

Negative Exponents

EXP4

with a negative exponent:

reciprocal of the base to the opposite exponent

$$a^{-n} = (1/a)^n$$

$$a^n = (1/a)^{-n}$$

The sign of the exponent does NOT affect the sign of answer.Proof:

$$2^{-3}, 2^{-2}, 2^{-1}, 2^0, 2^1, 2^2, 2^3, 2^4, 2^5$$

$$\frac{1}{8}, \frac{1}{4}, \frac{1}{2}, 1, 2, 4, 8, 16, 32$$

★ flip it and raise it to the positive ★

Ex: • $2^{-2} = (1/2)^2 = 1/4$
 $2^2 = 4 \quad 2^{-2} = 1/4$

• $2^{-3} = (1/2)^3 = 1/8$
 $\frac{1}{2^3} = \frac{1}{8}$

• $(1/2)^{-2} = 2^2 = 4$

• $(-2)^{-3} = (-1/2)^3 = -1/8$

• $(-2)^{-2} = (-1/2)^2 = 1/4$

• $(1/2)^{-3} = 2^3 = 8$

• $(-1/2)^{-2} = (-2)^2 = 4$

• $(-1/2)^{-3} = (-2)^3 = -8$

Zero Exponent Law:

$$a^0 = 1 \quad a \neq 0$$

any non-zero number raised to zero exponent = 1

($0^0 = \text{undefined}$, $0^{-n} = \text{undefined}$) $\left. \begin{array}{l} > \text{it places zero} \\ > \text{in denominator} \end{array} \right\}$

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

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

bases same \rightarrow subtract exp.

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

exponents same \rightarrow divide bases