OCTOBER 7, 2015

UNIT 2: POWERS AND EXPONENT LAWS

SECTION 2.1:
WHAT IS A POWER?

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MATH 9

WHAT'S THE POINT OF TODAY'S LESSON?

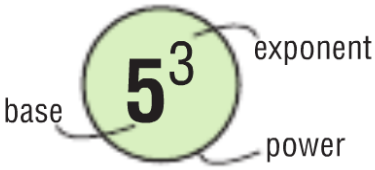
We will begin working on the Math 9 Specific Curriculum Outcome (SCO) "Numbers 1" OR "N1" which states:

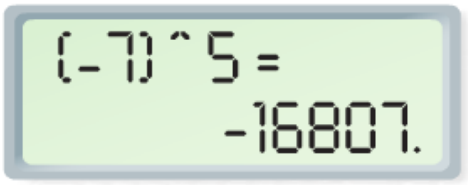
"Demonstrate an understanding of powers with integral bases (excluding base 0) and whole number exponents by: representing repeated multiplication using powers; using patterns to show that a power with an exponent of zero is equal to one; solving problems involving powers."

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.

UNIT 2: POWERS AND EXPONENT LAWS





PLEASE TURN TO PAGE 50 IN *MMS9*.

UNIT 2: VOCABULARY

1. POWER: an expression in the form of a^n, where a is the base and n is the exponent; it represents a product of equal factors.

ex.: $4 \times 4 \times 4 = 4^3$

2. **SQUARE NUMBER:** a number that can be written as a power with an integer base and an exponent of 2.
   ex.: $49 = 7^2$
   (49 is a square number)

3. **CUBE NUMBER:** a number that can be written as a power with an integer base and an exponent of 3.
   ex.: $8 = 2^3$
   (8 is a cube number)

125 CAN BE WRITTEN SEVERAL WAYS:

1. **Standard Form:** 125
2. **As repeated multiplication:** 5 x 5 x 5
3. **As a POWER:** 5^3

(What kind of a number is 125? Think of definition #3...)

↓

cube number

PLEASE TURN TO PAGE 53 IN *MMS9*.
LOOK AT EXAMPLE 1 - *WRITING POWERS*.

How would I write the following examples as POWERS?

1. $6 \times 6 \times 6 \times 6 \times 6 = 6^5$

2. $8 \times 8 \times 8 \times 8 \times 8 \times 8 \times 8 = 8^7$

PLEASE TURN TO PAGE 54 IN *MMS9*. LOOK AT EXAMPLE 2 - *EVALUATING POWERS*.

How would I write the following examples as repeated multiplication and in standard form?

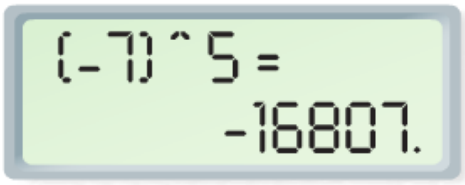
1. $2^6 = 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2$

$= 64$

2. $10^5 = 10 \cdot 10 \cdot 10 \cdot 10 \cdot 10$

$= 100\,000$

Let's talk about the ways in which we can use our calculators to evaluate powers.



There are 4 possible ways that I know of. Please let me know if there are others.)

1. x^y **2.** y^x **3.** $\wedge$ **4.** $x\blacksquare$

Examples 1 and 2 on pages 53 and 54 showed powers with positive integer bases; however, a power can also be negative or have a base that is a negative integer.

A quick review of "double signs"...

What do each of the following actually mean?

1. + (+) = +
2. - (-) = +
3. + (-) = −
4. - (+) = −

WHAT IS THE DIFFERENCE BETWEEN...

Base = 5

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

CONCEPT REINFORCEMENT:

MMS9:

PAGE 55: #7 TO #9
PAGE 56: #11 TO #13 and #16