

BUILDING FUNCTIONS THAT MODEL RELATIONSHIPS BETWEEN TWO QUANTITIES (3.2)

Vocabulary

- A **function** is a relation for which each input has exactly one output. If any input has more than one output, then the relation is **not** a function.
 - We can use the Vertical Line Test to determine if a graphed relation is a function.
- $f(x)$ is a fancy way of writing _____

COMBINING FUNCTIONS USING ARITHMETIC OPERATIONS

Let f and g be any two functions. A new function h can be created by performing any of the the four basic operations on f and g . The domain of h consists of the x -values that are in the domains of both f and g . Additionally, the domain of a quotient does not include x -values for which $g(x) = 0$.

Example 1: $f(x) = 5x^2 + 2x$; $g(x) = -3x^2$

a. Find $h(x) = f(x) + g(x)$.

Operation:

b. Find $h(x) = f(x) - g(x)$.

Operation:

c. Find $h(x) = f(x) \cdot g(x)$.

Operation:

d. Find $h(x) = \frac{f(x)}{g(x)}$.

Operation:

When finding the domain algebraically, there are two “problem areas” we look for in the equation. (If there are no “problem areas”, the domain is $(-\infty, \infty)$ (or “all real numbers”).

1.

2.

Find the domain (algebraically) of the following functions.

a. $f(x) = \sqrt{2x-8}$

b. $u(x) = \frac{x-5}{2x+4}$

c. $m(x) = \sqrt{9-3x}$

d. $d(x) = x + 3$

Example 2: Let $f(x) = 2x + 1$ and $g(x) = x^2 + 3x - 4$. Perform the indicated operation and state the domain of the new function.

a. Find $h(x) = f(x) + g(x)$.

Operation:

Domain:

c. Find $h(x) = f(x) \cdot g(x)$.

Operation:

Domain:

e. Find $h(x) = \frac{f(x)}{g(x)}$.

Operation:

Domain:

g. Find $h(x) = \frac{2f(x)}{f(x)}$.

Operation:

Domain:

b. Find $h(x) = f(x) - g(x)$.

Operation:

Domain:

d. Find $h(x) = 2f(x) - g(x)$.

Operation:

Domain:

f. Find $h(x) = \frac{g(x)}{f(x)}$.

Operation:

Domain:

h. Find $h(x) = f(4) - g(-2)$.

Operation: