OCTOBER 4, 2018

UNIT 2: POWERS AND EXPONENT LAWS

SECTION 2.3: ORDER OF OPERATIONS WITH POWERS

K. Sears
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."

We will also begin working on the Math 9 Specific Curriculum Outcomes (SCOs) "Numbers 2" and "Numbers 4" OR "N3" and "N4" which state:

"Demonstrate an understanding of operations on powers with integral bases (excluding base 0) and whole number exponents."

AND

"Explain and apply the order of operations, including exponents, with and without technology."

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.

SCO N2 means that we will learn rules to work with powers with integer bases (other than 0) and exponents of 0 or higher.

SCO N4 means that we will use order of operations (as always) to solve problems that include powers both with and without calculators.

Warm Up:

Evaluate using fractions.

$$\frac{5}{2} - 0.5 + \frac{(-2)^0}{5}$$

$= \frac{5}{2} - \frac{1}{2} + \frac{1}{5}$

$= \frac{4}{2} + \frac{1}{5}$

$= 2 + \frac{1}{5}$

$= 2\frac{1}{5}$

HOMEWORK QUESTIONS?
(Page 61, #4 TO #12)

SECTION 2.3: ORDER OF OPERATIONS WITH POWERS

You've just won a competition, and you must answer the following skill-testing question to collect your prize: $6 \times (3^2 + 2) - 10 \div 2$

Would you be able to solve it and collect the prize?

$6 \times (9+2) - 10 \div 2$

$6 \times (11) - 10 \div 2$

$66 - 5$

61

What does BEDMAS stands for?

B: Brackets
E: Exponents
D: Division
M: Multiplication } In order, from left to right.
A: Addition
S: Subtraction } In order, from left to right.

Why is it important that EVERYONE follows the SAME order of operations?

This is important because it is the only way that everyone can get the SAME answer to a question.

PLEASE TURN TO PAGE 64 IN *MMS9*. LOOK AT EXAMPLE 1 - *ADDING AND SUBTRACTING WITH POWERS.*

Evaluate:

1. $4^3 - 4^2$
$= 64 - 16$
$= 48$

2. $5^0 + 6^2$
$= 1 + 36$
$= 37$

3. $(2 - 4)^2$
$= (-2)^2$
$= 4$

NOTE: **When we need curved brackets, like "(" and ")", for integers (usually to indicate a negative base in a power), we use square brackets, like "[" and "]", to show the order of operations.**

PLEASE TURN TO PAGE 64 IN *MMS9*. LOOK AT EXAMPLE 2 - *MULTIPLYING AND DIVIDING WITH POWERS.*

Evaluate:

1. $[\ 2 \times (-3)^3 - 6\ ]^2$
   $= (2 \times (-27) - 6)^2$
   $= (-54 - 6)^2$
   $= (-60)^2$
   $= 3600$

2. $(18^2 + 5^0)^2 \div (-5)^3$
   $= (324 + 1)^2 \div -125$
   $= (325)^2 \div -125$
   $= 105\,625 \div -125$
   $= -845$

Evaluate:

1. $(2 + 3)^2 \times (5 - 7)^3$
   $= 5^2 \times (-2)^3$
   $= 25 \times (-8)$
   $= -200$

2. $8^2 \div [36 \div (-9)]^2$
   $= 8^2 \div (-4)^2$
   $= 64 \div 16$
   $= 4$

PLEASE TURN TO PAGE 65 IN *MMS9*. LOOK AT EXAMPLE 3 - *SOLVING PROBLEMS USING POWERS.*

$$\frac{690}{2 \times 4^2 + \pi \times 1^3} = \frac{690}{32 + \pi}$$

② ① ④ ③

$$= 690/(32+\pi)$$

$$\doteq 19.63$$

PLEASE TURN TO PAGE 65 IN *MMS9*.

"Discuss the Ideas":

1. $3^3 + 2^3$

$= 27 + 8$

$= 35$

(Cube first, then add.)

$(3 + 2)^3$

$= 5^3$

$= 125$

(Add first, then cube.)

CONCEPT REINFORCEMENT:

MMS9:

PAGE 66: #3 TO 8, 10 and 12
PAGE 67: #14, 15, 16 (you don't need to write down the key strokes), 18a and 19
PAGE 68: #22 and 24

MID-UNIT REVIEW:

MMS9:

PAGE 69: ALL!!!