

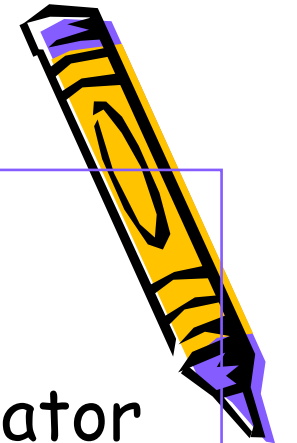


## Ch 8.5

### Division Properties of Exponents



# Dividing Powers with Same Base

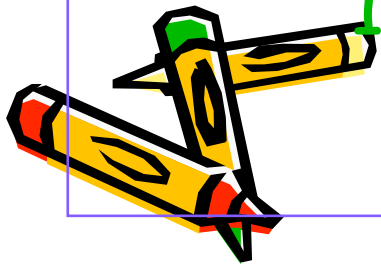


- For every non-zero #  $a$  & integers  $m$  &  $n$ ,  $\frac{a^m}{a^n} = a^{m-n}$
- When you have the same base in the numerator & denominator, **subtract the exponents**.
- Always raise powers before multiplying or dividing same bases, move negatives last.

Examples:

$$\frac{x^7}{x^4} = \frac{\cancel{x \cdot x \cdot x \cdot x \cdot x \cdot x \cdot x}}{\cancel{x \cdot x \cdot x \cdot x}} = x \cdot x \cdot x = x^3$$

1.  $\frac{a^{10}}{a^5} = a^5$       2.  $\frac{2x^4}{8x^6} = \frac{x^{4-6}}{4} = \frac{x^{-2}}{4} = \frac{1}{4x^2}$



Try some  
Simplify each expression.

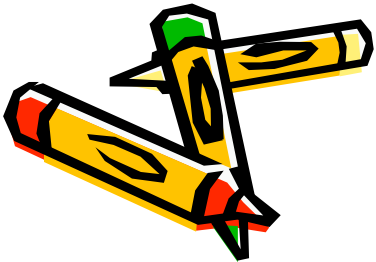
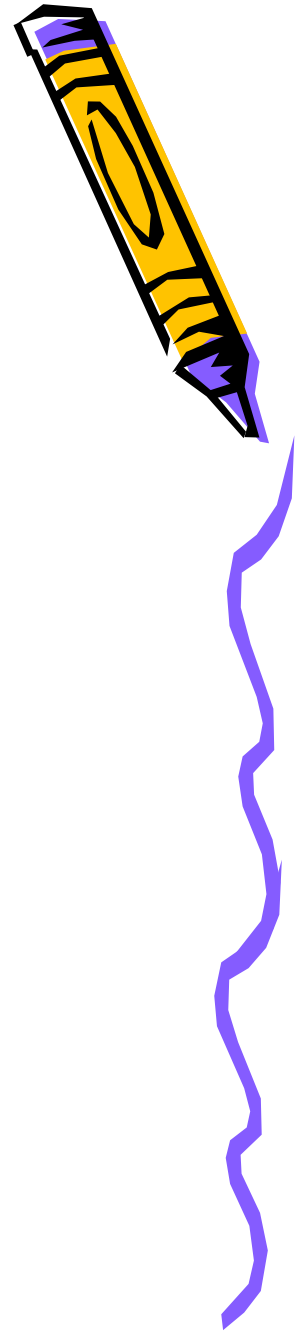
1.  $\frac{a^3}{a^7}$

2.  $\frac{b^2(b^4)}{b^3}$

3.  $\frac{x^4}{x^4}$

4.  $\frac{24p^3j^{-4}}{6p^{-3}j^6}$

5.  $\frac{x^2y^{-1}z^4}{xy^4z^{-3}}$



# Raising a Quotient to a Power

- For every non-zero #  $a$  &  $b$  and integer  $n$ ,  $\left(\frac{a}{b}\right)^n = \frac{a^n}{b^n}$
  - When a power is attached to parentheses, the exponent gets 'distributed' to each value inside (multiply exponents)
- \*\*Remember 1<sup>st</sup> 'remove' ( ) before applying the other rules of exponents**

## Examples:

1.  $\left(\frac{4}{6}\right)^3 = \frac{4^3}{6^3} = \frac{64}{216} = \frac{8}{27}$

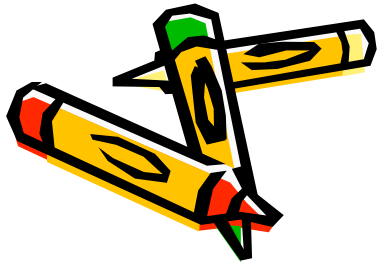
2.  $\left(\frac{3}{x^{-2}}\right)^3 = \frac{3^3}{x^{-6}} = 27x^6$



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

If you have a negative exponent outside, flip the entire fraction and make the outside exp. positive.

Ex.  $\left(\frac{2x^2}{y^{-3}}\right)^{-2} = \left(\frac{y^{-3}}{2x^2}\right)^2 = \left(\frac{y^{-6}}{2^2 x^4}\right) = \frac{1}{4x^4 y^6}$



Try some  
Simplify each expression.

1.  $\left(\frac{3m^{-1}}{n^3}\right)^4$

2.  $\left(\frac{x^{-1}}{x^2y^{-2}}\right)^3$

3.  $\left(\frac{-4b}{c}\right)^{-2}$

4.  $\left(\frac{7a}{m^{-3}}\right)^{-2}$

