

Dividing Exponents

When dividing exponential expressions with the same bases, we subtract the exponents.

e.g. (1) $\frac{4^7}{4^2} = 4^{(7-2)} = 4^5$

(2) $x^6 \div x^5 = x^{(6-5)} = x^1$

(3) $a^7 \div a^{-2} = a^{7-(-2)} = a^{7+2} = a^9$

(4) $y^4 \div y^9 = y^{4-9} = y^{-5} = \frac{1}{y^5}$

Remember you must have common bases to subtract the exponents. You cannot subtract the exponents of the expression $(8^4) \div (2^2)$ can be evaluated as:

$$\begin{array}{ccc} (8^4) \div (2^2) & & \\ \swarrow \quad \searrow & & \\ (4096) \div & & (4) \\ & & \\ & & 1024 \end{array}$$

Examples:

(a)	$\begin{aligned} \frac{3^1}{3^{-6}} &= 3^1 \div 3^{-6} \\ &= 3^{1-(-6)} \\ &= 3^{1+6} \\ &= 3^7 \end{aligned}$	(b)	$\frac{m^a}{m^b} = m^{a-b}$
(c)	$\begin{aligned} b^4 \div b^3 &= b^{4-3} \\ &= b^1 \\ &= b \end{aligned}$	(d)	$q^1 \div p^3 = \frac{q}{p^3}$ <div style="text-align: center;"> <p>Not the same base</p> </div>