Unit 5: Intro to Functions

Content Area: **Mathematics**
Course(s): **Algebra 8**
Time Period: **December**
Length: **4 weeks**
Status: **Published**

Transfer

Big Idea: Intro to Functions

Enduring Understandings

Functions can be represented in a variety of ways, such as graphs, tables, equations, or words. Each representation is particularly useful in certain situations.

New functions can be made from other functions by applying arithmetic operations or by applying one function to the output of another.

Functions are used to analyze change in various contexts and model real-world phenomena.

Essential Questions

What is the best way to represent and describe functions?

How do I translate between the various algebraic forms of a linear function?

What types of real world situations can be described by linear and non-linear functions?

Critical Knowledge and Skills

Vocabulary

Vocabulary

Continuous Graph, Dependent Variable, Discrete Graph, Domain, Function, Function Notation, Input, Independent Variable, Linear Function, Nonlinear Function, Output, Range, Relation, Vertical Line Test

Learning Objectives

Represent mathematical relationships using graphs and tables (F.IF.4)

Identify and represent patterns that describe linear functions (A.REI.10)

Identify and represent patterns that describe nonlinear functions (A.REI.10)

Graph equations that represent functions (F.IF.5)

To calculate and interpret the average rate of change of a function (F.IF.6)

Write equations that represent functions (N.Q.2)

Determine whether a relation is a function (F.IF.1)

Find domain and range and use function notation (F.IF.1)

Evaluate functions for inputs in their domains using function notation (F.IF.2)

Compare properties of different types of functions each represented in different ways (algebraically, graphically, numerically in tables, or by verbal descriptions) (F.IF.9, F.LE.1)

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 (F.BF.3)

Resources

Desmos Function Bundle

Desmos What's My Transformation?

Khan Academy: Functions

Standards

RST.6-8.4 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 grades 6-8 texts and topics.

RST.6-8.7 Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).

CRP2. Apply appropriate academic and technical skills.

CRP4. Communicate clearly and effectively and with reason.

CRP11. Use technology to enhance productivity.

9.1.8.A.2 Relate how career choices, education choices, skills, entrepreneurship, and economic conditions affect income.

9.1.8.C.5 Calculate the cost of borrowing various amounts of money using different types of credit (e.g., credit cards, installment loans, mortgages).

9.1.8.D.3 Differentiate among various investment options.

9.1.8.E.6 Compare the value of goods or services from different sellers when purchasing large quantities and small quantities.

9.2.8.B.7 Evaluate the impact of online activities and social media on employer decisions.

8.1.8.A.1 Demonstrate knowledge of a real world problem using digital tools.

8.2.8.C.8 Develop a proposal for a chosen solution that include models (physical, graphical or mathematical) to communicate the solution to peers.

MA.F-IF.A	Understand the concept of a function and use function notation
MA.K-12.2	Reason abstractly and quantitatively.
MA.F-IF.A.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 $y = f(x)$.
MA.F-IF.A.2	Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.
MA.K-12.3	Construct viable arguments and critique the reasoning of others.
MA.K-12.4	Model with mathematics.
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.N-Q.A	Reason quantitatively and use units to solve problems.
MA.K-12.5	Use appropriate tools strategically.
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.F-IF.C	Analyze functions using different representations
MA.K-12.8	Look for and express regularity in repeated reasoning.
MA.F-IF.C.9	Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).
MA.F-BF.B	Build new functions from existing functions
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	Construct and compare linear and exponential models and solve problems
MA.F-LE.A.1	Distinguish between situations that can be modeled with linear functions and with exponential functions.
MA.A-REI.D	Represent and solve equations and inequalities graphically
MA.A-REI.D.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).