

Logarithms

Chapter 8: Logarithms · Topic 1

Key Concept

If $a^x = N$, then log base a of N equals x , written as $\log_a(N) = x$, showing the relationship between exponents and logarithms.

Common logarithms use base 10, written as $\log(N)$, while natural logarithms use base e (approximately 2.718), written as $\ln(N)$.

Laws of logarithms include: $\log(mn) = \log(m) + \log(n)$, $\log(m/n) = \log(m) - \log(n)$, and $\log(m^n) = n \times \log(m)$.

Logarithms are useful for solving exponential equations and are used in fields like science, engineering, and finance.

Quick Revision Notes

- If $a^x = N$, then $\log_a(N) = x$.
- This shows the exponent-logarithm relationship.
- Common logarithms use base 10.
- Natural logarithms use base e (≈ 2.718).
- $\log(mn) = \log(m) + \log(n)$.
- $\log(m/n) = \log(m) - \log(n)$.
- $\log(m^n) = n \times \log(m)$.
- Logarithms help solve exponential equations.

Practice Questions

- 1 Find log base 10 of 100.
- 2 Use the logarithm law to simplify $\log(6)$ if $\log(2)$ and $\log(3)$ are known.
- 3 Discuss the relationship between exponents and logarithms.
- 4 Research a real-life use of logarithms.
- 5 Solve a simple logarithm problem.
- 6 Explain why logarithms are useful in science.