

1A-BE

TUESDAY 4-7-09

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
 $0^0 = 0$.

$$\boxed{a^0 = 1}$$

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

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

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

Ex 3 (a) $\left(-\frac{3x^5y}{8xy^7} \right)^0 = ? = \boxed{1}$
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(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 $\frac{x^2}{x^5} = \frac{\overset{x}{\cancel{x}} \overset{x}{\cancel{x}}}{\underset{x}{\cancel{x}} \underset{x}{\cancel{x}} \underset{x}{\cancel{x}} \underset{x}{\cancel{x}} \underset{x}{\cancel{x}}} = \frac{1}{x^3}$

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

NER
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!

3.

$$\textcircled{\text{EX}} (4x^3y^{-2})^2 = 4^2x^6y^{-4} \\ = \boxed{\frac{16x^6}{y^4}}$$

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

Why? $\textcircled{\text{EX}} \frac{1}{2^{-3}} = \frac{1}{\frac{1}{2^3}} = \frac{1}{\frac{1}{8}} = 1 \cdot \frac{8}{1} = 8$

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

$$\textcircled{\text{EX}} \frac{5x^{-2}y^4z^3}{2x^2y^{-1}z} = \frac{5}{2}x^{-4}y^5z^2 \\ = \boxed{\frac{5y^5z^2}{2x^4}}$$

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

$$\textcircled{\text{EX}} \quad \frac{-3x^4}{9x^7} = \frac{-1x^{-3}}{3} = \boxed{\frac{-1}{3x^3}}$$

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

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

$$\textcircled{\text{EX}} \quad \frac{-5xy^{-2}z}{-3x^{-1}y^{-2}z^{-3}} = 5x^{1-(-1)}y^{-2-(-2)}z^{1-(-3)}$$

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

↑ since $y^0 = 1$

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

Homework / Classwork :: Pg 421 # 20-31

• Memorize the 6 exponent rules.