L6 Negative Exponents

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Lesson 6 Negative Exponents

Negative Exponent Law:
$$a^{-n} = \frac{1}{a^n} \ \text{ or } \ \frac{1}{a^{-n}} = a^n$$

Shortcut for fractions with negative exponents:
$$\left(\frac{x}{y}\right)^{-n} = \left(\frac{y}{x}\right)^n$$

**Flip the numerator and denominator (reciprocal)
Switch sign of exponent.**

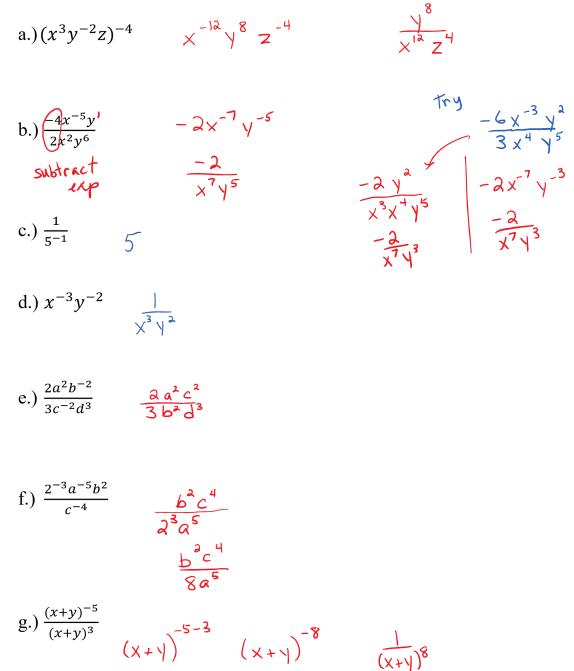
Always write answers in terms of positive exponents

Example 1

a.) 2^{-4} $\frac{1}{2^4}$ $\frac{1}{16}$

b.) $\left(-\frac{3}{4}\right)^{-3}$ $\left(-\frac{4}{3}\right)^{3}$ $-\frac{64}{27}$

flip the fraction, exponent becomes positive

c.) 0.3^{-4} $\left(\frac{3}{10}\right)^{-4}$ $\left(\frac{10}{3}\right)^{4}$ $\frac{10000}{81}$ Try 5^{-2} $\frac{1}{25}$

                                                       $\left(\frac{2}{3}\right)^{-3}$ $\frac{27}{8}$

d.) $-(-2)^{-3}$

$-\frac{1}{(-2)^3}$

$-\frac{1}{(-8)}$

$\frac{1}{8}$

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

$-(-3)^{-4}$ $-\frac{1}{(-3)^4}$ $-\frac{1}{81}$

Example 2
Simplify leaving no negative exponents.

a.) $(x^3y^{-2}z)^{-4}$ $\quad x^{-12}y^8 z^{-4}$ $\qquad \dfrac{y^8}{x^{12}z^4}$

b.) $\dfrac{-4x^{-5}y^1}{2x^2y^6}$ $\qquad -2x^{-7}y^{-5}$ $\qquad \dfrac{-2}{x^7y^5}$

subtract exp

Try

$\dfrac{-6x^{-3}y^2}{3x^4y^5}$

$\dfrac{-2y^2}{x^3x^4y^5}$ $\qquad -2x^{-7}y^{-3}$

$\dfrac{-2}{x^7y^3}$ $\qquad \dfrac{-2}{x^7y^3}$

c.) $\dfrac{1}{5^{-1}}$ $\qquad 5$

d.) $x^{-3}y^{-2}$ $\qquad \dfrac{1}{x^3y^2}$

e.) $\dfrac{2a^2b^{-2}}{3c^{-2}d^3}$ $\qquad \dfrac{2a^2c^2}{3b^2d^3}$

f.) $\dfrac{2^{-3}a^{-5}b^2}{c^{-4}}$ $\qquad \dfrac{b^2c^4}{2^3a^5}$

$\dfrac{b^2c^4}{8a^5}$

g.) $\dfrac{(x+y)^{-5}}{(x+y)^3}$ $\qquad (x+y)^{-5-3}$ $\qquad (x+y)^{-8}$ $\qquad \dfrac{1}{(x+y)^8}$

*Be careful, do not move a negative number, only a negative exponent.