

Rules of Exponents

Rule	Example
$a^1 = a$	$3^1 = 3$
$a^0 = 1$	$23^0 = 1$
$a^m \times a^n = a^{m+n}$	$3^3 \times 3^2 = 3^5 = 243$
$\frac{a^m}{a^n} = a^{m-n}$	$\frac{3^5}{3^3} = 3^2 = \frac{243}{27} = 9$
$(a^m)^n = a^{m \times n}$	$(2^3)^2 = 2^6 = 64$
$\left(\frac{a}{b}\right)^m = \frac{a^m}{b^m}$	$\left(\frac{3}{2}\right)^3 = \frac{3^3}{2^3} = \frac{27}{8}$
$a^{-m} = \frac{1}{a^m}$	$5^{-2} = \frac{1}{5^2} = \frac{1}{25}$
$a^{\frac{m}{n}} = \sqrt[n]{a^m} = \left(\sqrt[n]{a}\right)^m$	$8^{\frac{4}{3}} = \sqrt[3]{8^4} = \left(\sqrt[3]{8}\right)^4 = 2^4 = 16$
$a^{-\frac{m}{n}} = \frac{1}{\sqrt[n]{a^m}}$	$8^{-\frac{4}{3}} = \frac{1}{\sqrt[3]{8^4}} = \frac{1}{16}$