

Warm up  
Discuss the answers to these problems with a neighbor:

- $x^2 \cdot x^3 = x^5$
- $(x^2)^3 = x^6$
- $x^{-2} = \frac{1}{x^2}$   $\frac{1}{x^{-2}} = x^2$
- $\frac{a^5}{a^2} = a^3$
- $-3^2 = -9$   $-1 \cdot 3^2$
- $5^0 = 1$
- $(-3)^2 = 9$

Jul 31-3:21 PM

**Properties of Exponents**  
a & b are real numbers, m & n are integers

- Product Property:  $a^m \cdot a^n = a^{m+n}$
- Power of a Power Property:  $(a^m)^n = a^{m \cdot n}$   $(2x)^3 = 2^3 x^3$
- Power of a Product Property:  $(ab)^n = a^n b^n$
- Negative Exponent Property:  $a^{-n} = \frac{1}{a^n}$ ;  $a \neq 0$
- Zero Exponent Property:  $a^0 = 1$ ;  $a \neq 0$
- Quotient of Powers:  $\frac{a^m}{a^n} = a^{m-n}$ ;  $a \neq 0$
- Power of Quotient:  $\left(\frac{a}{b}\right)^n = \frac{a^n}{b^n}$ ;  $b \neq 0$

Practice:

- $(3x^4)(2x^3) = 6x^7$   
xxxxxxx
- $\frac{5a^4 b^7}{12a^4 b^5} = \frac{5b^2}{6a^4}$   $a^{4-4} = a^{-4} = \frac{1}{a^4}$
- $(5p^4 q^2)^2 = 5^2 (p^4)^2 (q^2)^2 = 25 p^8 q^4$

Jun 1-9:34 AM

- $(4t^3 v^2)(-8t v^5) = -32 t^4 v^7$
- $(-3m^3 n^2)(2m^2 n^4) = 18 m^5 n^6$
- $\frac{18a^3 b^7 c^{62}}{24a^2 b^5 c^4} = \frac{3c^2}{4a^5 b^3}$   $a^{-5}$

Jun 1-9:37 AM

- $\left(\frac{2x^5 y^3 z^{-2}}{5x^2 y^4}\right)^2 = \left(\frac{2x^3 y^4 z^{-2}}{5y^2}\right)^2 = \frac{4x^6}{25y^2 z^4}$
- $(6a^2 b^5 c)(4a^3 b^{-2} c^8) = 24 a^5 b^3 c^9$

Jun 1-9:41 AM

- $(4p^3 q^{-2} t^4)^2 = 16 p^6 q^{-4} t^8 = \frac{16 p^6 t^8}{q^4}$   $y^{-2+3} = y$
- $\left(\frac{4x^2 y^{-3}}{y^{-2}}\right)^{-1} = \left(\frac{4x^2 y^{-1}}{y^{-2}}\right)^{-1} = \frac{y}{4x^2}$
- $(8x^7 y^3)(3x^{-4} y^8) = 24 x^3 y^{11} = \frac{24 y^{11}}{x^3}$

Jun 1-9:46 AM