

Exponent & Radical Rules

8th Grade

Every exponent law with an example, plus roots and scientific notation.

EXPONENT LAWS

Product

$$a^m \times a^n = a^{m+n}$$

$$x^3 \cdot x^4 = x^7$$

Quotient

$$a^m \div a^n = a^{m-n}$$

$$x^7 / x^3 = x^4$$

Power of a power

$$(a^m)^n = a^{mn}$$

$$(x^3)^2 = x^6$$

Power of a product

$$(ab)^n = a^n b^n$$

$$(2x)^3 = 8x^3$$

Zero

$$a^0 = 1$$

any base but 0

Negative

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

$$2^{-3} = 1/8$$

Fractional

$$a^{(1/n)} = \sqrt[n]{a}$$

$$9^{(1/2)} = 3$$

SCIENTIFIC NOTATION

$a \times 10^n$, where $1 \leq a < 10$

$$4\,800\,000 = 4.8 \times 10^6 \cdot 0.00032 = 3.2 \times 10^{-4}$$

Big number → positive power. Small number → negative power. Count the decimal moves.

ROOTS

Perfect squares: 1 4 9 16 25 36 49 64 81 100 121 144

Perfect cubes: 1 8 27 64 125 216

$\sqrt{50} = \sqrt{(25 \times 2)} = 5\sqrt{2}$ — pull out the largest perfect square.