TOPIC: INTRO TO THE POWER RULES

The Power Rule for Exponents

EXPONENT RULES			
Name	Example	Rule	Description
Product Rule	$4^2 \times 4^1 = 4 \times 4 \times 4 = 4^3 = 4^{2+1}$	$a^m \times a^n = a^{m+n}$	*Multiply* terms w/ **same base** $\Rightarrow$ [ADD | SUBTRACT] exp.
Power Rule	$(4^3)^2$	$(a^m)^n = a^{m \cdot n}$	*Power* to another power $\Rightarrow$ _____ exponents

EXAMPLE   Use the power rule to evaluate or simplify each exponential expression.

(A)

$$((-2)^3)^5$$

(B)

$$(y^8)^4$$

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Simplify each expression, but don't evaluate.

(A)

$$\left(4^{15}\right)^3$$

(B)

$$\left(100^{26}\right)^0$$

(C)

$$\frac{\left(x^2\right)^4}{\left(x^3\right)^3}$$

EXAMPLE Evaluate each expression using a calculator, then compare the answers. Which is larger?

(A)

$$\left(3^4\right)^2$$

(B)

$$\left(3^2\right)^4$$

EXAMPLE Fill in the blanks to make the statement true.

$$\left(x-\right)^{\overline{}} = x^{15}$$

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<u>**Power of a Product Rule**</u>

◆ Use the **Power of a Product Rule** (a.k.a. the product to a power rule) to distribute an exponent to a product.

EXPONENT RULES			
Name	Example	Rule	Description
Power of a Product Rule	$(3 \cdot 4)^2 =$ $\qquad\qquad = 3^2 \cdot 4^2$	$(a \cdot b)^m = a^m \cdot b^m$	**Distribute** exponent to each _____ in parenthesis

EXAMPLE   Use the power of a product rule to evaluate or simplify each exponential expression.

(A)

$(5 \cdot 3^2)^2$

(B)

$(xy)^5$

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Simplify each expression.

(A)

$$(4z^2)^3$$

(B)

$$(-6^5)^5$$

(C)

$$(x^2z^5)^4$$

Simplify each expression.

(A)

$$(-2x^4y^5)^4$$

(B)

$$(4x^3y^2z^3)^2$$