

## 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/ <b>same base</b> $\Rightarrow$ [ <b>ADD</b>   <b>SUBTRACT</b> ] 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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### PRACTICE

Simplify each expression, but don't evaluate.

(A)  $(4^{15})^3$

(B)  $(100^{26})^0$

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

### EXAMPLE

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

(A)  $(3^4)^2$

(B)  $(3^2)^4$

### EXAMPLE

Fill in the blanks to make the statement true.

$$(x \text{ ---})^{\text{---}} = x^{15}$$

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### Power of a Product Rule

- ◆ 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	$(3 \cdot 4)^2 = \quad = 3^2 \cdot 4^2$	$(a \cdot b)^m = a^m \cdot b^m$	<b>Distribute</b> exponent to <b>each</b> _____ 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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**PRACTICE**

Simplify each expression.

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

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

(C)  $\frac{(6m^2n^3)^2}{(-4m^7n^5)^3}$