

Negative } Zero

**M**ultiplication

POWER  
to a  
POWER

DiViSiOn

Product  
to a  
Power

QUOTIENT  
to a  
POWER

Rule:  $a^{-n} = \frac{1}{a^n}$

Rule:  $a^0 = 1$   
 $(-a)^0 = 1$   $-(a)^0 = -1$

Rule:  $a^n \cdot a^m = a^{n+m}$

- \* bases are the same
- \* leave bases alone
- \* add exponents

Rule:  $(a^n)^m = a^{nm}$

- \* leave base alone
- \* multiply exponents

Rule:  $\frac{a^n}{a^m} = a^{n-m}$   
bases match!

- \* leave base alone
- \* subtract exponents

Rule:  $(ab)^n = a^n b^n$

- \* must be multiplied
- \* exponent gets distributed to every part

Rule:  $\left(\frac{a}{b}\right)^n = \frac{a^n}{b^n}$

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

EX:  $4^{-3} = \frac{1}{4^3} = \frac{1}{64}$

EX:  $\frac{1}{2^{-3}} = \frac{2^3}{1} = 8$

EX:  $25^0 = 1$

EX:  $2xy^0 = 2x \cdot 1 = 2x$

EX:  $5^2 \cdot 5^6 = 5^8$

EX:  $x^5 \cdot x^6 = x^{11}$

EX:  $4m \cdot 3m^4 = 12m^5$

EX:  $2s^3 \cdot (-4)y^8 = -8s^3y^8$

EX:  $(3^3)^2 = 3^6 = 729$

EX:  $(x^4)^3 = x^{12}$

EX:  $(2^1x^2)^4 = 16x^8$

EX:  $\frac{2^6}{2^3} = 2^3 = 8$

EX:  $\frac{m^{12}}{m^4} = m^8$

EX:  $\frac{x^{10}y^4}{y^3x} = x^9y$

EX:  $(3^1x^6)^3 = 3^3x^{18}$

$= 27x^{18}$

EX:  $(-2^1m^4n^7)^3 = (-2)^3m^{12}n^{21} = -8m^{12}n^{21}$

EX:  $\left(\frac{x^3}{y^4}\right)^2 = \frac{x^6}{y^8}$

EX:  $\left(\frac{2x}{y^3}\right)^{-3} = \frac{y^9}{2^3x^3} = \frac{y^9}{8x^3}$