

Exponential and Logarithmic Functions: worked examples

HSC Mathematics Advanced

These examples show assessable skills, not an official HSC topic weighting or prediction. The 2024 NSW syllabuses have their first HSC examination in 2027; students sitting the 2026 HSC continue under the applicable 2017 syllabus.

Worked example 1 | 3 marks

Catalog reference: adv_nsb20_solve_log_equation | seed 41001 | mapping adv-e1-1

Logarithmic equation

Solve $2\ln x = \ln(2x+8)$.

(a) Find the admissible solution. [3 marks]

Answer: $1 + \sqrt{9}$

Logarithm Laws: $x^2 = 2x + c$

Solve Quadratic: 4

Domain Check: $1 + \sqrt{9}$

Worked example 2 | 2 marks

Catalog reference: adv_cssa20_mixed_base_logarithm_equation | seed 41001 | mapping adv-e1-1

Mixed-base logarithm equation

Solve $\log_2 x + \log_4 x = 15$.

(a) Find the exact positive solution. [2 marks]

Answer: 1024

Change Of Base: 10

Solve Logarithmic Equation: 1024

Worked example 3 | 1 marks

Catalog reference: adv_nsb20_log_domain | seed 41001 | mapping adv-e1-2

Logarithmic domain

State the domain of $g(x) = \ln(x+2\pi)$.

(a) Give the excluded boundary; the domain is all greater values. [1 mark]

Answer: $0 - (2\pi)$

Solution Rationale: Result recorded in the checked answer.

Source and methodology

Examples are deterministic curriq catalog generations from existing QDSL archetypes at the published fixed seed. The generator copies only student-facing prompts, mark allocations, topic mappings, display tables or options, checked answers and marking-path results into this resource.

Official syllabus source:

<https://curriculum.nsw.edu.au/learning-areas/mathematics/mathematics-advanced-11-12-2024/overview/course>

Teacher verification note: check the mathematics, notation, permitted technology and syllabus fit for your cohort before classroom or assessment use.