

## LAWS OF EXPONENTS

For any real number and any rational exponent  $m$  and  $n$ ;

1.  $a^m * a^n = a^{m+n}$

In multiplying, we can add exponents if the bases are the same.

Example:

$$x^2 * x^4 = x^{2+4} = x^6$$

2.  $\frac{a^m}{a^n} = a^{m-n}$

In dividing we can subtract exponents if the bases are the same.

Example:

$$\frac{y^3}{y^2} = y^{3-2} = y$$

3.  $(a^m)^n = a^{m*n}$

To raise a power to a power, we can multiply the exponents.

Example:

$$(a^3)^4 = a^{3*4} = a^{12}$$

4.  $(ab)^m = a^m b^m$

To raise a product to a power, we can raise each factor to the power.

Example:

$$(-2x^2)^3 = (-2)^3(x^{2*3}) = -8x^6$$

5.  $\left(\frac{a}{b}\right)^n = \frac{a^n}{b^n}$

To raise a quotient to a power we can raise both the numerator and the denominator to the power.

Example:

$$\left(\frac{a^2}{b^4}\right)^3 = \frac{a^{2*3}}{b^{4*3}} = \frac{a^6}{b^{12}}$$

Practice Problems:

1.  $x^3 * x^5 =$

2.  $\frac{4^4}{4^2} =$

3.  $(4^2)^2 =$

4.  $(3y)^3 =$

5.  $\left(\frac{4}{3}\right)^2 =$