Exponents #3 - Integral Exponents

Sep 17

$3^4 = 81$

$3^3 = 27$

$3^2 = 9$

$3^1 = 3$

$3^0 = 1$

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

$3^{-2} = \frac{1}{9}$

$3^{-3} = \frac{1}{27}$

$3^{-4} = \frac{1}{81}$

÷3 ÷3 which is the same as $\frac{81}{3}$

$\div 3 = \frac{27}{3}$

$\div 3 = \frac{9}{3}$

$\div 3$

Notice the pattern! If you know the positive value, then you have a hint for the negative power

9 and $\frac{1}{9}$ are reciprocals.... So 3^2 and 3^{-2} are reciprocals.

Ex. $6^{-2} = ?$ So $6^2 = 36$ so 6^{-2} is $\frac{1}{36}$ (reciprocal of 36)

Ex. $\frac{1}{4^{-3}} = ?$ Means $1 \div 4^{-3} = 1 \div \frac{1}{4^3} = 1 \times \frac{4^3}{1} = 4^3$

reciprocal

multiply by the reciprocal (dividing fractions)

So: $\frac{1}{4^{-3}} = \frac{4^3}{1}$

When a power is moved from one place (top or bottom) to the other in a fraction, the exponent changes to its opposite.

★ Positive exponents are easier to work with!

Ex. $\frac{2^{-3}}{5^{-2}} = \frac{5^2}{\cancel{2}^3} = \frac{25}{8}$

or

$2^{-3} \div 5^{-2} = \frac{1}{8} \div \frac{1}{25} = \frac{1}{8} \times \frac{25}{1} =$

Ex. $\frac{4^1 a^{-3}}{b^2} = \frac{4}{b^2 \cdot a^3}$

every number has an exponent

(only powers with negative exponents have to move)

The most important idea from today's lesson is:

Sep18

Ex $2x^{-3}$ is really $2^{1}x^{-3}$

use Integral exponent law to remove negative

$$\frac{2^1}{x^3}$$

$$\frac{2}{x^3}$$

Ex $(2^1x^1)^{-3}$

use Power of Product to remove brackets

$$2^{-3}x^{-3}$$

use the Integral exponent law to remove negatives on exponents

$$\frac{1}{2^3x^3}$$

evaluate coefficient

$$\frac{1}{8x^3}$$

Always use HAPPY exponents

Ex $$\frac{5(x^3y^4)^{-1}}{(3x^{-2}y^6)^{-2}}$$

Power of a Product law

$$\frac{5(x^{-3}y^{-4})}{3^{-2}\cdot x^4y^{-12}}$$

Integral exponent law

$$\frac{5\cdot 3^2\cdot y^{12}}{x^3\cdot y^4\cdot x^4}$$

$3^2 = 9$

Mult. law & division law of exponents

$\dfrac{45\cdot y^8}{x^7}$ is the same as $45\dfrac{y^8}{x^7}$