7.3 More Multiplication
Properties of Exponents

Learning Goal: I will be able to raise a power to a power and raise a product to a power

**Property:**

*Raising a Power to a Power:*

To raise a power to a power, the

**Examples 1-2:** Simplify.

Warm Up:
Simplify.

5^3 \cdot 5^4

x^3 \cdot x^7

2^4 \cdot 2^{-3}

y^{10} \cdot y^{-12}

Examples:

Examples:
Examples 3-5: Simplify.

Examples 6-11: Evaluate if you can.

Examples 12-13: Simplify.

**Property:**

*Raising a Product to a Power:*
To raise a product to a power, raise to the power and

\[(ab)^n = a^n b^n\] where a & b ≠ 0

**Examples:**

\[(3x)^4 = 3^4 x^4 = 81x^4\]

\[(4b)^{3/2} = 4^{3/2} b^{3/2} = 8b^{3/2}\]

**Examples 16-17:**
Simplify.

\[(xy^2)^3 = x^3 y^{6}\]

\[(x^3 y^4)^2 = x^6 y^8\]

**Examples 18-20:**
Simplify.

\[(a^3 b)^2 = a^6 b^2\]

\[(3cd)^2 = 9c^2 d^2\]

\[(x^3 y^5)^3 = x^9 y^{15}\]

**Examples 21-22:**
With your shoulder buddy.

\[(5x^4 y^6)^3 = 125x^{12} y^{18}\]

\[(z^5 x^6)^2 = z^{10} x^{12}\]

\[(3x^2 y^4)^5 = 243x^{10} y^{20}\]

\[(2x^4 y^3)^2 = 4x^8 y^6\]
Examples 23–24:
Simplify. Write each answer in scientific notation.

\[(3 \times 10^5)^2\]
\[(2 \times 10^{-10})^3\]

Summary
When you raise a power to a power you __________________!!!!

In your own words describe how you would simplify this problem.

\[(x^4y^9)^2\]