

Warm Up:

Simplify:

$$x^2 + 8 - 2x + 4x - 3x^2$$

$$-2x^2 + 8 + 2x$$

$$4(3x^2 - 2x) + 9x - 6x^2$$

$$12x^2 - 8x + 9x - 6x^2$$

$$6x^2 + x$$

$$\frac{3}{1} \cdot \frac{2}{7}$$

$$\frac{6}{7}$$

Return quizzes

Name: _____ Period: _____ Date: _____

Algebra: Exponent Laws INVESTIGATION

Complete the chart below.

Original Problem	Expanded	Rewritten with a New Exponent	Solution
$2^1 \cdot 2^1$	$2 \cdot 2$	2^2	4
$2^1 \cdot 2^2$	$2 \cdot 2 \cdot 2$	2^3	8
$2^3 \cdot 2^3$			
$x^3 \cdot x^4$			
$x^4 \cdot x^4$			
$x^2 \cdot y^3 \cdot x^4$			

What is the relationship between the exponents of a multiplication problem and the exponent of the simplified version (column 3)? [ex: what can I do with the exponents in the second row to get from $2^1 \cdot 2^2 \rightarrow 2^3$?

Create a general formula to represent this relationship & write it in the box below by filling in the gray box to represent what we do with a and b in the simplified version.

Multiplying Powers with the Same Base

$$x^a \cdot x^b = x^{a+b}$$

Try these -> Simplify completely

1.) $(5^2)(5^0)(5^3) =$

2.) $(n^5)(n^2) =$

3.) $x \cdot x^2 \cdot x^4 =$

4.) $c^4 \cdot d^3 \cdot c^2 =$

5.) $(a)(b)(a^5) =$

6.) $m^2 \cdot n^2 \cdot m =$

Complete the chart below.

Original Problem	Expanded	Rewritten with a New Exponent	Solution
$\frac{2^1}{2^1} = \square$	$\begin{array}{c} 2 \\ \\ 2 \\ \\ 2 \end{array}$	2^0	1
$\frac{2^2}{2^1} = \square$	$\begin{array}{c} 2 \cdot 2 \\ \\ 2 \end{array}$	2^1	2
$\frac{2^3}{2^1} = \square$	$\begin{array}{c} 2 \cdot 2 \cdot 2 \\ \\ 2 \end{array}$		
$\frac{2^5}{2^2} = \square$			
$\frac{x^6}{x^2} = \square$			
$\frac{x^8 y^2}{x^3} = \square$			

What is the relationship between the exponents of a multiplication problem and the exponent of the solution (from column 1 to column 3)?

Create a general formula to represent this relationship & write it in the box below by filling in the gray box to represent what we do with a and b in the simplified version.

Division of Powers with the Same Base

$$\frac{x^a}{x^b} = x^{\boxed{a-b}}$$

Try these -> Simplify each expression...COMPLETELY!

1.) $\frac{x^5}{x^2} =$

2.) $\frac{xy^2}{y} =$

3.) $\frac{m^3 n^2}{mn} =$

4.) $\frac{x^4 y^5 z}{x^2 y^3 z} =$

Complete the chart below.

Original Expression	Expand by Multiplying	Apply Product Rule	Rewritten with New Exponents	Solution
$(2^3)^2$	$2^3 \cdot 2^3$	2^{3+3}	2^6	64
$(2^5)^4$	$2^5 \cdot 2^5 \cdot 2^5 \cdot 2^5$	$2^{5+5+5+5}$	2^{20}	1,048,576
$(2^7)^4$				
$(a^2)^2$				
$(h^2g^4)^3$				
$\left(\frac{a^3}{b}\right)^3$				

Look at the exponents in the original problem and the exponent of the solution. What shortcut can we take to get from column 1 to column 4?

What if there is more than one variable in the parenthesis? How do we address that (example 5)?

Create a general formula to represent this relationship & write it in the box below by filling in the gray box to represent what we do with a and b in the simplified version.

Raising a Power to a Power

$$(x^a)^b = x^{a \cdot b}$$

1.) $(2^3)^2$

2.) $(g^{10})^4$

3.) $\left(\frac{a^3}{b^2}\right)^3$

$$\frac{a^9}{b^6}$$

Check with teacher before completing this page!

Simplify. **Remember, coefficients have invisible exponents of 1!**

1. $b^2 \cdot b \cdot b^4$

2. $\frac{x^5 y^6}{x^2 y}$

3. $(4m^3)^2$

$16m^6$

4. $6x^3 \cdot 2x^4$

5. $\frac{6m^6 n}{3m^3 n}$

6. $(2x^2)^4$

$2m^3$

7. $2m^2 \cdot 2m^3 =$

8. $\frac{3x^9 y^5 z^3}{9x^3 y z^2}$

9. $2x^2 y \cdot x^3 y^4 =$

10. $-3x^4 y \cdot 4xy^3$

11. $\frac{-2a^7 bc^6}{4abc}$

12. $3x^2 \cdot 2y =$

13. $(4x^2 y)^2 \cdot (2xy^3 z)^3$

January 17, 2020

