

Warm Up:

1. $-4x^4 \cdot 3x^6y$

$$-12x^{10}y$$

2. $\frac{9a^6b^4}{3a^2b}$

$$3a^4b^3$$

3. $(2x^3y^2z)^2$

$$4x^6y^4z^2$$

Before we start, there are two special exponents that we need to remember. See if you can remember:

$$x^1 = x$$

$$x^0 = 1$$

$$\frac{2^2}{2^2} = 2^0 = 1$$

The negative exponent property states that:

$$x^{-a} = \frac{1}{x^a}$$

$$\frac{1}{x^{-a}} = x^a$$

$$a \neq 0$$

When simplified, we do NOT want a negative exponent! All exponents should be made POSITIVE.

$$\frac{1}{x^{-2}} \cdot \frac{x^2}{x^2} = \frac{x^2}{1} = x^2 \approx \left\{ \frac{x^{-2}}{1} \cdot \frac{x^2}{x^2} = \frac{x^0}{x^2} = \frac{1}{x^2} \right.$$

Examples >

$$\frac{x^{-2}}{1} = \frac{1}{x^2}$$

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

$$\frac{x^{-4}}{y^{-3}} = \frac{y^3}{x^4}$$

$$\frac{x^2}{y^{-4}} = x^2 y^4$$

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

$$\frac{1}{25}$$

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

$$\frac{2^{-4}}{3^{-3}} = \frac{3^3}{2^4} =$$

$$\frac{27}{16}$$

$$\frac{6^2}{3y^{-4}} =$$

$$\frac{6^2 y^4}{3}$$

$$\frac{36y^4}{3} = 12y^4$$

So if we are simplifying and we have to subtract an exponent and get a negative exponent...

$$\frac{-6a^6bc^5}{3ab^3c^7} = -2a^5b^{-2}c^{-2} = \frac{-2a^5}{b^2c^2}$$

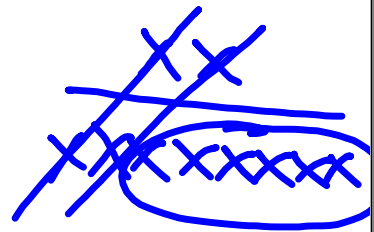
If we raise something to a negative exponent...

$$\left(\frac{-3x^4y}{6xy^{-4}}\right)^{-2} =$$

$$= \frac{x^{-8} y^{-2}}{(-2)^{-2} x^{-2} y^8} = \frac{(-2)^2 x^2}{x^8 y^2 y^8}$$

$$4x^{-6}$$

$$\frac{4}{x^6 y^{10}}$$



$$1. x^{-6} = \frac{1}{x^6}$$

$$2. x^2 y^{-3} = \frac{x^2}{y^3}$$

$$3. \frac{x^{-1}}{y^{-7}} = \frac{y^7}{x}$$

$$4. \frac{1}{y^{-1}} = y$$

$$5. \frac{1}{(-3)^{-2}} = 9$$

$$6. \frac{y^{-1} z^{-7}}{x^{-4}} = \frac{x^4}{y z^7}$$

$$7. 5^{-2} \cdot y^3 = \frac{y^3}{25}$$

$$8. \frac{2^{-3}}{6^2} = \frac{1}{2^3 \cdot 6^2} = \frac{1}{298}$$

$$9. \left(\frac{1}{4}\right)^{-2} = \frac{1^{-2}}{4^{-2}} = \frac{4^2}{1^2} = 16$$

$$10. \left(\frac{a^4 b^3}{c^{-6}}\right)^{-1} =$$

$$11. \left(\frac{5x^2 y}{10x^4 y^{-5}}\right)^{-2} =$$

$$\frac{x^9}{27y^{21}} = \left(\frac{3^1 x^{-2} y^3}{x^1 y^{-4}} \right)^{-3} = \frac{3^{-3} x^6 y^{-9}}{x^{-3} y^{12}} = \frac{x^9}{27y^{21}}$$

$$(3x^{-2}y^4)^{-1} \cdot -2x^{-4}y$$

$$3^{-1}x^2y^{-4} \cdot -2x^{-4}y$$

$$3^{-1} \cdot -2x^{-2}y^{-3}$$

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

