Big Ideas Math: California Algebra 1

Parent Newsletter

Chapter 5: Linear Functions

Standards

California Common Core:
8.F.1, 8.F.3, 8.F.4, F.IF.1, F.IF.2, F.IF.3, F.IF.5, F.IF.7b, F.BF.1a, F.BF.2, F.BF.3, F.LE.1b, F.LE.2

Game

- How Are We Related?

This is available online in the *Game Closet* at www.bigideasmath.com

Students will...

Find the domain and range of functions from graphs or tables.

Determine whether relations are functions.

Use the vertical line test to determine whether a graph represents a function.

Graph discrete and continuous data.

Determine whether functions have a discrete or continuous domain.

Write linear functions from graphs or tables.

Solve linear functions.

Graph piecewise, step, and absolute value functions.

Identify linear and nonlinear functions from tables or graphs.

Evaluate, solve, and graph functions when written in function notation.

Compare graphs of linear functions.

Extend and graph arithmetic sequences.

Write equations for arithmetic sequences.

Solve real-life problems.

Essential Questions

- How can you find the domain and range of a function?
- How can you decide whether the domain of a function is discrete or continuous?
- How can you use a linear function to describe a linear pattern?
- How can you use function notation to represent a function?
- How can you recognize when a pattern in real life is linear or nonlinear?
- How are arithmetic sequences used to describe patterns?

What's the Point?

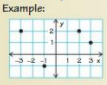
The Chapter 5: Phases of the Moon STEM Video is available online at www.bigideasmath.com.

Quick Review

- A relation is not a function if one unique input yields more than one output.
- A graph represents a function when no vertical line passes through more than one point on the graph.
- A graph has a continuous domain if the points on the graph are connected.
- A graph has a discrete domain if the points on the graph are separated.
- Function notation $f(x)$ is another name for y. The language and notation are different, but the process for finding outputs is the same.
- Nonlinear functions do not have constant rates of change. Their graphs are not a line.
- In an arithmetic sequence, each term is found by adding the common difference to the previous term.

Reference Tools

A **Comparison Chart** can be used to compare two different topics. Comparison Charts are particularly useful with topics that are related but have distinct differences.

	Domain	Range
Definition	the set of all possible input values	the set of all possible output values
Algebra Example: $y = mx + b$	x-values	corresponding y-values
Ordered pairs Example: (–4, 0), (–3, 1), (–2, 2), (–1, 3)	–4, –3, –2, –1	0, 1, 2, 3
Table Example: x: –1, 0, 2, 3 y: 1, 0, 4, 9	–1, 0, 2, 3	0, 1, 4, 9
Graph Example: 	–3, –1, 2, 3	–1, 1, 2

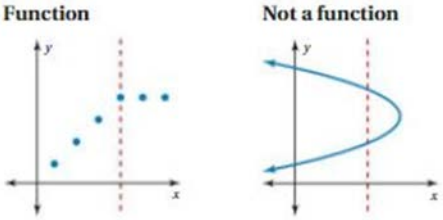
Key Ideas

Functions

A function is a relationship that pairs each input with exactly one output.

Vertical Line Test

A graph represents a function when no vertical line passes through more than one point on the graph.



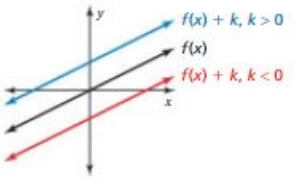
Discrete and Continuous Domains

- A discrete domain is a set of input values that consists of only certain numbers in an interval.

- A continuous domain is a set of input values that consists of all numbers in an interval.

Vertical Translations

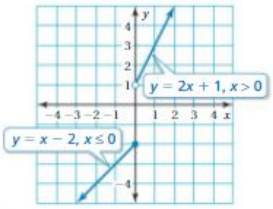
The graph of $f(x) + k$ is a vertical translation of the graph of $f(x)$, where $k \neq 0$.



Piecewise Function

A piecewise function is a function defined by two or more equations. Each "piece" of the function applies to a different part of its domain.

$$y = \begin{cases} x - 2, & \text{if } x \leq 0 \\ 2x + 1, & \text{if } x > 0 \end{cases}$$

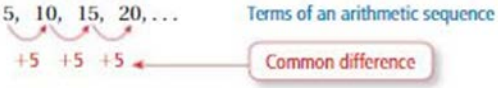


Absolute Value Function

An absolute value function has a V-shaped graph that opens up or down.

Arithmetic Sequence

In an arithmetic sequence, the difference between consecutive terms is the same. This difference is called the common difference. Each term is found by adding the common difference to the previous term.



Equation for an Arithmetic Sequence

Let a_n be the nth term of an arithmetic sequence with first term a_1 and common difference d. The nth term is given by $a_n = a_1 + (n - 1)d$.

Key Terms

The variable that represents input values of a function is the ***independent variable***.

The variable that represents output values of a function is the ***dependent variable***.

A ***relation*** pairs inputs with outputs.

A ***discrete domain*** is a set of input values that consists of only certain numbers in an interval.

A ***continuous domain*** is a set of input values that consists of all numbers in an interval.

A ***linear function*** is a function whose graph is a nonvertical line.

Function notation is a way to name a function using the $f(x)$ instead of y.

A ***function*** is a relationship that pairs each input with exactly one output.

The ***domain*** is the set of all possible input values.

The ***range*** is the set of all possible output values.

An ***absolute value function*** is a function that has a V-shaped graph that opens up or down.

A ***piecewise function*** is a function defined by two or more equations.

A ***nonlinear function*** is a function that does not have a constant rate of change.

A ***sequence*** is an ordered list of numbers. Each number in a sequence is called a ***term***.

In an ***arithmetic sequence***, the difference between consecutive terms is the same. This difference is called the ***common difference***.