

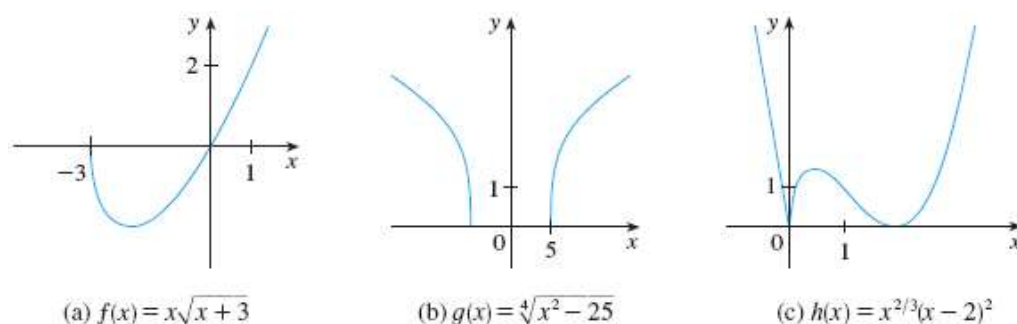
## Algebraic Functions

A function  $f$  is called an **algebraic function** if it can be constructed using algebraic operations (such as addition, subtraction, multiplication, division, and taking roots) starting with polynomials. Any rational function is automatically an algebraic function. Here are two more examples:

$$f(x) = \sqrt{x^2 + 1} \quad g(x) = \frac{x^4 - 16x^2}{x + \sqrt{x}} + (x - 2)\sqrt[3]{x + 1}$$

When we sketch algebraic functions in [Chapter 4](#), we will see that their graphs can assume a variety of shapes. [Figure 17](#) illustrates some of the possibilities.

**Figure 17**



An example of an algebraic function occurs in the theory of relativity. The mass of a particle with velocity  $v$  is

$$m = f(v) = \frac{m_0}{\sqrt{1 - v^2/c^2}}$$

where  $m_0$  is the rest mass of the particle and  $c = 3.0 \times 10^8$  km/s is the speed of light in a vacuum.