

FURTHER APPLICATIONS OF LOGARITHMS:

Use log laws to solve these questions.

- $\log_a xy = \log_a x + \log_a y$
- $\log_a \frac{x}{y} = \log_a x - \log_a y$
- $\log_a 1 = 0$
- $\log_a a = 1$
- $\log_a x^p = p \log_a x$
- $\log_a a^x = x$
- $\log_a x = \frac{\log_b x}{\log_b a}$
- $a^{\log_a x} = x$

Questions involving a quadratic in the form $(\log x)^2 + a(\log x) + b = 0$:

- Let $u = \log x$
- Solve for 'u', either by factorisation or by using quadratic formula.
- Replace 'u' with $\log x$, then solve for x .

6.3 WORKED EXAMPLE

Solve for x :

$$\log_x \left(\frac{1}{8} \right) = -\frac{3}{2}$$

6.4 WORKED EXAMPLE

Solve for x :

$$(\log_3 x)^2 = \log_3 x^5 - 6$$