MATH 2270/1314 COLLEGE ALGEBRA Week 2 Friday 2/1/2019

- NEGATIVE INTEGER EXPONENT

show: $2^{-3} = \frac{1}{2^3}$.

$2^3 = 2 \cdot 2 \cdot 2 = 8$

$2^0 = 1$

proof: we know $2^3 = 8$.

And $2^3 \cdot 2^{-3} = 2^{(3+(-3))} = 2^0 = 1$

$8 \cdot \frac{1}{8} = 1$.

multiplying fractions: $\frac{a}{b} \cdot \frac{c}{d} = \frac{ac}{bd}$.

$\frac{8}{1} \cdot \frac{1}{8} = \frac{8}{8} = 1$.

- definition: RECIPROCALS.

Two numbers whose product is 1

e.g. -2 and $-\frac{1}{2}$

$\frac{3}{5}$ and $\frac{5}{3}$ → change a fraction upside down to get its reciprocal.

- $7 = \frac{7}{10}; \frac{10}{7}$

- $.41 = \frac{41}{100}; \frac{100}{41}$

- calculation: $\boxed{\frac{1}{x}}$ or $\boxed{x^{-1}}$

- RECIPROCAL OF ZERO IS NOT DEFINED!

Since anything multiplied by zero is still zero, in other words, nothing multiplied by zero will turn out to be 1.

- Rules:

(1). Any number to a negative power is the same as its reciprocal to the positive power

$$2^{-3} = \left(\frac{1}{2}\right)^3 = \frac{1}{2} \cdot \frac{1}{2} \cdot \frac{1}{2} = \frac{1 \cdot 1 \cdot 1}{2 \cdot 2 \cdot 2} = \frac{1^3}{2^3} = \frac{1}{8}$$

$$\left(\frac{2}{3}\right)^{-2} = \left(\frac{3}{2}\right)^{2} = \left(\frac{3}{2}\right)\cdot\left(\frac{3}{2}\right) = \frac{3\cdot 3}{2\cdot 2} = \frac{9}{4}$$

(2). I am free to move any factor to the other part of the fraction IF I change the sign of the exponent.

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

$$5ab^{-2} = \frac{5ab^{-2}}{1} = \frac{5a}{b^2}$$

$$\frac{1}{6a^{-5}} = \frac{a^5}{6}$$

WEBASSIGN

(1) $3^{-1} + 4^{-1} = \frac{3^{-1}}{1} + \frac{4^{-1}}{1} = \frac{1}{3^1} + \frac{1}{4^1} = \frac{1}{3} + \frac{1}{4} = \frac{1\cdot 4 + 1\cdot 3}{(3)(4)} = \frac{7}{12} = \boxed{7/12}$

★ TO EVALUATE ADDITION/SUBTRACTION OF TWO FRACTIONS

(1). multiply the denominator

(2) start with upper left and cross multiply. } "HANDY-DANDY" METHOD

$$\frac{4}{9} - \frac{3}{7} = \frac{4\cdot 7 - 3\cdot 9}{9\cdot 7} = \frac{28-27}{63} = \frac{1}{63}$$

$$\frac{3}{x} + \frac{5}{y} = \frac{3y+5x}{xy}$$

(2) $(3^{-1})^{-2} = 3^{(-1)\cdot(-2)} = 3^2 = 9$

$\hookrightarrow = \left(\frac{1}{3}\right)^{-2} = 3^2 = 9$

Third Property of Exponent

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

(3) $\frac{3x^6}{x^5} = \frac{3x^{6-5}}{1} = \frac{3x^1}{1} = 3x$; $\frac{25a^3b^7}{40a^{10}b^2} = \frac{5b^{7-2}}{8a^{10-3}} = \frac{5b^5}{8a^7}$