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UNIT 2: POWERS AND EXPONENT LAWS

SECTION 2.1: POWERS OF 10 AND THE ZERO EXPONENT

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MATH 9

WHAT'S THE POINT OF TODAY'S LESSON?

We will continue working on the Math 9 Specific Curriculum Outcome (SCO) "Numbers 1" OR "N1" which states:

"Demonstrate an understanding of powers with integral bases (excluding base 0) and whole number exponents by: representing repeated multiplication using powers; using patterns to show that a power with an exponent of zero is equal to one; solving problems involving powers."

What does THAT mean???

SCO N1 means that we will learn about the two parts of a power (the base, or "the big number", and the exponent, or "the little number"). We will show what a power means when we write it out using multiplication (ex: $3^2 = 3 \times 3$), and we will use patterns to prove, for example, that $3^0 = 1$. Finally, we will use what we know about powers to solve problems.

WHAT IS THE DIFFERENCE BETWEEN...

Base = -5	Base = 5	Base = 5	Base = 5
$(-5)^2$	$-(5^2)$	-5^2	$-(-5^2)$
$= (-5)(-5)$	$= -(5)(5)$	$= -(5)(5)$	$= -[-(5)(5)]$
$= 25$	$= -25$	$= -25$	$= -(-25)$
			$= 25$

$(-1) \times (5^2)$

WARM UP:

Evaluate each expression.

i) -3^2 Base = 3

$= -(3)(3)$

$= -9$

ii) $-(3)^2$ Base = 3

$= -(3)(3)$

$= -9$

iii) $-(-3)^2$ Base = -3

$= -(-3)(-3)$

$= -9$

iv) $(-3)^2$ Base = -3

$= (-3)(-3)$

$= 9$

HOMEWORK QUESTIONS?
(pages 55 / 56, #7 TO #9, #11 TO #13 and #16)

16. a) 3^{12}

3 x^y 1 2 =

$= 531441$

b) -7^7 Base = 7

$= -823543$

d) $-(-4)^{10}$ Base = -4

$= -1048576$

DEALING WITH NEGATIVE BASES ON YOUR CALCULATOR:

Examples:

1. $(-2)^3$

$= (-2)(-2)(-2)$

$= -8$

2. $(-2)^6$

$= (-2)(-2)(-2)(-2)(-2)(-2)$

$= 64$

3. $(-4)^2$

$= (-4)(-4)$

$= 16$

4. $(-4)^5$

$= (-4)(-4)(-4)(-4)(-4)$

$= -1024$

* Negative base, even exponent = + answer

* Negative base, odd exponent = − answer

PLEASE TURN TO PAGE 54 IN *MMS9*.
LOOK AT EXAMPLE 3 - *EVALUATING EXPRESSIONS INVOLVING NEGATIVE SIGNS*.

Identify the base in each of these powers, then evaluate the power.

1. -5^4: **Base** = 5
Repeated Multiplication = $-(5)(5)(5)(5)$
Standard Form = -625

2. $-(-4^5)$: **Base** = 4
Repeated Multiplication = $-[-(4)(4)(4)(4)(4)]$
Standard Form = 1024

What is the square root of 9? 3

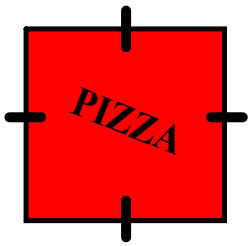
What ARE the square roots of 9? ± 3

$(+3)(+3) = 9$
$(-3)(-3) = 9$

What is $\sqrt{9}$? 3

"$\sqrt{\ }$" : **PRINCIPAL SQUARE ROOT; this means the POSITIVE square root only.**

An example where ONLY the PRINCIPAL square root is appropriate:



The area of this pizza box is 144 cm^2 ; what is the length of each side of the pizza box?

$A = bh$

$\sqrt{144}$

= **12 cm (not -12 cm)**

CONCEPT REINFORCEMENT:

MMS9:

PAGE 56: #14

PAGE 57: #20 & #21a