

Functions: worked examples

HSC Mathematics Extension 1

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 | 1 marks

Catalog reference: ext1_sgs25_third_polynomial_zero | seed 41001 | mapping ext1-f2-2

Third zero

A cubic has leading coefficient 2, a repeated zero at $x=2$, and sum of zeros $3/2$.

(a) Find the third zero. [1 mark]

Answer: $-5/2$

Vieta: $-5/2$

Worked example 2 | 2 marks

Catalog reference: ext1_ind_2025_q12bii_factor_cubic | seed 41001 | mapping ext1-f2-2

Extracting a quadratic factor

A cubic $x^3 - 2x^2 - 2x + 1$ has root $x = -1$. Find the quadratic equation satisfied by its other two roots.

(a) Factor out $(x+1)$ and state the remaining quadratic equation. [2 marks]

Answer: $x^2 - (3x) + 1$

Factor Theorem: Factor out $(x+1)$.

Polynomial Factorisation: $x^2 - 3x + 1 = 0$.

Worked example 3 | 3 marks

Catalog reference: ext1_ind_2025_q11d_nested_absolute_inequality | seed 41001 | mapping ext1-f1-2

Nested absolute values

Solve $||x| - 5| \leq 3$. The complete solution is $[-8, -2] \cup [2, 8]$ once the two positive endpoints are established.

(a) Find the positive inner endpoint. [1 mark]

Answer: 2

Absolute Value Inequality: $-3 \leq |x| - 5 \leq 3$.

(b) Find the positive outer endpoint and hence state the symmetric union of intervals. [2 marks]

Answer: 8

Compound Inequality: $2 \leq |x| \leq 8$.

Absolute Value Solution Set: $[-8, -2] \cup [2, 8]$.

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-extension-1-11-12-2024/overview/course>

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