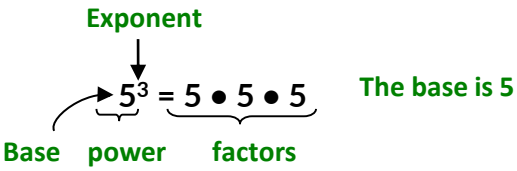
Powers and Exponents

A **power** is the result of a repeated multiplication of the same factor. For example, the number 125 is a power because

125 = 5 • 5 • 5. A power can be written in a form that has two parts: a number called the **base** and a number called the **exponent.** The exponent shows the number of times the base is used as a factor.



The table shows how to read and write powers. Numbers raised to the first power, such as 12^1, are usually written without the exponent.

Power	In words	Value
12^1	12 to the first power	$12^1 = 12$
$(0.5)^2$	0.5 to the second, or 0.5 squared	(0.5)(0.5)= 0.25
4^3	4 to the third power, or 4 cubed	4 • 4 • 4 = 64
8^4	8 to the fourth power	8 • 8 • 8 • 8= 4096

Example 1: **Write the product using an exponent.**

A. 13 • 13 • 13 • 13
13 is multiplied by itself 4 times
⇒13 is the base and the exponent is 4
⇒13 • 13 • 13 • 13 =13^4

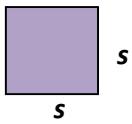
B. (0.2)(0.2) (0.2)
0.2 is multiplied by itself 3 times
⇒0.2 is the base and the exponent is 3
⇒(0.2)(0.2) (0.2) = $(0.2)^3$

C. $n \bullet n \bullet n \bullet n \bullet n \bullet n$
"n" is multiplied by itself 6 times
⇒n is the base and the exponent is 6
⇒$n \bullet n \bullet n \bullet n \bullet n \bullet n = n^6$

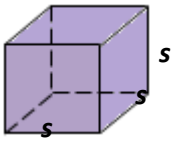
D. $t \bullet t \bullet t \bullet t \bullet t$

t is multiplied by itself 5 times
⇒t is the base and the exponent is 5
⇒$t \bullet t \bullet t \bullet t \bullet t = t^5$

A formula describes a relationship between quantities. Some formulas involve powers. For example, you can use a formula to find the area of a square or the volume of a cube.



$A = s^2$



$V = s^3$

Area is measured in square units, such as square feet (ft^2) or square centimeters (cm^2).

Volume is measured in cubic units, such as cubic inches ($in.^3$) or cubic meters (m^3).