Name _____ Class _____ Date _____

Reteaching 7-5

Division Properties of Exponents

OBJECTIVE: Applying division properties of exponents

MATERIALS: None

To divide powers with the same base, subtract exponents.

Example

Simplify $\frac{4^3}{4^5}$.

Method 1

$\frac{4 \cdot 4 \cdot 4}{4 \cdot 4 \cdot 4 \cdot 4 \cdot 4}$ ← **Expand the numerator and the denominator.**

$\frac{\cancel{4} \cdot \cancel{4} \cdot \cancel{4}}{\cancel{4} \cdot \cancel{4} \cdot \cancel{4} \cdot 4 \cdot 4}$ ← **Draw lines through terms that are in both the numerator and the denominator.**

$\frac{1}{4 \cdot 4}$ ← **Cancel.**

$\frac{1}{4^2}$ or 4^{-2} ← **Rewrite with exponents.**

Method 2

$3 - 5 = -2$ ← **Subtract the exponents from the original equation. Compare this to the exponent in the first answer.**

So $\frac{4^3}{4^5} = 4^{3-5} = 4^{-2}$. ← **Subtract the exponents from the original equation. Compare this to the exponent in the first answer.**

$\frac{1}{4^2}$ ← **Write with positive exponents.**

To raise a quotient to a power use repeated multiplication.

Exercises

Use both methods shown in the example to simplify each expression. Use only positive exponents.

1. $\frac{z^6}{z^3}$ **2.** $\left(\frac{3^2}{4}\right)^3$ **3.** $\frac{m^{-3}}{m^{-4}}$ **4.** $\frac{5^3}{5^4}$

5. $\left(\frac{b^7}{b^5}\right)^3$ **6.** $\frac{5a^5}{15a^2}$ **7.** $\frac{2^2}{2^5}$ **8.** $\frac{d^8}{d^3}$

9. $\frac{x^7}{x^5}$ **10.** $\left(\frac{10^8}{10^2}\right)^3$ **11.** $\frac{14x^{11}}{7x^{10}}$ **12.** $\frac{8x^9}{12x^6}$

13. $\frac{x^{12}}{x^5}$ **14.** $\frac{6x^4}{4x^2}$ **15.** $\frac{x^3}{x^8}$ **16.** $\left(\frac{x^5}{x^3}\right)^4$

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