Section 2.1: Functions

1. Determine Whether a Relation Represents a Function (p. 56)
2. Find the Value of a Function (p. 60)
3. Find the Domain of a Function (p. 63)
4. Form the Sum, Difference, Product, and Quotient of Two Functions (p. 65)

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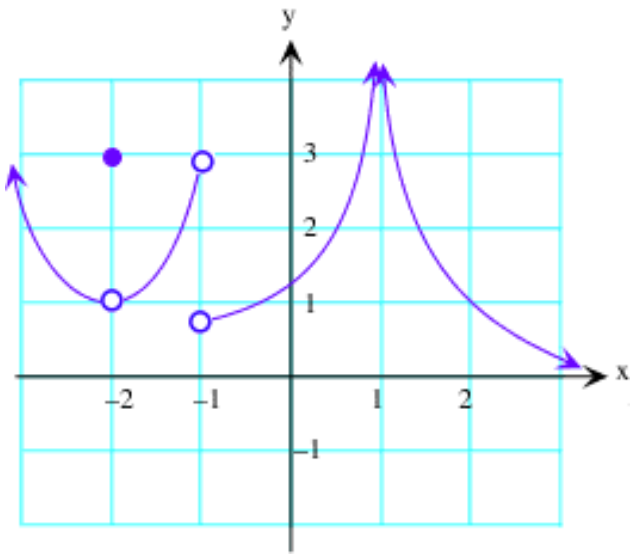


Operations on Functions

If f and g are functions:

The **sum** $f + g$ is the function defined by

$$(f + g)(x) = f(x) + g(x)$$

The **difference** $f - g$ is the function defined by

$$(f - g)(x) = f(x) - g(x)$$

The product $f \cdot g$ is the function defined by

$$(f \cdot g)(x) = f(x) \cdot g(x)$$

The **quotient** $\frac{f}{g}$ is the function defined by

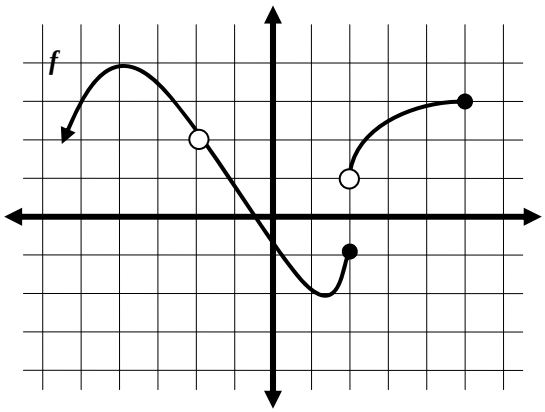
$$\left(\frac{f}{g}\right)(x) = \frac{f(x)}{g(x)} \qquad g(x) \neq 0$$

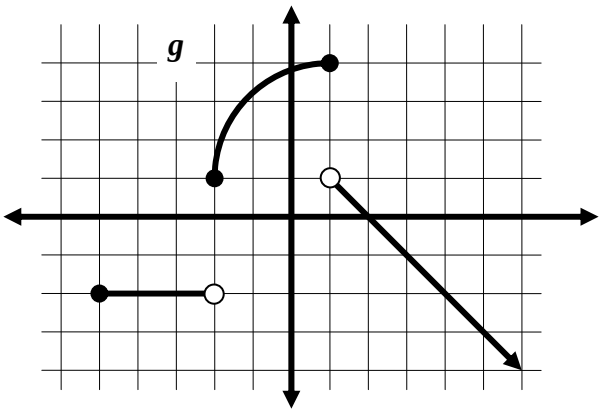
1. Use the table to answer the following questions

x	*f(x)*	*g(x)*
-2	3	-7
-1	5	0
0	7	4
2	11	3
4	-2	2

a. $f(2) + g(2)$ b. $(f \bullet g)(-2)$

2. Use the graphs to answer the following questions. *(Assume the x- and y-axes have a scale of 1)*





a. $\left(\frac{f}{g}\right)(-4)$ b. $f(5) + 2$

Summary

Function

A relation between two sets of real numbers so that each number x in the first set, the domain, has corresponding to it exactly one number y in the second set.
A set of ordered pairs (x, y) or $(x, f(x))$ in which no first element is paired with two different second elements.
The range is the set of y values of the function for the x values in the domain.
A function f may be defined implicitly by an equation involving x and y or explicitly by writing $y = f(x)$.

Unspecified domain

If a function f is defined by an equation and no domain is specified, then the domain will be taken to be the largest set of real numbers for which the equation defines a real number.

Function notation

$y = f(x)$
f is a symbol for the function.
x is the independent variable or argument.
y is the dependent variable.
$f(x)$ is the value of the function at x, or the image of x.