

Vectors: 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_vector_dot_product | seed 41001 | mapping ext1-v1-1

Dot product

Let $\mathbf{u}=(2,-1)$ and $\mathbf{v}=(3,2)$.

(a) Calculate $\mathbf{u} \cdot \mathbf{v}$. [1 mark]

Answer: 4

Dot Product: 4

Worked example 2 | 2 marks

Catalog reference: ext1_cssa25_vector_sum_magnitude | seed 41001 | mapping ext1-v1-1

Magnitude of a vector sum

Let $\mathbf{u}=(15,36)$ and $\mathbf{v}=(9,9)$.

(a) Calculate $|\mathbf{u}+\mathbf{v}|$. [2 marks]

Answer: $\sqrt{2601}$

Vector Addition: $[24,45]$

Vector Magnitude: $\sqrt{2601}$

Worked example 3 | 2 marks

Catalog reference: ext1_nsb_2025_q13c_i_projectile_fall_time | seed 41001 | mapping ext1-v1-4

Canister fall time

A canister is released horizontally from 240 metres above the water. Its vertical position is $y=240-5t^2$. How long does it take to hit the water?

(a) Find the positive time in seconds. [2 marks]

Answer: $\sqrt{48}$

Set Height Zero: $0=240-5t^2$.

Positive Square Root: $t=\sqrt{24\{\{\}}}$.

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.