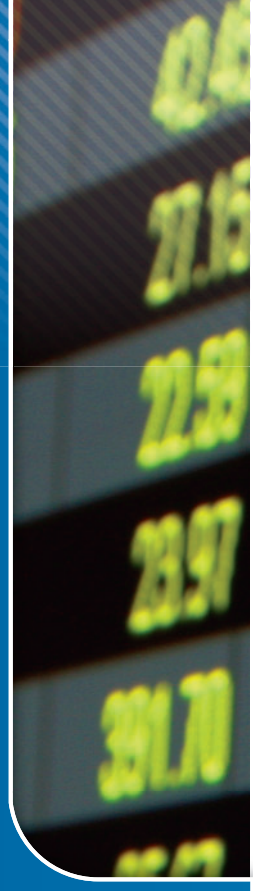
Chapter

11 Polynomials



Expressions such as those below are *polynomials.*

$1 \cdot 10^3 + 4 \cdot 10^2 + 9 \cdot 10^1 + 2$

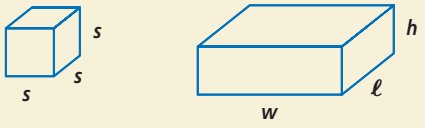
s^3

$2\ell w + 2wh + 2\ell h$

$1{,}000x^4 + 500x^3 + 100x^2 + 200x$

Polynomials form the basic structure of our base 10 arithmetic. The expanded form of a number like 1,492, or $1 \cdot 10^3 + 4 \cdot 10^2 + 9 \cdot 10^1 + 2 \cdot 10^0$, is a polynomial in x with the base 10 substituted for x.

Polynomials are also found in geometry. For example, the monomial s^3 represents the volume of a cube with edge s, as shown below. The trinomial $2\ell w + 2wh + 2\ell h$ represents the surface area of a box of dimensions ℓ by w by h, as shown below.



Algebra is filled with polynomials. The linear expression $ax + b$ is a polynomial, as is the quadratic expression $ax^2 + bx + c$. In Chapter 7, you calculated compound interest for a single deposit. When several deposits are made, the total amount of money accumulated can be expressed as a polynomial. For example, the polynomial $1{,}000x^4 + 800x^3 + 600x^2 + 250x$ represents the amount of money you would have if you had invested \$1,000 four years ago, added \$800 to it three years ago, added \$600 to it two years ago, and added \$250 to it one year ago, all earning at the same rate $x - 1$.

In this chapter you will study these and other situations that give rise to polynomials and how to add, subtract, multiply, and factor them.