

### Powers of Real Numbers

Some numbers may be written as the product of numbers that have identical factors— for example,  $100 = 10 \times 10$  or  $10^2$ . In this case, 10 is called the *base*, and 2 is the *expo- nent*. The exponent shows the number of times the base is a factor. Powers of a number can be written in factored form or in exponential form:

- ▶ Factored form indicates the products of the factors as in  $b \cdot b \cdot b \cdot b$ .
- ▶ Exponential form indicates the base and exponents as in  $b^4$ .

Examples of some of the powers of the real number  $b$  follow.

	<i>Factored Form</i>	<i>Exponential Form</i>	<i>Read</i>
Zero power of $b$	$1 (b \neq 0)$	$b^0$	1
First power of $b$	$b$	$b^1$ or $b$	$b$ to the first power
Second power of $b$	$b \cdot b$	$b^2$	$b$ to the second power, $b$ squared, or the square of $b$
Third power of $b$	$b \cdot b \cdot b$	$b^3$	$b$ to the third power, $b$ cubed, or the cube of $b$
Fourth power of $b$	$b \cdot b \cdot b \cdot b$	$b^4$	$b$ to the fourth power, or $b$ to the fourth
$n$ th power of $b$ ( $n$ is a positive integer that represents the number of times $b$ is multiplied)	$b \cdot b \cdot b \cdot b \dots b$	$b^n$	$b$ to the $n$ th power, or $b$ to the $n$ th
$-n$ th power of $b$ ( $n$ is a positive integer that represents the number of times $b$ is multiplied. $b \neq 0$ )	$\frac{1}{b \cdot b \cdot b \cdot b \dots b}$	$b^{-n}$	$b$ to the $-n$ th power, or $b$ to the $-n$ th