Exponents — Rules

Meanings of Exponents

Positive whole exponents represent repeated multiplication.

$$b^n = b \cdot b \cdot b \cdot \ldots \cdot b$$

Powers with exponent 1 are always equal to the base.

$$b^1 = b$$

Powers with exponent 0 are always equal to 1.

$$b^0 = 1$$

Negative whole exponents represent fractions.

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

Exponents — Rules

Exponent calculation properties

Multiplying powers with the same base: add the exponents.

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

Dividing powers with the same base: subtract the exponents

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

Power of a power: multiply the exponents.

$$\left(a^m\right)^n = a^{mn}$$

Multiplying powers with the same exponent:

$$a^m \cdot b^m = (ab)^m$$

Dividing powers with the same exponent:

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