# Exponential/logarithmic inverse relationship

6 questions | 13 marks

Equivalent correct methods earn the corresponding marks.

**1.** Evaluate $\log_3 81$. [2 marks]

$3^4 = 81$, so the required exponent is 4.

**Answer:** 4

**2.** Evaluate $\log_2 (1/16)$. [2 marks]

$1/16 = 2^{-4}$.

**Answer:** $-4$

**3.** Write $7^{-1} = 1/7$ as a logarithmic statement. [2 marks]

The logarithm records the exponent of base 7.

**Answer:** $\log_7 (1/7) = -1$

**4.** Solve $\log_4 x = 3/2$. [2 marks]

$x = 4^{3/2} = (\sqrt{4})^3 = 8$.

**Answer:** $x = 8$

**5.** Find the real domain of $g(x) = \log_2 (x + 5)$. [2 marks]

The input must satisfy $x + 5 > 0$.

**Answer:** $x > -5$

**6.** Find the inverse of $h(x) = 5^{2x}$ and its domain. [3 marks]

$\log_5 y = 2x$. Solve for $x$, then interchange names.

**Answer:** $h^{-1}(x) = \frac{1}{2}\log_5 x$, $x > 0$