

# Unit 3 Linear Functions

Content Area: **Math**  
Course(s): **Accelerated Algebra I**  
Time Period: **Marking Period 1**  
Length: **4**  
Status: **Published**

## Unit Overview

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This unit allows students to master the building, graphing and interpreting of linear functions and inequalities.

Link to optional Desmos Curriculum resource:

<https://teacher.desmos.com/collection/61bcc95700581818dff1d4d7?intro-banner-expanded=true>

## Enduring Understandings

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- Ratios can be used to show a relationship between changing quantities, such as vertical and horizontal change.
- If the ratio of two variables is constant, then the variables have a special relationship, called a direct variation.
- A line on a graph can be represented by a linear equation.
- The relationship between two lines can be determined by comparing their slopes and y-intercepts.
- Absolute value equations can be graphed quickly by shifting the graph of  $y = |x|$
- Two sets of numerical data can be graphed as ordered pairs. If the two sets of data are related, a line on the graph can be used to estimate or predict values.

## Essential Questions

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- What does the slope of a line indicate about the line?
- What information does the equation of a line give you?
- How can you make predictions based on a scatter plot?

## New Jersey Student Learning Standards (No CCS)

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MA.N-RN.A.1

Explain how the definition of the meaning of rational exponents follows from extending the properties of integer exponents to those values, allowing for a notation for radicals in terms of rational exponents.

MA.A-SSE.A.1a

Interpret parts of an expression, such as terms, factors, and coefficients.

MA.N-RN.A.2	Rewrite expressions involving radicals and rational exponents using the properties of exponents.
MA.A-SSE.A.2	Use the structure of an expression to identify ways to rewrite it. For example, see $x^4 - y^4$ as $(x^2)^2 - (y^2)^2$ , thus recognizing it as a difference of squares that can be factored as $(x^2 - y^2)(x^2 + y^2)$ .
MA.F-IF.B.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 a verbal description of the relationship.
MA.S-ID.B.6a	Fit a function to the data (including with the use of technology); use functions fitted to data to solve problems in the context of the data.
MA.F-IF.B.5	Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes.
MA.N-Q.A.2	Define appropriate quantities for the purpose of descriptive modeling.
MA.F-IF.B.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.
MA.S-ID.B.6b	Informally assess the fit of a function by plotting and analyzing residuals, including with the use of technology.
MA.S-ID.B.6c	Fit a linear function for a scatter plot that suggests a linear association.
MA.F-IF.C.7a	Graph linear and quadratic functions and show intercepts, maxima, and minima.
MA.S-ID.C.7	Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.
MA.S-ID.C.8	Compute (using technology) and interpret the correlation coefficient of a linear fit.
MA.F-IF.C.7b	Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.
MA.S-ID.C.9	Distinguish between correlation and causation.
MA.F-BF.A.1	Write a function that describes a relationship between two quantities.
MA.A-CED.A.2	Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.
MA.F-BF.B.3	Identify the effect on the graph of replacing $f(x)$ by $f(x) + k$ , $kf(x)$ , $f(kx)$ , and $f(x + k)$ for specific values of $k$ (both positive and negative); find the value of $k$ given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology.
MA.F-LE.A.1b	Recognize situations in which one quantity changes at a constant rate per unit interval relative to another.
MA.F-LE.A.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).
MA.G-GPE.B.5	Prove the slope criteria for parallel and perpendicular lines and use them to solve geometric problems (e.g., find the equation of a line parallel or perpendicular to a given line that passes through a given point).

## Interdisciplinary Connections

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LA.W.9-10.6	Use technology, including the Internet, to produce, share, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically.
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SCI.HS-ETS1-2	Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.
TECH.8.1.12.C.CS4	Contribute to project teams to produce original works or solve problems.

## Technology Standards

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TECH.8.1.12.C.CS4	Contribute to project teams to produce original works or solve problems.
TECH.8.1.12.E.CS4	Process data and report results.
TECH.8.1.12.F.CS3	Collect and analyze data to identify solutions and/or make informed decisions.
TECH.8.1.12.F.CS4	Use multiple processes and diverse perspectives to explore alternative solutions.

## 21st Century Themes/Careers

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CAEP.9.2.12.C.3	Identify transferable career skills and design alternate career plans.
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## Financial Literacy Integration

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PFL.9.1.12.C.1	Compare and contrast the financial benefits of different products and services offered by a variety of financial institutions.
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## Instructional Strategies & Learning Activities

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- Use graphing calculator to explore tables.
- Spend time with modeling problems.
- Use problems and activities from book involving modeling problems.
- ~~Provide access to online book~~
- Provide access to book pages and problems through Canvas
- Provide access to review keys
- ~~Use Pearson Quizzes~~ to review and reinforce.
- ~~Provide access to Pearson Review.~~
- ~~Examview~~ Quizzes to assess HW.
- Desmos
- Delta Math

## Differentiated Instruction

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- Inquiry/Problem-Based Learning
- Learning preferences integration (visual, auditory, kinesthetic)

- Tiered Learning Targets
- Meaningful Student Voice & Choice
- Relationship-Building & Team-Building
- Self-Directed Learning
- Debate
- Student Data Inventories
- Goal-Setting & Learning Contracts
- Game-Based Learning
- Grouping
- Rubrics
- Jigsaws
- Learning Through Workstations
- Concept Attainment
- Flipped Classroom
- Mentoring
- Assessment Design & Backwards Planning

## **Formative Assessments**

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- Daily homework checks
- Quizzes
- ~~Exam View~~ Checks of HW
- Warm-ups
- Height and Broad Jump (Optional)

## **Summative Assessment**

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- Unit Test