# 6.1B Properties of Exponents

# (Power of a Power)

Expand. What do you think the new rule is?

$(4^2)^3$

$4^2 \cdot 4^2 \cdot 4^2$

$4^6$

YOU MAY ONLY USE THESE RULES WITH COMMON BASES!!

P Power of a Power

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

M Multiply

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

A Add

Power of a Product Property

$3x^2 = 3 \cdot x \cdot x = 3x^2$

$(3x)^2 = 3x \cdot 3x = 3 \cdot 3 \cdot x \cdot x = 3^2x^2 = 9x^2$

* Distribute the outer exponent to all exponents inside.

* Don't forget about the bases that have an exponent of 1.

Simplify.

1. $(5^2)^4$

$5^8 = 390625$

2. $(4^3)^0$

$4^0 = 1$

3. $(x^3)^{-5} \cdot x^4$

$x^{-15} \cdot x^4 = x^{-11} = \frac{1}{x^{11}}$

Simplify.

1. $(2y^4)^2$

$2^2 y^8$

$4y^8$

2. $(-2y)^3$

$-8y^3$

3. $(x^6y^{-3})^{-2}$

$x^{-12}y^6 = \frac{y^6}{x^{12}}$

## Simplify each.

1. $(6^{-2})^{-1}$

$6^2 = 36$

2. $(w^{12})^5$

$w^{60}$

3. $(2x^{-3}y^4)^4$

$2^4 x^{-12} y^{16}$

$\frac{16y^{16}}{x^{12}}$

4. $(6a^5b^{-1}c)^2$

$6^2 a^{10} b^{-2} c^2$

$\frac{36a^{10}c^2}{b^2}$

## Simplify: $x^3y^8 \cdot (2x^4y^3)^3 \cdot x^{-15}y$

$x^3y^8 \cdot 2^3 x^{12} y^9 \cdot x^{-15} y$

$8y^{18}$

## Homework

WS 6.1B Properties of Exponents