

NAME \_\_\_\_\_

Law of exponents for "power to a power" (one base, two exponents):

Example:  $(2^2)^3 = 2^{\boxed{6}}$

Let's work it out!  $(2^2)^3$  means,  $2^2$  repeated 3 times.

So,  $2^2 \times 2^2 \times 2^2 = \underbrace{2 \cdot 2}_{\text{6-times}} \times \underbrace{2 \cdot 2}_{\text{6-times}} \times \underbrace{2 \cdot 2}_{\text{6-times}}$

Now just count the number of 2's to find the exponent.

RULE: When you raise a base number with an exponent to a power, you keep the base number and MULTIPLY the exponents

Find the missing exponent in these examples.

$(5^5)^2 = 5^{\boxed{10}}$

$(6^{\boxed{0}})^3 = 6^{\boxed{0}}$   
 $= 1$

$(3^4)^3 = 3^{\boxed{12}}$

MIXED PRACTICE:

Use laws of exponents to find the missing exponent

$+ 6^4 \times 6^7 = 6^{11}$

$+ 3^6 \times 3^2 \times 3^1 = 3^9$

$- 7^7 / 7^5 = 7^2$

$* (8^2)^3 = 8^6$

$+ 5^8 \cdot 5^6 = 5^{14}$

$* (9^4)^6 = 9^{24}$

$\frac{-}{+} 10^6 / 10^3 \cdot 10^2 = 10^5$

$\frac{\text{mult}}{\text{add}} (4^2)^3 \cdot 4^3 = 4^9$

Evaluate:

$7^0 = \underline{5764801}$

$10^5 = \underline{100,000}$

$2^{-4} = \underline{0.0625}$