

## Exponent Rules 2

1. Simplify the following expressions so that each variable has one single exponent.

a.  $\frac{a^8}{a^3}$

b.  $\frac{7^{11}}{7^8}$

c.  $\frac{b^8}{b^2}$

d.  $\frac{2^5}{2^6}$

e.  $\frac{12g^8h^4}{2g^3h^6}$

f.  $\frac{8p^{11}}{4p^6}$

g.  $\frac{c^4}{c^9}$

h.  $\frac{x^3y^8}{y^2}$

i.  $\frac{a^5}{a^2} \cdot \frac{a^7}{a^4}$

j.  $\frac{x^{10}}{y} \cdot \frac{y^9}{x^2}$

k.  $\frac{k^{15}}{k^{12}} \cdot \frac{k^{17}}{k^{14}}$

l.  $\frac{3^4 \cdot 3^6}{3^8}$

2. Write each of the following expressions with a positive exponent. Simplify where possible.

a.  $2^{-2}$

b.  $3^{-4}$

c.  $4^{-1}$

d.  $x^{-5}$

e.  $5y^{-2}$

f.  $\frac{z^3}{z^6}$

g.  $6c^3d^{-2}$

h.  $\frac{x^{-5}}{z^{-2}}$

i.  $(w^{-2}y^{-3})^2$

j.  $\left(\frac{1}{4}\right)^{-2}$

k.  $\left(\frac{1}{3}\right)^{-3}$

l.  $\left(\frac{x^{-2}}{y^{-3}}\right)^{-2}$

3. Using **laws of exponents** and the rule that  $x^0 = 1$  (except when  $x = 0$ ), simplify the following.

a.  $4^0$

b.  $(-5)^0$

c.  $(xy)^0$

d.  $8x^0$

e.  $\left(\frac{x^0}{y^0}\right)^0$

f.  $(3a^0b^2)^2$

g.  $5a^{-3} \cdot a^3$

h.  $\frac{(2x)^0}{2x^0}$

i.  $5(x^2y^{-2}z^5)^0$

j.  $a^0 + b^0 + c^0$

k.  $-(9x)^0$

l.  $\frac{xy^5}{xy^5}$