

Exponent Rules Chart

A printable exponent rules chart with symbolic laws and quick examples for products, quotients, powers, zero, negative, and fractional exponents.

Product rule

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

Example: $x^3 x^5 = x^8$

Quotient rule

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

Example: $\frac{y^7}{y^2} = y^5$

Power rule

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

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

Power of a product

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

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

Power of a quotient

$$\left(\frac{a}{b}\right)^n = \frac{a^n}{b^n}$$

Example: $\left(\frac{x}{3}\right)^2 = \frac{x^2}{9}$

Zero exponent

$$a^0 = 1$$

Example: $7^0 = 1$

Negative exponent

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

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

Fractional exponent

$$a^{\frac{1}{n}} = \sqrt[n]{a}$$

Example: $27^{\frac{1}{3}} = 3$

Exponent Rules Chart

01 Combine powers

These rules require a shared base.

Product rule

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

Example: $x^3 x^5 = x^8$

Quotient rule

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

Example: $\frac{y^7}{y^2} = y^5$

Exponent Rules Chart

02 Powers of powers and products

Distribute the outside exponent to every factor.

Power rule

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

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

Power of a product

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

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

Power of a quotient

$$\left(\frac{a}{b}\right)^n = \frac{a^n}{b^n}$$

Example: $\left(\frac{x}{3}\right)^2 = \frac{x^2}{9}$

Exponent Rules Chart

03 Special exponents

Assume the base is nonzero where division occurs.

Zero exponent

$$a^0 = 1$$

Example: $7^0 = 1$

Negative exponent

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

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

Fractional exponent

$$a^{\frac{1}{n}} = \sqrt[n]{a}$$

Example: $27^{\frac{1}{3}} = 3$

Exponent Rules Chart

HOW TO REMEMBER IT

Decide what operation connects the powers

1

Same base multiplied: add exponents.

2

Same base divided: subtract exponents.

3

A power raised to a power: multiply exponents.

4

A negative exponent means reciprocal, not a negative value.