



Negative Exponents

Video Notes

[Video Link](#)

Negative Exponents

Background Information:

- Dividing Monomials
- Zero Exponents

"cancels" to get 1.

Divide: $5-3=2$

$$\frac{2^5}{2^3} = \frac{2 \cdot 2 \cdot 2 \cdot 2 \cdot 2}{2 \cdot 2 \cdot 2} = \frac{32}{8} = 4 = 2^2$$

$$\frac{2^2}{2^3} = \frac{2 \cdot 2}{2 \cdot 2 \cdot 2} = \frac{4}{8} = \frac{1}{2} = 2^{-1}$$

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

$4-3=1$

$$\frac{2^4}{2^3} = \frac{2 \cdot 2 \cdot 2 \cdot 2}{2 \cdot 2 \cdot 2} = \frac{16}{8} = 2 = 2^1$$

$$\frac{2^1}{2^3} = \frac{2 \cdot 1}{2 \cdot 2 \cdot 2} = \frac{2}{8} = \frac{1}{4} = 2^{-2}$$

$2^{-2} = \frac{1}{2^2} = \frac{1}{4}$

$3-3=0$

$$\frac{2^3}{2^3} = \frac{2 \cdot 2 \cdot 2}{2 \cdot 2 \cdot 2} = \frac{8}{8} = 1 = 2^0$$

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

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

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

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

$$\frac{2^2}{2^5} = \frac{2 \cdot 2}{2 \cdot 2 \cdot 2 \cdot 2 \cdot 2} = \frac{4}{40} = \frac{1}{10} = \frac{1}{2^3}$$

Divide:

$3-5=-2$

$$\frac{x^3}{x^5} = x^{-2} = \frac{1}{x^2}$$

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

$2-6=-4$

$$\frac{15a^2}{3a^6} = \frac{5a^{-4}}{1} = \frac{5}{a^4}$$

$$\frac{5 \cdot 15 a \cdot a}{1 \cdot 3 a \cdot a \cdot a \cdot a \cdot a} = \frac{5}{a^4}$$

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

$$\frac{12a^3b^2c^2}{16a^3bc^4} = \frac{3}{4} \cdot \frac{b^1 c^{-2}}{b^1 c^4} = \frac{3}{4} \cdot \frac{1}{b^1 c^2} = \frac{3}{4bc^2}$$

$$\frac{3 \cdot 12 a \cdot a \cdot a \cdot b \cdot b \cdot c \cdot c}{4 \cdot 16 a \cdot a \cdot a \cdot b \cdot c \cdot c \cdot c} = \frac{3b}{4c^2}$$

Conclusion:

A negative exponent means to do the reciprocal.

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

Ex: $\frac{6a^{-3}}{1} = \frac{6}{a^3}$

Ex: $\frac{1}{5x^{-4}} = \frac{x^4}{5}$