Rules for Exponentials

$a^0 = 1$, $a \neq 0$	$10^0 = 1$
$a^1 = a$	$10^1 = 10$
$a^{-n} = \frac{1}{a^n}$ $a \neq 0$	$5^{-3} = \frac{1}{5^3}$ $= \frac{1}{125}$
$(a^m)^n$	$(3^2)^4 = 3^8$

Rules	Information	Examples
$a^n a^m = a^{n+m}$ $a \neq 0$	$\underbrace{(a \times a \times \ldots \times a)}_{n}\underbrace{(a \times a \times \ldots a)}_{m}$ $= \underbrace{(a \times a \times \ldots \times a)}_{m+n} = a^{m+n}$	$2^3 2^2 = 2^5$
$\frac{a^n}{a^m} = a^{n-m}$	$\frac{\overbrace{(a \times a \times \ldots \times a)}^{n}}{\underbrace{(a \times a \times \ldots a)}_{m}} = \underbrace{(a \times a \times \ldots \times a)}_{n-m} = a^{m-n}$	$\frac{2^3}{2^2} = 2^2 = 4$ $\frac{2^2}{2^3} = 2^{-1}$ $= \frac{1}{2^{-1}} = \frac{1}{2}.$
$(ab)^n = a^n b^n$	$\underbrace{(ab)(ab)\ldots(ab)}_{n} = \underbrace{a \times a \ldots \times a}_{n}\underbrace{b \times b \ldots \times b}_{n}$ $= a^n b^n$	$(2\times3)^5 = 2^5 \times 3^5$
$(\frac{a}{b})^n = \frac{a^n}{b^n}$		$(2\times3)^5 = 2^5 \times 3^5$