

Finite: Mathematics of Finance

ESTABLISHED GOALS:

Competencies:

- Students will demonstrate perseverance and strategic thinking by identifying the underlying meaning of a problem, planning a logical solution pathway, working through challenges, and verifying the reasonableness of their answers.
- Students will demonstrate logical thinking and communication skills by building justified mathematical arguments, comprehending the justification of others, and critiquing their reasoning.
- Students will demonstrate application skills by using mathematical concepts and symbols to represent, analyze, and solve problems arising in everyday life, society, and the workplace.
- Students will demonstrate resourcefulness by evaluating and selecting the most effective tools to solve mathematical problems and deepen their understanding of concepts.
- Students will demonstrate accuracy and clarity using correct mathematical terminology, specifying units of measure, and calculating with the degree of precision appropriate for the problem context.
- Students will demonstrate the ability to analyze and summarize text and integrate knowledge to make meaning of discipline-specific materials.
- Students will demonstrate the ability to produce coherent and supported writing in order to communicate effectively for a range of discipline-specific tasks, purposes, and audiences.
- Students will demonstrate the ability to speak purposefully and effectively by strategically making decisions about content, language use, and discourse style.

Content Standards:

- A.CED.2 Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.
- A.CED.3 Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or non-viable options in a modeling context.
- A.REI.10 Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line).
- F-IF.1 Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. If f is a function and x is an element of its domain, then $f(x)$ denotes the output of f corresponding to the input x . The graph of f is the graph of the equation $y = f(x)$.
- F-IF.4 For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of

Transfer

*Students will be able to independently use their learning to **make informed decisions about investments and loans.***

Meaning

ENDURING UNDERSTANDINGS

Students will understand that...

- a knowledge of the mathematics of investments and loans is important for not only business majors but for all adults.
- the best choice for the form of an investment depends largely on how the interest payment best suits the need of the investor.
- consideration of the total interest paid over the life of a loan is important in selecting a loan type.

ESSENTIAL QUESTIONS

- When does a short-term benefit outweigh a long-term one?

Acquisition

Students will know...

- that while multi-letter variables are almost never used in mathematics, they are common in financial formulas.
- that future value can be represented as a function of time.
- that the yield and the discount rate are two different ways of determining what the investment pays.
- that fees on loans can be thought of as a form of interest.

formulas for: simple interest, future value for simple interest, present value for simple interest, future value of compound interest, the present value of compound interest.

Students will be skilled at...

- computing simple interest.
- calculating present value of an investment.
- applying simple interest formulas to real world examples.
- interpreting financial news.
- using the financial capabilities of graphing calculators.
- calculating the future value of an investment.
- calculating the present value of an investment.
- finding effective annual interest rates.
- calculating the future value and payments of a sinking fund.
- calculating the present value and payments of an annuity.
- using a spreadsheet to analyze financial models.

the quantities, and sketch graphs showing key features given a verbal description of the relationship. Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity. • F-IF.5 Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. • F-IF.6 Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph. • F-IF.7 Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. • F-IF.C.7a Graph linear functions and show intercepts. • F.LE.5 Interpret the parameters in a linear or exponential function in terms of a context. • MP2 Reason abstractly and quantitatively. • MP4 Model with mathematics. • MP5 Use appropriate tools strategically. • MP7 Look for and make use of structure. • MP8 Look for and express regularity in repeated reasoning.	<i>vocabulary: simple interest, principal, present value, future value, bonds, matures, treasury bills, yield, discount rate, maturity value, compound interest, reinvests, compounding, compounding period, inflation, constant dollars, effective interest rate, annuity, savings account, pension fund, sinking fund, amortizing, yield, rate of return, bond, subprime mortgage, adjustable rate loan</i>	
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Content Area Literacy Standards	21st Century Skills
• RST.9-10.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. • RST.9-10.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to <i>grades 9-10 texts and topics</i>. • RST.9-10.7 Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.	• <i>reason effectively</i> • <i>use systems thinking</i> • <i>solve problems</i> • <i>access and evaluate information</i> • <i>use and manage information</i> • <i>be self-directed learners</i>

<i>Evaluative Criteria</i>	<i>Assessment Evidence</i>
	PERFORMANCE TASK(S):
	OTHER EVIDENCE:

<i>Summary of Key Learning Events and Instruction</i>		
<i>Science Integration</i>	<i>College, Career, and Civic Life Integration</i>	<i>Technology Integration</i>
<i>District Materials</i>	<i>Distance Learning/Field Trips</i>	<i>Technology Resources</i>