3.1 Using Exponents to Describe Numbers

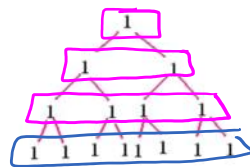## CHAPTER 3 – POWERS & EXPONENTS

Name:_____   Block_____

PRACTICE → Complete "GET READY" Questions #1-9 on textbook pg 74-75
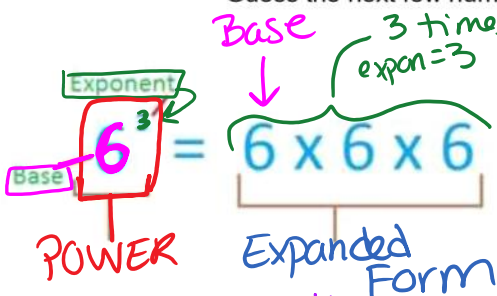
3.1 USING EXPONENTS TO DESCRIBE NUMBERS

All organisms begin as one cell and then through a process called mitosis the single cell splits into two, then each of those split into two, etc. Eventually, these cells together form a multi-celled organism with trillions of cells.

Zero Power Rule

1 cell - 2^0
2 cells - $2^{\boxed{1}} = 2$
4 cells - $2^{\boxed{2}} = 2 \times 2$
8 cells - $2^3 = 2 \times 2 \times 2$

6th time

** Guess the next few numbers $2^4 = 16$, $2^5 = 32$, $2^6 = 64$ cells

Base → 3 times (expon = 3)

Exponent
$$6^3 = 6 \times 6 \times 6$$
Base
POWER
Expanded Form

exponent

When numbers are written in a form such as 2^3 it is called a __POWER__, the "2" is the *Base* __BASE__ and the "3" is the __EXPONENT__. The exponent represents the number of times the base is multiplied by itself.

HINTS:

a^x *variable*	a is the base, x is the exponent and a^x is the power.
5^2	Is read 5 to the exponent 2 and equals 5×5 as a repeated multiplication and evaluates to 25.
2^5	Is read 2 to the exponent 5 and equals $2 \times 2 \times 2 \times 2 \times 2$ as a repeated multiplication and evaluates to 32.

→ "expanded form"

A) Write 2^3 as a *repeated multiplication*:

$2 \times 2 \times 2$

B) Evaluate 2^3:

$2 \times 2 \times 2 =$
$4 \times 2 = 8$

C) Write the repeated multiplication as a power:

$3 \times 3 \times 3 \times 3 \times 3 = \boxed{3}\overline{|5|}$ exponent
Base
5

D) Write as a *repeated multiplication* and evaluate:

multiply base 3 times $\left(\frac{7}{8}\right)^3$ $\frac{7}{8} = $ Base

$$\left(\frac{7}{8}\right) \times \left(\frac{7}{8}\right) \times \left(\frac{7}{8}\right) = \frac{7 \times 7 \times 7}{8 \times 8 \times 8} = \boxed{\frac{343}{512}}$$

PRACTICE ➤

expanded form

Writing numbers in expanded form and exponential form.

3. Express 5^4 as a ==repeated multiplication.==

4. Express AAA as power.

5. Express 7^2 as a repeated multiplication.

6. Express (-3)(-3)(-3)(-3) as power.

7. Express 8^5 as a repeated multiplication.

8. Express nnnnnnn as power.

9. Express $(-2)^4$ as a repeated multiplication.

10. Express mmmmm as power.

11. Express A^3B^2 as a repeated multiplication.

12. Express mGmGmmG as power.

13. Express A^0B^3 as a repeated multiplication.

14. Express AABBAABAB as power.

Zero Power Rule: $x^0 = 1$

NEGATIVE NUMBERS, SIGNS AND EXPONENTS:

✯**Be careful:** the negative acts differently if it is not within the brackets of the base number✯

Expand & Evaluate:

a) $(-3)^2$

b) $(-3)^3$

c) -3^2

d) $-(-3)^2$

VERBAL EXPRESSION OF POWERS

If the exponent is 2, "_____"

If the exponent is 3, "_____"

Any exponent higher than 3, "_____"

Example #1: Complete the chart below.

	Power	Exponent	Base	Repeated Multiplication (Expanded Form)	Standard Form (Evaluate)
a.	5^4				
b.	4^5				
c.	$(-5)^6$				
d.	-5^6				
e.	7^3				
f.	9^5				
g.	2^6				
	Nine squared				
				5*5*5*5*5*5*5	
	Four cubed				
				−(9*9*9)	
	Six to the seventh power				
				(-2)(-2)(-2)(-2)	

Example #3: Write as **repeated multiplication** AND in **standard form**.

i. 9^3

ii. $(-10)^2$

iii. $-(-3)^5$

Example #4: Benjamin will load and unload the dishwasher every day of the week. In return, his parents will pay him 2 cents for the first week, and twice as much as the previous week for each week thereafter. Use the expression 2^w to determine his weekly rate of pay, where w represents the number of weeks. How much will he earn, in dollars, in week 7, week 15, week 25 and week 30?
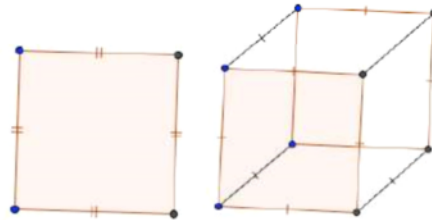
Challenge #3:

16. Which of the following are equal:

A. -3^2

B. (-3^2)

C. $-(3)^2$

D. $(-3)^2$

Explain your reasoning.

17. Does $2^3 = 3^2$? Explain how you know.

Homework   **ASSIGNMENT #1   Section 3.1 pg 79-81**
Questions #1-6, 8, 9, 11, 12, 14 *15, *16, *17, *18

you're so sharp

please remember to TITLE your homework "Assignment #1" at the top of the page. You should also write the date, page & question numbers....

MAKE IT happen

use your ASSIGNMENT LOG and check off homework as you complete it!