Chapter 2 Section 3
The Algebra of Functions

Domain of a Function: largest set of real numbers for which the value of f(x) is a real number.
Example 1: page 127
Find the domain of the function.

a) f(x) = 3x + 2 b) g(x) = $\frac{3x+2}{x+1}$

What values of x makes the function defined?

Domain of f: $(-\infty,\infty)$

b) Since it is a fraction, what values of x makes the function not defined?
When x = -1, the fraction is not defined, so one has to eliminate this value from the domain.
Domain of g: $(-\infty,-1)\cup(-1,\infty)$, union, or

Find the domain: f(x) = $\frac{1}{x+5}$

Algebra of Functions
Combine function using addition, subtraction, multiplication, and division.
Sum: f + g: (f + g)(x) = f(x) + g(x)

Difference: f – g: (f – g)(x) = f(x) – g(x)

Product: fg: (fg)(x) = f(x) • g(x)

Quotient: $\frac{f}{g}:\left(\frac{f}{g}\right)(x)=\frac{f(x)}{g(x)}$

Example: f(x) = 2x, g(x) = x – 1
(f +g)(x) = f(x) + g(x)
= 2x + (x – 1)
= 3x – 1

(f-g)(x) = f(x) – g(x)
= 2x – (x – 1)
= 2x – x + 1
= x + 1

$(fg)(x) = f(x) \bullet g(x)$

$= 2x \bullet (x - 1)$

$= 2x^2 - 2x$

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

$= \frac{2x}{x-1}$, $x \neq 1$

Example 2: page 128

c) $f(x) = x^2 - 3$, $g(x) = 4x + 5$, find $(f + g)(3)$