IA-BE Tuesday 3-29-11

1. List the 4 exponent rules with an example of each. Do not just name them, state what each rule is.

2. $\left(\frac{2p^2}{3}\right)^4$

3. $\frac{x^7 y^{12}}{x^6 y^3}$

4. $\left(\frac{4c^3 d^2}{5e^4 f^7}\right)^3$

- Homework review: Pg. 421 #14-19

THE DIVISION RULE for EXPONENTS SAYS TO subtract the EXPONENT, top − bottom, WHICH is OK if the top EXPONENT is the bigger ONE: (EX) $\frac{x^5}{x^2} = x^{5-2} = x^3$

BUT WHAT IS THE EXPONENTS AND THE BASES ARE THE SAME?

(EX) $\frac{x^5}{x^5} = x^{5-5} = x^0$

BUT SINCE $\frac{x^5}{x^5} = 1$, then x^0 MUST EQUAL 1.

This leads to:

ZER

Zero Exponent Rule

ANYTHING TO THE ZERO POWER IS ONE EXCEPT $0^0 = 0$.

$\boxed{a^0 = 1}$

(EX) $(3x^2y^8z^8)^0 = 1$

(Ex) $8xy^2z^0 = ?$

$8xy^{2 \cdot 1} = \boxed{8xy^2}$

Ex 3 @ Pg 419 $\left(-\frac{3x^5y}{8xy^7}\right)^0 = ? = \boxed{1}$

(b) $\frac{t^3s^0}{t} = t^{3-1} \cdot 1 = \boxed{t^2}$

WHAT if THE BOTTOM EXPONENT IS bigger?

(Ex) $\frac{x^2}{x^5} = x^{2-5} = x^{-3}$

BUT $\frac{x^2}{x^5} = \frac{xx}{xxxxx} = \frac{1}{x^3}$

So $x^{-3} = \frac{1}{x^3}$

NEGATIVE EXPONENT RULE $\boxed{a^{-N} = \frac{1}{a^N}}$

(Ex) $5^{-2} = \frac{1}{5^2} = \frac{1}{25}$

RULE: Never leave a negative exponent!

(EX) $(4x^3y^{-2})^2 = 4^2x^6y^{-4}$

$= \boxed{\dfrac{16x^6}{y^4}}$

NOTE: Since $a^{-N} = \dfrac{1}{a^N}$ then $\dfrac{1}{a^{-N}} = a^N$

WHY? (EX) $\dfrac{1}{2^{-3}} = \dfrac{1}{\frac{1}{2^3}} = \dfrac{1}{\frac{1}{8}} = 1 \cdot \dfrac{8}{1} = 8$

$\therefore \dfrac{1}{2^{-3}} = 2^3 = 8$

(EX) $\dfrac{5x^{-2}y^4z^3}{2x^2y^{-1}z} = \dfrac{5}{2}x^{-4}y^5z^2$

$= \boxed{\dfrac{5y^5z^2}{2x^4}}$

(EX) $\left(\dfrac{3}{2x^{-4}}\right)^2 = \dfrac{3^2}{2^2x^{-8}} = \boxed{\dfrac{9x^8}{4}}$

(Ex) $\dfrac{-3x^4}{9x^7} = \dfrac{-1x^{-3}}{3} = \boxed{\dfrac{-1}{3x^3}}$

OR $\dfrac{-3x^4}{9x^7} = \boxed{\dfrac{-1}{3x^3}}$ ← go directly, there are "3 more" x's in the bottom.

ANOTHER WAY TO LOOK AT IT } If the bottom is bigger, subtract bottom − top!

(Ex) $\dfrac{-5xy^{-2}z}{-3x^{-1}y^{-2}z^{-3}} = 5x^{1-(-1)}y^{-2-(-2)}z^{1-(-3)}$

$= 5x^2y^0z^4$

↑ (since $y^0 = 1$)

$= \boxed{5x^2z^4}$

Homework / Classwork: • Pg 421 # 20-31

• Memorize the 6 exponent rules.