

Pre-Algebra
Variables, Expressions, and Integers
Example 2

Powers and Exponents

Write the following using an exponent:

1. $6 \cdot 6 \cdot 6 \cdot 6$ 2. $9 \cdot 9 \cdot 9 \cdot 9 \cdot 9 \cdot 9 \cdot 9$ 3. $(4 \cdot 1)(4 \cdot 1)$ 4. $n \cdot n \cdot n \cdot n$

* COUNT THE NUMBER OF TERMS AND THAT IS EQUAL TO YOUR EXPONENT *

1. NUMBER OF SIXES = 4
 ↑ ↑
 BASE EXPONENT
 $\boxed{6^4}$

2. NUMBER OF NINES = 7
 ↑ ↑
 BASE EXPONENT
 $\boxed{9^7}$

3. NUMBER OF 4.1 = 2
 ↑ ↑
 BASE EXPONENT
 $\boxed{(4.1)^2}$

4. NUMBER OF "n"'s = 4
 ↑ ↑
 BASE EXPONENT
 $\boxed{n^4}$

Write the following in words, then evaluate the expression:

1. 9^3 2. 7^6 3. 8^2 4. 10^4 5. $(0.6)^5$

1. NINE CUBED
= $9 \cdot 9 \cdot 9$
= 729

2. SEVEN RAISED TO THE SIXTH POWER
= $7 \cdot 7 \cdot 7 \cdot 7 \cdot 7 \cdot 7$
= 117649

3. EIGHT SQUARED
= $8 \cdot 8$
= 64

4. TEN RAISED TO THE FOURTH POWER
= $10 \cdot 10 \cdot 10 \cdot 10$
= 10000

5. SIX TENTHS RAISED TO THE FIFTH POWER
= $(0.6)(0.6)(0.6)(0.6)(0.6)$
= 0.0778

Evaluate the expression when $n = 0.5$

1. n^0

$= (0.5)^0$

$= 1$ → Anything raised to the zero power is ALWAYS 1

1

4. n^3

$= (0.5)^3$

$= (0.5)(0.5)(0.5)$

$= 0.125$

0.125

2. n^1

$= (0.5)^1$

$= 0.5$

0.5

5. n^4

$= (0.5)^4$

$= (0.5)(0.5)(0.5)(0.5)$

$= 0.0625$

0.0625

3. n^2

$= (0.5)^2$

$= (0.5)(0.5)$

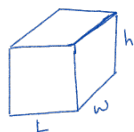
$= 0.25$

0.25

0.25

The volume of a cube is the area of the base times the height of the cube. If a cube has a side length of 18 inches, write an expression for the volume of the cube using exponents, then evaluate the volume of the cube.

DRAW A PICTURE TO VISUALIZE THE PROBLEM



* ON A CUBE ALL THE SIDES HAVE EQUAL LENGTH

$\therefore L = w = h$

VOLUME = (AREA BASE)(HEIGHT)

$= L \cdot w \cdot h$

$= L \cdot L \cdot L$

$= L^3$

$= (18 \text{ in})^3$

$= 5832 \text{ in}^3$

$V = 5832 \text{ in}^3$