

**Standard - New Jersey Student Learning Standards: N-Q, A-SSE, A-CED, A-REI, F-IF, F-LE, F-BF
Consumer Mathematics (Chapter 10)****Strand****N-Q: Quantities****Reason quantitatively and use units to solve problems.**

1. Use units as a way to understand problems and to guide the solutions of multi-step problems; choose and interpret unit's consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.
2. Define appropriate quantities for the purpose of descriptive modeling.
3. Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

A-SSE: Seeing Structure of Expressions**Interpret the structure of expressions.**

1. Interpret expressions that represent a quantity in terms of its context*.
 - a. Interpret parts of an expression, such as terms, factors, and coefficients.
 - b. Interpret complicated expressions by viewing one or more of their parts as a single entity. For example, interpret $P(1+r)^n$ as the product of P and a factor not depending on P .

A-CED: Creating Equations***Create equations that describe numbers or relationships.**

1. Create equations and inequalities in one variable and use them to solve problems. *Include equations arising from linear and quadratic functions, and simple rational and exponential functions.*
2. Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.
3. Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in modeling context. *For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.*

A-REI: Reasoning with Equations and Inequalities**Understand solving equations as a process of reasoning and explain the reasoning.**

1. Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.
2. Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.

F-IF: Interpreting Functions

Interpret functions that arise in application in terms of the context.

4. For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given in 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.**
5. Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. *For example, if the function $h(n)$ gives the number of person-hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function.**
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.*

Analyze functions using different representations.

7. Graph functions expressed symbolically and show key features of the graph, by hand in sample cases and using technology for more complicated cases.*
 - a. Graph linear and quadratic functions and show intercepts, maxima, and minima.
 - b. Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.

F-BF: Building Functions**Build a function relationship that models a relationship between two quantities.**

1. Write a function that describes a relationship between two quantities.*
 - a. Determine an explicit expression, a recursive process, or steps for calculations from a context.
 - b. Combine standard function types using arithmetic operations. *For example, build a function that models the temperature of a cooling body by adding a constant function to a decaying exponential and relate these functions to the model.*
 - c. (+) Compose functions. *For example, if $T(y)$ is the temperature in the atmosphere as a function of height, and $h(t)$ is the height of a weather balloon as a function of time, then $T(h(t))$ is the temperature at the location of the weather balloon as a function of time.*

F-LE: Linear and Exponential Models***Construct and compare linear and exponential models and solve problems.**

1. Distinguish between situations that can be modeled with linear functions and with exponential functions.
 - a. Prove that linear functions grow by equal differences over intervals, and that exponential functions grow by equal factors over equal intervals.
 - b. Recognize situations in which one quantity changes at a constant rate per unit interval relative to another.
 - c. Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another.
2. Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).

3. Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function.
4. For exponential models, express as a logarithm the solution to $ab^{ct} = d$ where a , c , and d are numbers and the base b is 2, 10 or e ; evaluate the logarithm using technology.

Interpret expressions for functions in terms of the situation they model.

5. Interpret the parameters in a linear or exponential function in terms of a context.

Curriculum aligned with: 2009 New Jersey Core Curriculum Content Standards for 21st Century Skills (9.1 A-F)

21st Century Theme: Global Awareness , Financial, economic, business and entrepreneurial literacy , Civic literacy , Health literacy , Environmental Literacy

21st Century Skills: Critical Thinking & Problem Solving , Creativity and Innovation , Collaboration, Teamwork and Leadership , Cross-Cultural Understanding and Interpersonal Communications Communication and Media Fluency , Accountability, Productivity and Ethics

Interdisciplinary Connection: Math=MA, English=ELA, Science=SCI, Social Studies=SS, Physical Education=PE, Art=ART, Music=MU, Technology=TECH, World Language=WL, Business = BU

Essential Questions	Enduring Understandings	Activities, Investigation, and Student Experiences
<ol style="list-style-type: none"> 1. What is the difference between simple interest and compound interest? 2. How do fixed loans work? 3. How do you take a mortgage out on a house? 	<p><i>Students will understand....</i></p> <ul style="list-style-type: none"> ● Percent ● Personal Loans and Simple Interest <ul style="list-style-type: none"> ● Compound Interest ● Installment Buying ● Buying a House with a Mortgage <ul style="list-style-type: none"> ● Ordinary Annuities, Sinking Funds, and Retirement Investments. 	<p style="text-align: center;">Task 1:BU</p> <p>Philip agrees to lend \$850 to his friend Joe to help Joe travel to Cincinnati to attend a family wedding. Nine months later, Joe repaid the original \$850 plus %51 interest. What annual rate of interest did Joe pay to Phillip?</p> <p style="text-align: center;">Answer:</p> <p>We need to solve for the interest rate. Since the time is 9 months, the time in years is 9/12 or 0.75. Using the formula $i = prt$, we get</p> <p style="text-align: center;">Task 2:</p> <p>Charlotte had a salary of \$41,500 during the first year of a new job and a salary of \$42,745 during the second year. Determine the percent of increase in Charlotte's salary from the first year to the second year.</p>

