## 8.2: Apply Exponent Properties Involving Quotients

Goals: \*Divide expressions with the same base and having exponents

\*Raise a quotient to a power

1)  $\frac{a^m}{a^n} = a^{m-n}$ 2)  $\left(\frac{a}{b}\right)^m = \frac{a^m}{b^m}$ 

Write out the following as a quotient:

$$\frac{a^5}{a^3} = \frac{a \cdot a \cdot a \cdot a \cdot a}{a \cdot a \cdot a} = a \cdot a = a^2$$

Can you come up with a rule for dividing expressions with the same base raised to a power?

## Same base, subtract the exponents

Simplify the following expressions. Write the answer using an exponent.

Ex: 
$$\frac{4^{7}}{4^{2}}$$
  
Ex:  $\frac{8^{10}}{8^{4}}$   
Ex:  $\frac{5^{4} \cdot 5^{8}}{5^{7}}$   
Ex:  $\frac{(-3)^{9}}{(-3)^{3}}$   
Ex:  $\frac{1}{x^{4}} \cdot x^{6}$   
Ex:  $\frac{9^{12}}{9^{5}}$   
3^{6}  
Ex:  $\frac{1}{x^{2}}$   
9<sup>7</sup>  
Ex:  $\frac{(-2)^{4}}{(-2)^{3}}$   
Ex:  $\frac{6^{3} \cdot 6^{4}}{6^{2}}$   
Ex:  $\frac{1}{r^{5}} \cdot r^{8}$   
-2  
6<sup>5</sup>  
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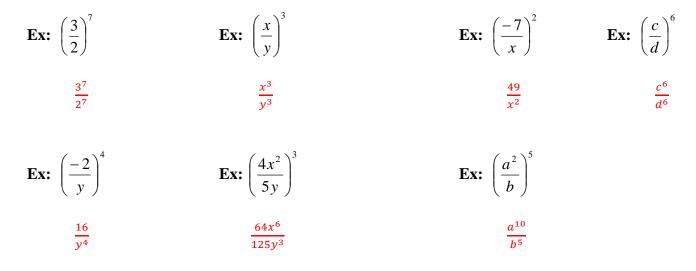
Write the following out as a product:

$$\left(\frac{a}{b}\right)^4 = \frac{a}{b} \cdot \frac{a}{b} \cdot \frac{a}{b} \cdot \frac{a}{b} = \frac{a \cdot a \cdot a \cdot a}{b \cdot b \cdot b \cdot b} = \frac{a^4}{b^4}$$

Can you come up with a rule to simplify a quotient being raised to a power?

Fraction raised to a power, both numerator and denominator get raised to the power

Use the rule you came up with to simplify the following expressions.



Try some more difficult ones:

