## 9.2 Power and Quotient Rules

Product of Powers

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

$7^9 \cdot 7^2 = 7^{11}$

$4^9 \cdot 4^{-2}$

Quotient of Powers

$\frac{a^m}{a^n} = a^{m-n}$ $\quad \frac{4^9}{4^2} = 4^7$

Power of Product

$(ab)^n = a^n b^n$ $\quad (2x)^3 = 2^3 x^3 = 8x^3$

Power of Quotient

$\left(\frac{a}{b}\right)^n = \frac{a^n}{b^n}$ $\quad \left(\frac{2x}{y}\right)^2 = \frac{2^2x^2}{y^2} = \frac{4x^2}{y^2}$

Power of Power

$(a^m)^n = a^{m \cdot n}$ $\quad (4^3)^5 = 4^{3 \cdot 5} = 4^{15}$

$3^3 = 27$

$3^2 = 9$

$3^1 = 3$

$3^0 = 1$

$3^{-1} = \frac{1}{3}$

$3^{-2} = \frac{1}{9}$

$3^{-n} = \frac{1}{3^n}$

$\frac{2x}{x^{-3}}$ $\quad \frac{2x}{\frac{1}{x^3}}$

$2x \cdot x^3 = 2x^4$

$\frac{27a^4b^{-2}c^3}{9a^{-2}b^4c}$

$\frac{27}{9} \left| \frac{a^4 \cdot a^2}{b^4 \cdot b^2} \right| \frac{c^2}{1}$

$\frac{3a^6c^2}{b^6}$

$\frac{(5a^2)^2 b^{-2} c}{10a^3 b c^{-5}}$ $\quad (5a^2)^2 = 5^2 a^4$

$\frac{25}{10} \left| \frac{a^{4-3}}{b^{1+2}} \right| \frac{c^{1+5}}{1}$

$\frac{5ac^6}{2b^3}$

Factor

Common in all terms

Variable to what power

number that goes into all

$a^4b^2 + a^3b^5$

$a^3b^2(a + b^3)$

$4x^2y + 8x^3y^3 + 10xy^2$

$2xy(2x + 4x^2y^2 + 5y)$