		<p style="text-align: center;">Answer:</p> <p style="text-align: center;">We find the difference divided by the original</p> $42745 - 41500 = 1245$ $\frac{1245}{41500} = 0.03$ <p style="text-align: center;">So Charlotte had a 3% raise.</p>
Content Statements	Cumulative Progress Indicators	
<p><i>Students will know...</i></p> <ul style="list-style-type: none"> ● Percent, fractions, and decimals ● Percent increase, percent decrease, and percent markup and markdowns <ul style="list-style-type: none"> ● Simple interest ● Compound interest <ul style="list-style-type: none"> ● Present value ● Fixed and open-ended installment loans <ul style="list-style-type: none"> ● Mortgages ● Annuities, sinking funds, and retirement investments. 	<ul style="list-style-type: none"> ● Tests ● Quizzes ● Practice problems for homework ● Workbook pages ● Worksheets 	<p style="text-align: center;">Task 3:</p> <p>Kathy invested \$3000 in a savings account with an interest rate of 1.8% compounded monthly. If Kathy makes no other deposits into this account, determine the amount in the savings account after 2 years.</p> <p style="text-align: center;">Answer:</p> <p style="text-align: center;">Use the compound interest formula</p> $A = p\left(1 + \frac{r}{n}\right)^{nt}$ $A = 3000\left(1 + \frac{0.018}{12}\right)^{12 \cdot 2}$ $A = 3109.88$ <p style="text-align: center;">Modifications and/or Accommodations:</p> <ul style="list-style-type: none"> ● Special Education: Utilize a multi-sensory (VAKT) approach during instruction, provide alternate presentations of skills by varying the method (repetition, simple explanations, additional examples, modeling, etc.), modify test content and/or format, allow students to retake test for additional credit, provide additional times and preferential seating as needed, review, restate and repeat directions, provide study guides, and/or break assignments into segments of shorter tasks.
Desired Results		

<ul style="list-style-type: none"> ● Personal Loans and Simple Interest ● Compound Interest ● Installment Buying ● Buying a House with a Mortgage ● Ordinary Annuities, Sinking Funds, and Retirement Investments. 	<ul style="list-style-type: none"> ● English Language Learners: Extend time requirements, preferred seating, positive reinforcement, check often for understanding/review, oral/visual directions/prompts when necessary, supplemental materials including use of online bilingual dictionary, and modified assessment and/or rubric. ● Students at Risk of School Failure: Deliver instruction utilizing varied learning styles including audio, visual, and tactile/kinesthetic, provide individual instruction as needed, modify assessments and/or rubrics, repeat instructions as needed. ● Gifted Students: Create an enhanced set of introductory activities, integrate active teaching/learning opportunities, incorporate authentic components, propose interest-based extension activities, and connect student to related talent development opportunities <p>Spot Light On: <i>Use multiple ways of assessing student understanding.</i></p>
<p align="center">Standards for Mathematical Practices</p>	
<ol style="list-style-type: none"> 1. Make sense of problems and persevere in solving them. 2. Reason abstractly and quantitatively. 3. Construct viable arguments and critique the reasoning of others. 4. Model with mathematics. 5. Use appropriate tools strategically. 6. Attend to precision. 7. Look for and make use of structure. 8. Look for and express regularity in repeated reasoning. 	
	<p align="center">Teacher Resources</p>

	<p>Mymathlab.com http://achievethecore.org https://learnzillion.com https://www.khanacademy.org/ https://www.desmos.com/ http://www.ixl.com</p>
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LGBT and Disabilities Law: *N.J.S.A. 18A:35-4.35*
 Neil Devine
 The mission is to ensure that every student is able to see themselves in our rich and diverse history.

Social and Emotional Learning: Competencies	Social and Emotional Learning: Sub-Competencies
Self-Awareness Social Awareness Self-Management Relationship Skills Responsible Decision-Making	<ul style="list-style-type: none"> ● Recognizing the importance of self-confidence in handling daily tasks and challenges. ● Demonstrate an awareness of the expectations for social interactions in a variety of ways. ● Demonstrate an understanding of the need for mutual respect when viewpoints differ. ● Recognize the skills needed to establish and achieve personal and educational goals. ● Utilize positive communication and social skills to interact effectively with others. ● Develop, implement, and model effective problem solving and critical thinking skills.

New Jersey Legislative Statutes and Administrative Code (place an "X" before each law/statute if/when present within the curriculum map)							
Amistad Law: <i>N.J.S.A. 18A 52:16A-88</i>		Holocaust Law: <i>N.J.S.A. 18A:35-28</i>	x	LGBT and Disabilities Law: <i>N.J.S.A. 18A:35-4.35</i>	x	Diversity & Inclusion: <i>N.J.S.A. 18A:35-4.36a</i>	Standards in Action: <i>Climate Change</i>