

Name: \_\_\_\_\_

Date: \_\_\_\_\_

Notes

Algebra Section 8.2

Pages 495-501



**Goal:** "Use properties of exponents involving quotients."

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

**Write out the following as a quotient:**

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

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

Keep the base. Subtract the exponents.

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

**Ex:**  $\frac{4^7}{4^2}$

$4^5$

**Ex:**  $\frac{8^{10}}{8^4}$

$8^6$

**Ex:**  $\frac{5^4 \cdot 5^8}{5^7}$

$5^5$

**Ex:**  $\frac{(-3)^9}{(-3)^3}$

$3^6$

**Ex:**  $\frac{1}{x^4} \cdot x^6$

$x^2$

**Ex:**  $\frac{9^{12}}{9^5}$

$9^7$

**Ex:**  $\frac{(-2)^4}{(-2)^3}$

$-2$

**Ex:**  $\frac{6^3 \cdot 6^4}{6^2}$

$6^5$

**Ex:**  $\frac{1}{r^5} \cdot r^8$

$r^3$

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.

**Ex:**  $\left(\frac{3}{2}\right)^7$

$$\frac{3^7}{2^7}$$

**Ex:**  $\left(\frac{x}{y}\right)^3$

$$\frac{x^3}{y^3}$$

**Ex:**  $\left(\frac{-7}{x}\right)^2$

$$\frac{49}{x^2}$$

**Ex:**  $\left(\frac{c}{d}\right)^6$

$$\frac{c^6}{d^6}$$

**Ex:**  $\left(\frac{-2}{y}\right)^4$

$$\frac{16}{y^4}$$

**Ex:**  $\left(\frac{4x^2}{5y}\right)^3$

$$\frac{64x^6}{125y^3}$$

**Ex:**  $\left(\frac{a^2}{b}\right)^5$

$$\frac{a^{10}}{b^5}$$