7.2 Division Properties of Exponents

Monomials – one term

7x 100 $\frac{6x}{5}$ ~~$\frac{x}{x}$~~ $-65x^7$

Division Properties of Exponents

Quotient of Powers	$\frac{a^m}{a^n} = a^{m-n}$ shortcut
Power of a Quotient	$\left(\frac{a^m}{a^n}\right)^p = \frac{a^{mp}}{a^{np}}$

Example 1: $\frac{a^4b^7}{ab^2} = \frac{aaaa\,bbbbbbb}{a\,bb} = a^3b^5$ (Look for same letters (bases))

Example 2: $\left(\frac{2a^3b^5}{3b^2}\right)^3 = \frac{2^3a^9b^{15}}{3^3b^6} = \frac{2^3a^9b^9}{3^3}$

1. $\frac{a^2}{a} = \frac{a\,a}{a} = a$

2. $\frac{x^5y^3}{x^5y^2} = \frac{xxxxx\,yyy}{xxxxx\,yy} = y^1$

3. $\frac{-2y^7}{14y^5} = \frac{-1}{7}y^2 = -\frac{y^2}{7}$

4. $\left(\frac{2r^5w^3}{r^4w^3}\right)^4 = \frac{2^4r^{20}w^{12}}{r^{16}w^{12}} = 2^4r^4$

5. $\left(\frac{3r^6n^3}{2r^5n}\right)^4 = \frac{3^4r^{24}n^{12}}{2^4r^{20}n^4} = \frac{3^4r^4n^8}{2^4}$

6. $\frac{r^7n^7t^2}{n^3r^3t^2} = r^4n^4$

$\frac{7}{7}=1$ $\frac{12}{12}=1$ $\frac{x}{x}=1$

Special Exponent Rules

Zero Exponent	$a^0 =$ $\frac{x^5}{x^5} = x^{5-5} = x^0 = 1$
Negative Exponent Property	$\frac{x^4}{x^7} = \frac{1}{x^3}$ $x^{4-7} = x^{-3}$ Not simplified. Need to cool off. $\frac{1}{x^3}$

Example: $\frac{4a^{-3}b^6}{16a^2b^6c^{-5}}$ NOT DONE b/c there are negative exponents. $= \frac{1c^5}{4a^5}$

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

2. $\frac{m^1}{m^{-4}}$ $= m^5$

3. $\left(\frac{4ab^3}{8y^4}\right)^5$ $= \frac{4^5a^5b^{15}}{8^5y^{20}}$

4. $\frac{y^0}{x^{-2}} = \frac{1}{x^{-2}} = x^2$

5. $\left(\frac{a^{-1}b}{7^{-1}}\right)^4$ $\frac{a^{-4}b^4}{7^4}$ $= \frac{b^4}{7^4a^4}$

6. $\frac{3rtu^{-4}}{r^{-1}t^2u^7} = 3r^2t^{-1}u^{-11}$ $= \frac{3r^2}{t^1u^{11}}$

7. $\left(\frac{-2mn^2}{4m^{-6}n^4}\right)^3$ $= \frac{(-2)^3m^3n^6}{4^3m^{-18}n^{12}}$ $= \frac{(-2)^3m^{21}n^{-6}}{4^3}$ $= \frac{(-2)^3m^{21}}{4^3n^6}$

8. $\left(\frac{-39xy^2}{49x^{-6}y^4}\right)^0$ 1

Homework Problems:
7.2 (p. 407) #19-41 odd