Chapter 1 Functions and Their Graphs

Course Number

Instructor

Date

Section 1.1 Functions

Objective: In this lesson you learned how to evaluate functions and find their domains.

Important Vocabulary Define each term or concept.

Function A function f from a set A to a set B is a relation that assigns to each element x in the set A exactly one element y in the set B.
Domain The set of inputs of the function f.

Range The set of all outputs for the given set of inputs of the function f.

Independent variable A variable in an equation that represents a function that can take on any value for which the function is defined.
Dependent variable A variable in an equation that represents a function whose value depends on the value of the independent variable.

I. Introduction to Functions (Pages 74–76)

What you should learn
How to decide whether relations between two variables are functions

A rule of correspondence that pairs items from one set with items from a different set is a ____relation____.

In functions that can be represented by ordered pairs, the first coordinate in each ordered pair is the ____input____ and the second coordinate is the ____output____.

Some characteristics of functions are . . .

1) Each element in the domain must be matched with an element of the range.
2) Some elements in the range may not be matched with any element in the domain.
3) Two or more elements of the domain may be matched with the same element of the range.

To decide whether a relation is a function, . . . decide whether each input value is matched with exactly one output value.

If any input value of a relation is matched with two or more output values, . . . the relation is not a function.

Some common ways to represent functions are . . .

1) Verbally in a sentence
2) Numerically in a table or list of ordered pairs
3) Graphically by points on a graph in the coordinate plane
4) Algebraically by an equation in two variables

Example 1: Decide whether the table represents y as a function of x.

x	-3	-1	0	2	4
y	5	-12	5	3	14

Yes, this table represents y as a function of x.

II. Function Notation (Pages 76–77)

What you should learn
How to use function notation and evaluate functions

The symbol ___$f(x)$___ is **function notation** for the value of f at x or f of x, used to describe y as a function of x. In this case, ___f___ is the name of the function and ___$f(x)$___ is the output value of the function at the input value x.

Example 2: If $f(w) = 4w^3 - 5w^2 - 7w + 13$, describe how to find $f(-2)$.

Replace each occurrence of w in the function by -2 and evaluate the resulting numerical expression.

A piecewise-defined function is . . . a function that is defined by two or more equations, each over a specified domain.

III. The Domain of a Function (Page 78)

What you should learn
How to find the domains of functions

If x is in the domain of f, then f is said to be ___defined___ at x. If x is not in the domain of f, then f is said to be ___undefined___ at x.

The **implied domain** of a function defined by an algebraic expression is . . . the set of all real numbers for which the expression is defined.

For example, the implied domain of the function $f(x) = \sqrt{5x - 8}$ is . . . the set of all real numbers greater than or equal to 8/5, or $[8/5, \infty)$.

IV. Applications of Functions (Pages 79–81)

What you should learn
How to use functions to model and solve real-life problems

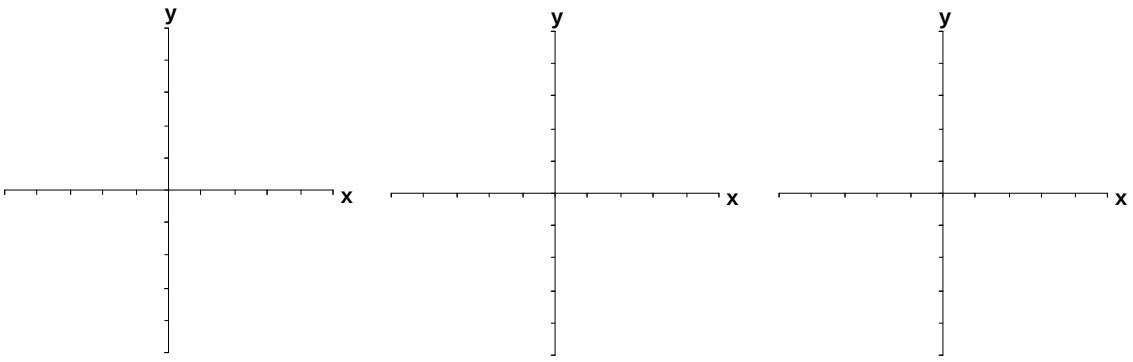
A **difference quotient** is defined as . . .

$[f(x + h) - f(x)]/h, \quad h \neq 0.$

Describe a real-life situation which can be represented by a function.

Answers will vary.

Additional notes



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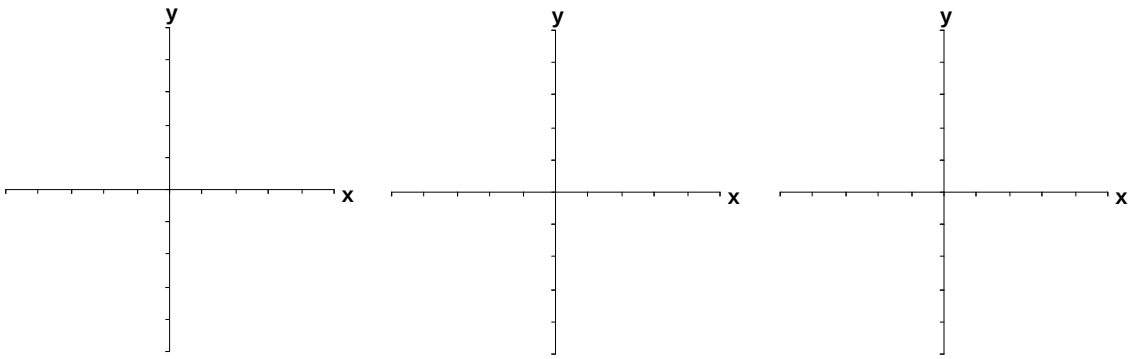

Homework Assignment

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