

**LAW**

$$x^a = \underbrace{(x * x * \dots * x)}_{a \text{ times}}$$

$$x^a * x^b = x^{a+b}$$

$$\frac{x^a}{x^b} = x^{a-b}$$

$$(x^a)^b = x^{ab}$$

$$(xy)^a = x^a y^a$$

$$\left(\frac{x}{y}\right)^a = \frac{x^a}{y^a}$$

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

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

$$(x)^{a/b} = \sqrt[b]{(x^a)} = (\sqrt[b]{x})^a$$

$$\sqrt[a]{xy} = \sqrt[a]{x} \sqrt[a]{y}$$

$$\sqrt[a]{\frac{x}{y}} = \frac{\sqrt[a]{x}}{\sqrt[a]{y}}$$

$$x^0 = 1$$

$$(-x)^2 \neq -(x)^2$$

EXAMPLE

$$7^4 = 7 * 7 * 7 * 7$$

$$2^3 * 2^2 = (2 * 2 * 2) * (2 * 2) = 2^{3+2} = 2^5$$

$$\frac{3^4}{3^2} = \frac{3*3*3*3}{3*3} = 3^{4-2} = 3^2$$

$$(5^2)^3 = (5 * 5)^3 = (5 * 5)(5 * 5)(5 * 5) = 5^{2*3}$$

$$(4 * 3)^2 = (4 * 3)(4 * 3) = 4^2 3^2$$

$$\left(\frac{7}{8}\right)^4 = \left(\frac{7}{8}\right)\left(\frac{7}{8}\right)\left(\frac{7}{8}\right)\left(\frac{7}{8}\right) = \frac{(7*7*7*7)}{(8*8*8*8)} = \frac{7^4}{8^4}$$

$$(9^{-7}) = \frac{1}{9^7}$$

$$(16)^{1/4} = \sqrt[4]{16} = 2$$

$$(8)^{2/3} = \sqrt[3]{(8^2)} = (\sqrt[3]{8})^2 = 4$$

$$\sqrt[2]{36} = \sqrt[2]{9 * 4} = \sqrt[2]{9} \sqrt[2]{4} = 3 * 2 = 6$$

$$\sqrt[2]{\frac{16}{4}} = \frac{\sqrt[2]{16}}{\sqrt[2]{4}} = \frac{4}{2} = 2$$

$$1 = \frac{11^7}{11^7} = 11^{7-7} = 11^0$$

$$(-1)^2 = (-1)(-1) = 1 \neq -(1)^2 = -(1)(1) = -1$$