including, but not limited to, floor plans, square footage, models of furniture arrangements, trip planning, and accident investigations.

MMFG1. Students will apply the concepts of area, volume, scale factors, and scale drawings to planning for housing.

MMFG2. Students will apply the distance formula.

MMFG3. Students will apply the properties of angles and segments in circles.

DATA ANALYSIS AND STATISTICS
Students will explore representations and models of data as tools in the decision making process of finance.

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MMFD1. **Students will use measures of central tendency to investigate data found in the stock market, retirement planning, transportation, budgeting, and home rental or ownership.**

MMFD2. **Students will use data displays including bar graphs, line graphs, stock bar charts, candlestick charts, box and whisker plots, stem and leaf plots, circle graphs, and scatterplots to recognize and interpret trends related to the stock market, retirement planning, insurance, car purchasing, and home rental or ownership.**

MMFD3. **Students will use linear, quadratic, and cubic regressions as well as the correlation coefficient to move supply and demand, revenue, profit, and other financial problem situations.**

MMFD4. **Students will use probability, the Monte Carlo method, and expected value to model and predict outcomes related to the stock market, retirement planning, insurance, and investing.**

Terms/Symbols: capital, profit, stock, stock holder, stock market, net change, spreadsheet, candlestick chart, stock bar chart, smoothing techniques, simple moving average, capital gain, capital loss, commission, dividend, preferred stock, common stock, maturity, stock value, explanatory variable, response variable, supply, demand, markup, retail price, equilibrium, revenue, debit, credit, overdraft, reconcile, future value, present value, asset, credit rating, finance charge, balloon payment, wage garnishment, cosigner, cubic regression, average daily balance, prime interest rate, liability, uninsured, no-fault, deductible, insurance, appreciation, depreciation, straight line depreciation, stem and leaf plot, exponential depreciation, braking distance, skid mark, yaw mark, overtime, gross pay, net pay, property tax, sales tax, income tax, debt-to-income ratio, points, amortization, budget matrix, cash flow, net worth.

PROCESS STANDARDS

The following process standards are essential to mastering each of the mathematics content standards. They emphasize critical dimensions of the mathematical proficiency that all students need.

MMFP1. Students will solve problems (using appropriate technology).
    a. Build new mathematical knowledge through problem solving.
    b. Solve problems that arise in mathematics and in other contexts.
    c. Apply and adapt a variety of appropriate strategies to solve problems.
    d. Monitor and reflect on the process of mathematical problem solving.

MMFP2. Students will reason and evaluate mathematical arguments.

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    a. Recognize reasoning and proof as fundamental aspects of mathematics.
    b. Make and investigate mathematical conjecture.
    c. Develop and evaluate mathematical arguments and proofs.
    d. Select and use various types of reasoning and methods of proof.

MMFP3. Students will communicate mathematically.
    a. Organize and consolidate their mathematical thinking through communication.
    b. Communicate their mathematical thinking coherently and clearly to peers, teachers, and
       others.
    c. Analyze and evaluate the mathematical thinking and strategies of others.
    d. Use the language of mathematics to express mathematical ideas precisely.

MMFP4. Students will make connections among mathematical ideas and to other disciplines.
    a. Recognize and use connections among mathematical ideas.
    b. Understand how mathematical ideas interconnect and build on one another to produce a
       coherent whole.
    c. Recognize and apply mathematics in contexts outside of mathematics.

MMFP5. Students will represent mathematics in multiple ways.
    a. Create and use representations to organize, record, and communicate mathematical ideas.
    b. Select, apply, and translate among mathematical representations to solve problems.
    c. Use representations to model and interpret physical, social, and mathematical phenomena.

Reading Standard Comment

After the elementary years, students are seriously engaged in reading for learning. This process sweeps across all disciplinary domains, extending even to the area of personal learning. Students encounter a variety of informational as well as fictional texts, and they experience text in all genres and modes of discourse. In the study of various disciplines of learning (language arts, mathematics, science, social studies), students must learn through reading the communities of discourse of each of those disciplines. Each subject has its own specific vocabulary, and for students to excel in all subjects, they must learn the specific vocabulary of those subject areas *in context.*

Beginning with the middle grades years, students begin to self-select reading materials based on personal interests established through classroom learning. Students become curious about science, mathematics, history, and literature as they form contexts for those subjects related to their personal and classroom experiences. As students explore academic areas through reading, they develop favorite subjects and become confident in their verbal discourse about those subjects.

Reading across curriculum content develops both academic and personal interests in students. As students read, they develop both content and contextual vocabulary. They also build good habits for reading, researching, and learning. The Reading Across the Curriculum standard focuses on the academic and personal skills students acquire as they read in all areas of learning.

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MRC. Students will enhance reading in all curriculum areas by:
  a. Reading in all curriculum areas
- Read a minimum of 25 grade-level appropriate books per year from a variety of subject disciplines and participate in discussions related to curricular learning in all areas
- Read both informational and fictional texts in a variety of genres and modes of discourse
- Read technical texts related to various subject areas
  b. Discussing books
- Discuss messages and themes from books in all subject areas.
- Respond to a variety of texts in multiple modes of discourse.
- Relate messages and themes from one subject area to messages and themes in another area.
- Evaluate the merit of texts in every subject discipline.
- Examine author's purpose in writing.
- Recognize the features of disciplinary texts.
  c. Building vocabulary knowledge
- Demonstrate an understanding of contextual vocabulary in various subjects.
- Use content vocabulary in writing and speaking.
- Explore understanding of new words found in subject area texts.
  d. Establishing context
- Explore life experiences related to subject area content.
- Discuss in both writing and speaking how certain words are subject area related.
- Determine strategies for finding content and contextual meaning for unknown words.