

Sec. 7.4 Division Properties of Exponents

$$\frac{a^m}{a^n} = a^{m-n}$$

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

$\xrightarrow{a^{5-2}}$

Problem 1: Simplify

a. $\frac{2^8}{2^4} = 2^{8-4} = 2^4$

b. $\frac{u^{-1}}{u^{-8}} \begin{cases} \rightarrow \frac{u^8}{u^1} = u^{8-1} = u^7 \\ \rightarrow u^{-1-(-8)} = u^{-1+8} = u^7 \end{cases}$

c. $\frac{y^{\frac{3}{4}}}{y^{\frac{1}{2}}} = y^{\frac{3}{4} - \frac{1}{2} \cdot \frac{2}{2}} = y^{\frac{3}{4} - \frac{2}{4}} = y^{\frac{1}{4}}$

d. $\frac{d^{\frac{7}{2}}}{d^3} = d^{\frac{7}{2} - \frac{3}{1} \cdot \frac{2}{2}} = d^{\frac{7}{2} - \frac{6}{2}} = d^{\frac{1}{2}}$

e. $\frac{x^3 y^4}{x^3 y^4} = x^4$

f. $\frac{x^4 y^{-1} z^8}{x^4 y^{-5} z^1} = y^4 z^7$

$y^{-1-(-5)} z^{8-1}$

g. $\frac{8x^4 y^{-1}}{2x^3 y} = 4xy^6$

h. $\frac{m^{\frac{3}{4}} n^6}{m^{-5} n^{-7}}$ $n^{6-(-7)} = n^{13} = \frac{1}{n}$

$= m^{\frac{3}{4} + (-7)\frac{1}{4}} = \frac{m^{\frac{23}{4}}}{n}$

i. $\frac{8a^{-2} b^7 c^{-4}}{4a^6 b^{-2} c^{-10}}$ $\frac{2b^9}{a^8 c^{10}}$

Problem 2: Simplify

$$\begin{array}{l}
 40 \rightarrow 4 \times 10^1 \\
 0.4 \rightarrow 4 \times 10^{-1}
 \end{array}$$

a. $\frac{2.8 \times 10^{-6}}{7 \times 10^{-4}} = 0.4 \times 10^{-2}$

$(4 \times 10^{-1}) \times 10^{-2}$

4×10^{-3}

$-6 - (-4)$
 $-6 + 4$
 -2
 10^{-2}

b. $\frac{3.5 \times 10^8}{7 \times 10^3} = 0.5 \times 10^5$

$5 \times 10^{-1} \times 10^5$

5×10^4

Problem 3:

$\left(\frac{4}{9}\right)^2$ Pass this out

$$= \frac{4}{9} \cdot \frac{4}{9} = \frac{4^2}{9^2} = \frac{16}{81}$$

$$\left(\frac{a^3}{2b}\right)^4 = \frac{(a^3)^4}{2^4 b^4} = \frac{a^{12}}{16b^4}$$

Problem 4:

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

Reciprocal

$$\left(\frac{3}{5}\right)^{-1} = \frac{5}{3}$$