

# Exponents

AAT

## properties

- ①  $a^x \cdot a^y = a^{x+y}$
- ②  $\frac{a^x}{a^y} = a^{x-y}$
- ③  $(a^x)^b = a^{xb}$
- ④  $a^{-x} = \frac{1}{a^x}$  OR  $\frac{1}{a^{-y}} = a^y$
- ⑤  $a^0 = 1$
- ⑥  $(ab)^x = a^x b^x$
- ⑦  $\left(\frac{a}{b}\right)^x = \frac{a^x}{b^x}$

## more challenging

8.  $x^{-8} = \frac{1}{x^8}$

9.  $\frac{2}{5x^{-3}} = \frac{2x^3}{5}$

10.  $\left(\frac{2x^2y^4}{6x^5y}\right)^2$   
 $= \left(\frac{y^3}{3x^3}\right)^2 = \frac{y^6}{9x^6}$

## examples

1.  $(2x^3)(-6x^5) = -12x^8$
2.  $4x^{-7} = \frac{4}{x^7}$
3.  $(2x^5)^3 = 8x^{15}$
4.  $(3xy)^0 = 1$
5.  $2x^7 \cdot -3x^{-2} = -6x^5$
6.  $\left(\frac{3}{4}\right)^2 = \frac{9}{16}$
7.  $(3x^2y)^4 = 81x^8y^4$

11.  $\left(\frac{3a^2b^5c^9}{7a^4b^2c}\right)^{-2}$   
 $= \left(\frac{3b^3c^8}{7a^4}\right)^{-2}$   
 $= \left(\frac{7a^4}{3b^3c^8}\right)^2$   
 $= \frac{49a^8}{9b^6c^{16}}$