Properties of Exponents in Chapter 8

- Zero and Negative Exponents $5b^{-3}c^{0}$
- Multiplying powers with the same base $a^{4}a^{7}a$
- Raising a power to a power $(m^{5})^{8}$
- Raising a product to a power $(5a^{3}b^{7})^{2}$
- Dividing powers with the same base $\frac{n^{8}}{n^{2}}$
- Raising a quotient to a power $\left(\frac{x^{3}}{y^{7}}\right)^{4}$

Sections 8-3 and 8-4:
Multiplication Properties of Exponents

Multiplying Powers with the Same Base: Add Exponents

Raising a Power to a Power: Multiply exponents

Raising a Product to a Power:

Raise everything inside the parentheses to the power that is outside of the parenthese.

This is when you distribute the exponent

Simplify each.

1. $(5R^{-5}ST^{-4})^{2}$

2. $(2w^{-5}x^{4})^{-3}$

What is the difference between these two?

$(x+5)^{2}$

$(x+5)(x+5)$

Here you can't just distribute the exponent, you have to expand.

F O I L

$x^{2}+5x+5x+25$

$x^{2}+10x+25$

$(5x)^{2}$ $5^{2}x^{2}$

$25x^{2}$

With this problem you CAN simply square everything inside the parentheses.

Simplify each.

3. $(5c^3d^{-2})^2(10cd^5)^3$

4. $(9x^4\,y^{-8})^0(x^3y^2)^5(x^{-2}y^4)$

5. Simplify:

Multiply exponents 4 and 2 first then raise everything to the 8th power.

$((a^5b^3)^2)^4 \rightarrow (a^5b^3)^8$

Square first then raise to the fourth power.

$(a^{10}b^6)^4$

$a^{40}b^{24}$

Hwk #21:
Sections 8-3 and 8-4

Page 407, Problems 14, 17, 18, 21
AND
Pages 413-414, Problems 7, 14, 15, 20, 21

6. Simplify:

$\frac{c^9}{c^4} = c^5$ $\frac{c\cdot c\cdot c\cdot c\cdot c\cdot \cancel{c}\cdot\cancel{c}\cdot\cancel{c}\cdot\cancel{c}}{\cancel{c}\cdot\cancel{c}\cdot\cancel{c}\cdot\cancel{c}}$

$c^9 \cdot c^{-4}$

Section 8-5:
Division Properties of Exponents

Dividing Powers with the Same Base:

Subtract Exponents

Exponent in Numerator − Exponent in Denominator

Simplify each. No negative exponents in your answer!

1. $\frac{12d^{6}}{3d^{2}} = 4d^{6}$

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

$m^{5-7} = m^{-2}$

$m^{7-5} = \frac{1}{m^{2}}$

3. $\frac{8n^{9}}{24n^{-2}} = \frac{n^{11}}{3}$

$n^{9-(-2)}$

4. $\frac{y^{-10}}{y^{-6}}$ $\frac{y^{6}}{y^{10}} = \frac{1}{y^{4}}$

5. Simplify.

$$\frac{7a^{8}b^{9}c^{-4}d^{6}}{35a^{-2}b^{7}c^{-8}d^{10}}$$

$$\frac{a^{10}b^{2}c^{4}}{5d^{4}}$$

6. Simplify

$$\left(\frac{10p^{6}q^{5}r^{-2}}{5p^{2}q^{-1}r^{3}p^{4}}\right)^{3}$$

$$\left(\frac{2q^{6}}{r^{5}}\right)^{3} = \frac{8q^{18}}{r^{15}}$$

Simplify each.

7. $\left(\frac{a^9 b^{-3}}{a^4 c^{-5}}\right)^{-3}$

8. $\left(\frac{8p^4 q^{-3} r^6}{p^9 q^2 r^5}\right)^{-2}$