# Meaning of a logarithm

6 questions | 14 marks

Equivalent correct methods earn the corresponding marks.

**1.** Evaluate $\log_2 32$. [2 marks]

$2^5 = 32$.

**Answer:** 5

**2.** Evaluate $\log 0.001$. [2 marks]

$10^{-3} = 0.001$.

**Answer:** -3

**3.** Write $7^2 = 49$ as a logarithmic statement. [2 marks]

The exponent 2 becomes the value of the logarithm.

**Answer:** $\log_7 49 = 2$

**4.** Evaluate $10^{\log 7}$. [2 marks]

The exponential and its base-ten logarithm are inverse operations for positive inputs.

**Answer:** 7

**5.** Explain why $\log 0$ is not a real number. [3 marks]

$10^x > 0$ for every real $x$; it approaches zero without reaching it.

**Answer:** No real exponent on 10 gives zero.

**6.** If $\log N = 4.2$, between which consecutive powers of ten does $N$ lie? [3 marks]

$4 < 4.2 < 5$ and the function $10^x$ increases.

**Answer:** $10^4 < N < 10^5$