September 29, 2017

UNIT 2: POWERS AND EXPONENT LAWS

SECTION 2.2: 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.

WARM UP:

Evaluate each expression.

i) -3^2 ii) $-(3)^2$ iii) $-(-3)^2$ iv) $(-3)^2$

$-1(3 \times 3)$
-9

$-(3 \times 3)$
-9

$-(-3 \times -3)$
-9

-3×-3
9

HOMEWORK QUESTIONS?

PAGE 55: #7, 8 and 9
PAGE 56: #11, 12, 13, 14 and 16
PAGE 57: #18, 19, 20 and 21a

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7. What is the base? (3)

c) 8^2 8

d) $(-10)^5$ -10

f) -8^3 8

9. Write as a repeated multiplication...(3)

c) $8^5 = 8\times8\times8\times8\times8$

d) -3^2 -3×3

f) $(-8)^3$ $=(-8)\times(-8)\times(-8)$

10. Write as a power then evaluate. (4)

c) 10x10x10x10x10 = 10^5

= 100 000

h) -(5)(5)(5)(5) = $-(5)^4$

= -625

UNIT 2, 2nd PAGE: "EXPONENT LAWS"

1. **ZERO EXPONENT LAW**: A power with an integer base (other than 0) and an exponent of 0 is equal to 1. We express this law as: $a^0 = 1$; $a \neq 0$.

   Ex.: $2^0 = 1$
   $3^0 = 1$
   $(-5)^0 = 1$
   $-4^0 = -1$

$$\left(\frac{1}{2} - \frac{1}{4}\left(\frac{3}{6}\right) \div \frac{2}{9} + 37\right)^0 = 1$$

PLEASE TURN TO PAGE 59 IN *MMS9*. LOOK AT EXAMPLE 1 - *EVALUATING POWERS WITH EXPONENT ZERO.*

Evaluate each expression:

1. $13^0 =$ 1
2. $(-15)^0 =$ 1
3. $-7^0 =$ -1
4. $-(-8^0) =$ 1
5. $[-2^2 + 3^3 \times (-5)^5 \div (-10)^8]^0 =$ 1

PLEASE TURN TO PAGE 60 IN *MMS9*. LOOK AT EXAMPLE 2 - *WRITING NUMBERS USING POWERS OF TEN.*

Write the following numbers using powers of 10:

1. 8 678 = $8000 + 600 + 70 + 8$
   $\longrightarrow 8\times1000 + 6\times100 + 7\times10 + 8\times1$
   $8\times10^3 + 6\times10^2 + 7\times10^1 + 8\times10^0$
2. 12 935 = $1\times10^4 + 2\times10^3 + 9\times10^2 + 3\times10^1 + 5\times10^0$
3. 403 = $4\times100 + 3\times1$
   $= 4\times10^2 + 3\times10^0$

Extra

$35\,012 = 3\times10000 + 5\times1000 + 1\times10 + 2\times1$

$= 3\times10^4 + 5\times10^3 + 1\times10^1 + 2\times10^0$

Write in standard form

$4\times10^5 + 3\times10^4 + 2\times10^1$

$4\times100\,000 + 3\times10000 + 2\times10$

$400\,000 + 30\,000 + 20$

$= 430\,020$

CONCEPT REINFORCEMENT:

MMS9:

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