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 $\log_2 (\frac{1}{16})$. [2 marks]

$\frac{1}{16} = 2^{-4}$.

Answer: -4

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

The logarithm records the exponent of base 7.

Answer: $\log_7 (\frac{1}{7}) = -1$

4. Solve $\log_4 x = \frac{3}{2}$. [2 marks]

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

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