Warm Up!

Rewrite each of the following exponent expressions as a multiplication sentence.

1. 2^2

$2 \cdot 2$

2. b^3

$b \cdot b \cdot b$

3. 2^2b^3

$2 \cdot 2 \cdot b \cdot b \cdot b$

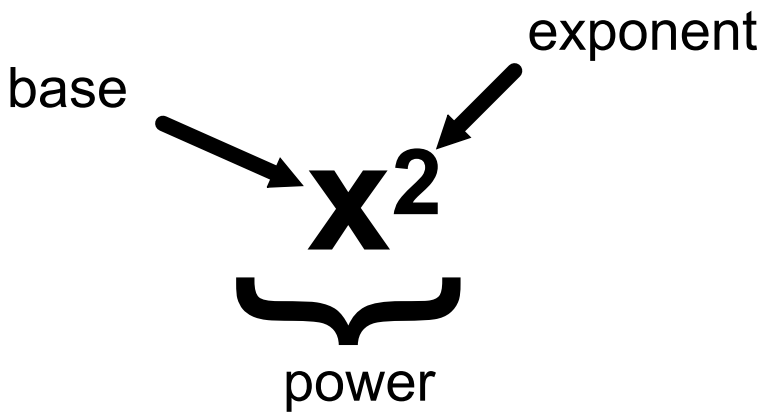
$b \cdot 2 \cdot b \cdot 2 \cdot b$

Multiplication Properties of Exponents

Clear Learning Target

You will be able to simplify exponential expressions using the multiplication rules of exponents.

Words Worth Knowing - Review!



Example #1: Simplify. $b^3 \cdot b^5$

$= b \cdot b \cdot b \cdot b \cdot b \cdot b \cdot b \cdot b$ $= b^{3+5} = b^8$

$= b^8$

$6n^3 \cdot 2n^7$

$6 \cdot n \cdot n \cdot n \cdot 2 \cdot n \cdot n \cdot n \cdot n \cdot n \cdot n \cdot n$ $= 6 \cdot 2 \cdot n^{3+7}$

$6 \cdot 2 \cdot n \cdot n \cdot n \cdot n \cdot n \cdot n \cdot n \cdot n \cdot n$ $= 12n^{10}$

$12n^{10}$

☆ RULE: Add exponents of same variables

You Try! Simplify. $3x^2 \cdot 7x^5$

$= 3 \cdot 7 \cdot x^{2+5}$

$= 21x^7$

Example #2: Simplify. $(r^4)^3$

$= r^4 \cdot r^4 \cdot r^4$

$= r^{4+4+4} = r^{12}$

$= r^{4 \cdot 3} = r^{12}$

$[(2^3)^2]^4$

$(2^{3 \cdot 2})^4 = (2^6)^4$

$= 2^{6 \cdot 4} = 2^{24}$

$2^{3 \cdot 2 \cdot 4} = 2^{24}$

RULE: Multiply exponents!

You Try! Simplify. $[(t^2)^2]^4$

$= t^{2 \cdot 2 \cdot 4} = t^{16}$

Example #3: Simplify. $(tw)^3$

$= tw \cdot tw \cdot tw$

$= t \cdot t \cdot t \cdot w \cdot w \cdot w$

$= t^3 w^3$

$= t^{1 \cdot 3} w^{1 \cdot 3}$

$= t^3 w^3$

$(2yz^2)^3$

$2^3 \cdot y^3 z^{2 \cdot 3} = 8y^3 z^6$

RULE: Distribute the outer exponent to all inner exponents

You Try! Simplify. $(4a^4b^9c)^2$

$= 4^2 a^{4 \cdot 2} b^{9 \cdot 2} c^2$

$= 16 a^8 b^{18} c^2$