

Indices

Expression	Examples
$a^m = a \times a \times a \times \dots m \text{ times}$	$4^5 = 4 \times 4 \times 4 \times 4 \times 4$
$a^{-m} = \frac{1}{a \times a \times a \times \dots m \text{ times}} = \frac{1}{a^m}$	$5^{-3} = \frac{1}{5 \times 5 \times 5} = \frac{1}{5^3}$
$a^{-1} = \frac{1}{a}$	$7^{-1} = \frac{1}{7}$
$a^m \times a^n = a^{m+n}$	$6^3 \times 6^2 = 6^{3+2} = 6^5$
$\frac{a^m}{a^n} = a^m \times a^{-n} = a^{m-n}$	$\frac{5^4}{5^3} = 5^{4-3} = 5^1 = 5$
	$\frac{8^4}{8^7} = 8^{4-7} = 8^{-3} = \frac{1}{8^3}$
$(a^m)^n = a^{mn}$	$(3^2)^3 = 3^{2 \times 3} = 3^6$
	$(4^3)^{-2} = 4^{-6} = \frac{1}{4^6}$
	$(5^{-2})^2 = 5^{-4} = \frac{1}{5^4}$
	$(2^{-1})^{-2} = 2^2 = 4$
$a^{1/2} = \sqrt{a}$	$8^{0.5} = 8^{1/2} = \sqrt{8} = 2\sqrt{2}$
$a^{0.5} = a^{1/2} = \sqrt{a}$	
$a^{1/m} = \sqrt[m]{a}$	$64^{1/3} = \sqrt[3]{64} = 4$
$a^{m/n} = \sqrt[n]{a^m}$	$100^{2/3} = \sqrt[3]{100^2} = \sqrt[3]{10000} = 10\sqrt[3]{10}$
$a^{-m/n} = \sqrt[n]{a^{-m}} = \sqrt[n]{\frac{1}{a^m}}$	$45^{-3/2} = \sqrt[2]{45^{-3}} = \sqrt[2]{\frac{1}{45^3}}$
$a^0 = 1$	$162543^0 = 1$
$(-a)^m = a^m$ if m is even	$(-3)^6 = 3^6$
$(-a)^m = -a^m$ if m is odd	$(-3)^5 = -3^5$
$(a \times b)^m = a^m \times b^m$	$(2 \times 4)^3 = 2^3 \times 4^3 = 8 \times 64$
$(a \times b)^{-m} = \frac{1}{a^m \times b^m}$	$(3 \times 5)^{-2} = \frac{1}{3^2 \times 5^2}$
If $a^{mx} = a^z$ then $mx=z$, $x=z/m$	$a^{3x} = a^6$ then $3x = 6$, or $x = 2$