NOTES: Section 8.1 – Multiplication Properties of Exponents

Goals: #1 - I can use multiplication properties of exponents.







Homework: Section 8.1 Worksheet

Exploration #1: Work with a partner and answer the following questions.

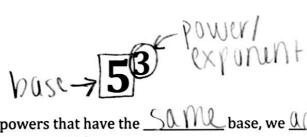
1. How could you write 7² as products?

2. How could you write 7³ as products?

3. How could you multiply $7^2 \cdot 7^3$? What about $x^3 \cdot x^4$?

4. Complete: $a^m \cdot a^n = a^{(m)+n}$

Notes:



To MUHTPLY powers that have the Same base, we all the exponents. Example: $7^2 \cdot 7^3 = 7^{2+3} = 7^5$

Example #1: Write the expression as a single power of the base.

1.
$$5^3 \cdot 5^6$$

$$5^3 + 6$$

$$5^9$$

$$2.(-2)(-2)^{4}$$

$$(-2)^{4}$$

$$[-2)^{5}$$
Its a single power of the ba

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

You practice: Write the expression as a single power of the base.

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

$$(-3)^2+1$$

$$(-3)^3$$

Exploration #2: Work with a partner and answer the following questions.

1. How could you write $(7^3)^2$ as products? Can you simplify this?

$$(7.7.7)^2 \Rightarrow (7.7.7)(7.7.7)$$

 $7^{6} = 1 \setminus 7649$ 2. How could you write $(x^{5})^{3}$ as products? Can you simplify this?

$$(x \cdot x \cdot x \cdot x \cdot x) \Rightarrow (x \cdot x \cdot x \cdot x \cdot x)(x \cdot x \cdot x \cdot x \cdot x)(x \cdot x \cdot x \cdot x \cdot x)$$

3. Complete: $(a^m)^n = a^{\text{min}}$

Notes:

(53)2 power

To raise a $\frac{\text{POWV}}{\text{to another } \text{POWV}}$ to another $\frac{\text{POWV}}{\text{to another } \text{POWV}}$ we $\frac{\text{MUltiply}}{\text{the exponents}}$.

Example #2: Write the expression as a single power of the base.

1. $(3^3)^2$

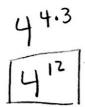
2. $[(-3)^5]^2$

$$(-3)^{5.2}$$

3. $(p^4)^4$

You practice: Write the expression as a single power of the base.

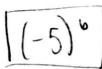
1. $(4^4)^3$



2. $(n^4)^5$

3. $[(-5)^2]^3$





Exploration #3: Work with a partner and answer the following questions.

1. How could you write $(5 \cdot 4)^2$ as products? Can you simplify this? $(5 \cdot 4)(5 \cdot 4) \rightarrow 5 \cdot 4 \cdot 5 \cdot 4 \rightarrow 5^2 \cdot 4^2$

$$(5.4)(5.4) \rightarrow 5.4.5.4 \rightarrow 5^2.4$$

2. How could you write $(x \cdot y)^3$ as products? Can you simplify this?

$$(x \cdot y)(x \cdot y)(x \cdot y)$$
3. Complete: $(a \cdot b)^m = a^m b^m$

Notes:

(5·2)(3) exponent

To find a power of a <u>PYOWCL</u>, find the <u>POWCY</u> of each factor and <u>MULTIPLY</u>

Example: $(5.2)^3 = 5^3 \cdot 2^3 = 125.8 = 1000$

Example #3: Simplify the expression.

2.
$$(4yz)^3$$
 $4^3 \cdot y^3 \cdot z^3$
 $4^3 y^3 z^3$

You practice: Simplify the expression.

$$\frac{3. (-3 \cdot 4)^2}{(-3)^2 \cdot 4^2}$$

Name:	Hour:	Date:

Notes:

. Multiplication Properties of Exponents:

Property:	Algebraic Expression:	Example:	
Product of Powers Property	$\alpha_m \cdot \alpha_u = \alpha_{m+n}$	3 ² ·3 ⁵ =3 ²¹⁵ =3 ⁷	
Power of a Power Property	$(\alpha_m)_n = \alpha_{m \cdot n}$	$(3^2)^5 = 3^{2 \cdot 5} = 3^{10}$	
Power of a Product Property	$(a \cdot b)^{m} = a^m b^m$	$(3.2)^5 = 3^5 2^5 = 248$	·32

Example #4: Simplify the expression.

1.
$$(4x^{2})^{3} \cdot x^{5}$$

$$4^{3}x^{2} \cdot x^{5}$$

$$64x^{6} \cdot x^{5}$$

$$64x^{6} \cdot x^{5}$$

$$64x^{6}$$

You practice: Simplify the expression.

2.
$$9 \cdot (9z^{5})^{2}$$
 $9 \cdot 9^{2} \neq 5 \cdot 2$
 $9 \cdot 9^{2} \neq 10$
 $9^{1+2} \neq 10$
 $9^{3} \neq 10$
 $729 \neq 10$
2. $(3x^{4})^{2} \cdot x^{3}$
 $9 \times 8 \cdot \times 3$
 $9 \times 8 \cdot \times 3$
 $9 \times 8 \cdot \times 3$