8.1: Apply Exponent Properties Involving Products

Goals: *Multiply expressions with exponents
*Raise expressions with exponents to a power

Product Properties of Exponents

1.
2.
3.

Write the following expressions out as products:

$a^2 =$ $a^3 =$

So then how would you multiply….?

$a^2 \cdot a^3$

Can you come up with a rule to multiply expressions that have the same base and also have exponents?

Use the rule to multiply the following. Write your answer as an exponent:

Ex: $7^3 \cdot 7^5$ **Ex:** $4^7 \cdot 4^6$ **Ex:** $9 \cdot 9^8 \cdot 9^2$

Ex: $8^5 \cdot 8 \cdot 8^2$ **Ex:** $(-5)(-5)^6$ **Ex:** $(-3)^3(-3)$

Ex: $x^7 \cdot x^3$ **Ex:** $b \cdot b^3 \cdot b^5 \cdot b^2$

Write out the following expression as a product:

$(a^2)^3 =$

Can you come up with a rule to simplify an expression with an exponent raised to a power?

<u>Use the rule to simplify the following expressions. Write your answer as an exponent</u>:

Ex: $(3^4)^2$ **Ex:** $(2^5)^3$ **Ex:** $[(-6)^5]^2$

Ex: $[(y + 2)^2]^6$ **Ex:** $(4^2)^7$ **Ex:** $(2^7)^4$

Ex: $(y^3)^3$ **Ex:** $[(n + 8)^2]^9$

Write out the following expression a product:

$(ab)^3 =$

Can you come up with a rule to simplify a product being raised to a power?

<u>Use your rule to simplify the following expressions. Write your answer as an exponent</u>:

Ex: $(23 \cdot 17)^5$ **Ex:** $(24 \cdot 13)^8$ **Ex:** $(34 \cdot 9)^6$

Simplify the following expressions:

Ex: $(9xy)^2$

Ex: $(-4z)^2$

Ex: $-(4z)^2$

Ex: $(9m^3n^4)^2$

Ex: $(4mn)^3$

Ex: $(-2g)^4$

Ex: $-(5x)^2$

Ex: $(2x^3)^2 \cdot x^4$

Ex: $(3d^5)^2 \cdot d$

Ex: $5 \cdot (5x^2)^4$