Warm Up   8/23/17

Distributive Property Quiz

Homework Questions?

$$3^2$$

https://youtu.be/VQsQj1Q_CMQ

Exponents.ppt

8/23/17

Essential Question

• **How do I simplify and evaluate numeric expressions involving integer exponents?**

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Rules of Exponents

N.RN.1   *I CAN... rewrite expressions involving rational exponents using the properties of exponents.*

vocabulary:

Monomial   A number, a variable, or a product of a number and one or more variables
Examples: 34xy, 7a²b

Power $\left\{ 5^2 \right.$ ← Exponent
← Base

rules of exponents:

Product of Powers: $a^m \bullet a^n = a^{m+n}$ If multiplying two numbers with the **same base, ADD** the exponents	
$5^2 \bullet 5^6$ $= 5^{2+6}$ $= 5^8$ 15 $\wedge$ 8 $= 390{,}625$	$y^4 \bullet y^3 \bullet y^1$ $= y^{4+3+1} = y^8$
$(7y^5)(6y)$ $y^{5+1} = y^6$ $42y^6$	$(-3x^2 y^7)(5xy^6)$ $-15x^3 y^{13}$ $x^{2+1} = x^3$ $y^{7+6} = y^{13}$

Quotient of Powers: $\dfrac{a^m}{a^n} = a^{m-n}$

If dividing two numbers with the **same base**, **SUBTRACT** the exponents

$\dfrac{y^6}{y} = y \cdot y \cdot y \cdot y \cdot y \cdot y$ $\boxed{y^5} = y^{6-1}$	$\dfrac{6^{13}}{6^2} = 6^{13-2}$ $= 6^{11}$ $= 362,797,056$	$\dfrac{10a^7b^9}{15a^5b^9}$ $\dfrac{10 \div 5}{15 \div 5} = \dfrac{2}{3}$ $\dfrac{2}{3}a^2 \cdot 1 \quad a^{7-5} = a^2$ $\boxed{\dfrac{2}{3}a^2} \quad b^{9-9}$ $= b^0$ $= 1$

Zero Exponent: $a^0 = 1$	
Any nonzero number with an exponent of zero is equivalent to 1	

WHY?? Let's explore $\dfrac{8^2}{8^2}$ .... $\dfrac{8 \cdot 8}{8 \cdot 8} = 1$

$(-3x+7)^0$ $= (-3x)^0 + 7^0$ $1 + 1 = 2$	$8x^0 + 5 = 8(1) + 5$ $= 8 + 5$ $= \boxed{13}$

Negative Exponent $a^{-n} = \dfrac{1}{a^n}$

For any nonzero number "a" raised to a negative exponent, place the power in the denominator to rewrite the power with a positive exponent

WHY?? Let's Explore $\dfrac{b^2}{b^5}$ ....

$$\dfrac{b \cdot b \cdot 1}{b \cdot b \cdot b \cdot b \cdot b} = \boxed{\dfrac{1}{b^3}} = b^{2-5} = \boxed{b^{-3}}$$

$$2^{-3} = \dfrac{1}{2^3} = \boxed{\dfrac{1}{8}}$$

$$(-3)^{-3} = \dfrac{1}{(-3)^3} = \boxed{\dfrac{1}{-27}}$$

Power of a Power: $(a^m)^n = a^{m \bullet n}$	
If raising a power to a power, **multiply** the exponents	

Examples: Simplify. Write each answer using only positive exponents:

$(x^2)^8 =$ X^{16}	$(y^{-3})^{-4} =$ y^{12}

Power of a Product: $(ab)^m = a^m \cdot b^m$		
Find the power of **each** factor in the parenthesis and multiply		

$(4x^3yz)^3$	$(7xy^{-2})^{-2}$	$(6x^{-6}y^{-7}z^0)^{-2}$
$4^3 X^9 y^3 z^3$ $64 X^9 y^3 z^3$	$7^{-2} X^{-2} y^4$ $= \dfrac{y^4}{7^2 X^2}$ $= \dfrac{y^4}{49x^2}$	$6^{-2} X^{12} y^{14} z^0$ $= \dfrac{X^{12}y^{14}}{6^2}$ $= \dfrac{X^{12}y^{14}}{36}$

Power of a Quotient: $\left(\dfrac{a}{b}\right)^m = \dfrac{a^m}{b^m}$

For any numbers "a" and "b" where $b \neq 0$, if the quotient of a and b is raised to a power, raise both the numerator and the denominator to the given power

$\left(\dfrac{3}{5}\right)^2 = \dfrac{3^2}{5^2} = \boxed{\dfrac{9}{25}}$

$\left(\dfrac{2a^5}{b^7}\right)^2 = \dfrac{2^2 a^{10}}{b^{14}} = \boxed{\dfrac{4a^{10}}{b^{14}}}$

$\left(\dfrac{3a^{-4}}{b^7}\right)^3 = \dfrac{3^3 a^{-12}}{b^{21}} = \boxed{\dfrac{27}{b^{21} a^{12}}}$

$\left(\dfrac{a^{-2}b^{-5}}{c^{-11}}\right)^{-6} = \boxed{\dfrac{a^{12} b^{30}}{c^{66}}}$

Distributive Property Quiz Review

Combine like terms to simplify each expression.

1) $-4x + 5x = 1x$

2) $1 + 5v + v - 6$

$6v - 5$

11) $9n + 3n$

$12n$

12) $12x + 11 - 4$

$12x + 7$

Use Distributive Property.

13) $3(-7 - 8n)$

$$-21 - 24n$$

14) $-8(1 + 5m)$

$$-8 - 40m$$

First, use Distributive Property, then Combine Llike Terms to simplify each expression.

25) $-n + 4(n + 1)$

$$-n + 4n + 4$$

$$\boxed{3n + 4}$$

26) $-3(1 - 3x) + 2x$

$$-3 + 9x + 2x$$

$$-3 + 11x$$

$$\boxed{11x - 3}$$

$$-1(4x + 3) - 2x$$

$$-4x - 3 \quad -2x$$

$$-6x - 3$$

https://youtu.be/1p5kpP7C_CE

Attachments

Exponents.ppt