# Interpreting logarithmic scales

6 questions | 13 marks

Equivalent correct methods earn the corresponding marks.

**1.** What quantity sits halfway between $10$ and $1000$ on a base-10 logarithmic axis? [2 marks]

The midpoint exponent is $\frac{1+3}{2}=2$, so the value is $10^2$.

**Answer:** 100

**2.** How many equal log intervals separate $1$ and $10000$ when adjacent labels differ by a factor of 10? [2 marks]

$10000=10^4$.

**Answer:** 4

**3.** For $M=\log_{10}(\frac{A}{A_0})$, find $M$ when $A=1000A_0$. [2 marks]

$M=\log_{10}1000=3$.

**Answer:** 3

**4.** Two amplitudes have scale values 4 and 6 under $M=\log_{10}(\frac{A}{A_0})$. Find their larger-to-smaller ratio. [2 marks]

$10^{6-4}=100$.

**Answer:** 100

**5.** For $p=-\log_{10}c$, find $c$ when $p=5$. [2 marks]

$\log_{10}c=-5$, so $c=10^{-5}$.

**Answer:** $c=10^{-5}$

**6.** Why can zero not appear as a value on an ordinary real logarithmic axis? [3 marks]

No real exponent of a positive valid base gives zero.

**Answer:** Its logarithm is undefined.