

## Section 1.4

### Section Objectives:

- Be able to add, subtract, multiply and divide functions and determine the domain of the resulting function.
- Understand composite functions both algebraically, pictorially and via a table of values.
- Find the domain and range of a composite function.
- Be able to break down a complicated function into simpler pieces using function composition.

### Practice Problems

1. Let  $f(x) = x^2 + 1$  and  $g(x) = \sqrt{x + 3}$ . Find and simplify each of the following. Then state their domain.

(a)  $f(x) - g(x)$

(b)  $f(x)g(x)$

(c)  $\frac{g(x)}{f(x)}$

(d)  $g(f(x))$

(e)  $(f \circ g)(x)$

2. Below is a table of function values for two functions  $f$  and  $g$ . Draw a circle diagram representing  $x$  mapping to  $g(x)$  and then to  $f(g(x))$  (See Figure 1.44 on page 73). Find the domain and image (set of all values that get mapped to) of  $f(g(x))$ .

$x$	$f(x)$	$g(x)$
0	1	1
1	2	3
2	3	5
3	7	3
4	2	8
5	1	2
6	9	1

3. Rewrite each function below as a composition of two simpler functions.

(a)  $(x + 1)^5 + 3$

(b)  $2^{\cos(x)}$

**More Practice from Textbook 1.4:** You should do as many problems from each set (1-2, 3-10, 11-14, 15-16, 17-22, 23-30, 31-32, 33-42, 43-48), as needed until you are comfortable with these techniques. 33-42 are good practice for more complicated application problems.