

Trigonometric 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 | 2 marks

Catalog reference: adv_nsb20_exact_cotangent | seed 41001 | mapping adv-t2-1

Exact cotangent

Given $\cos \theta = \frac{6}{10}$ and $\sin \theta < 0$, find $\cot \theta$ exactly.

(a) Find the exact value. [2 marks]

Answer: $-\frac{3}{4}$

Quadrant Sign: fourth quadrant

Pythagorean Identity: $-\frac{3}{4}$

Worked example 2 | 2 marks

Catalog reference: adv_pem24_exact_cosine_from_negative_tangent | seed 41001 | mapping adv-t2-1

Exact cosine from tangent

Given $\tan \alpha = -\frac{1}{7}$ and $\sin \alpha > 0$, find the exact value of $\cos \alpha$.

(a) Give the value in exact radical form. [2 marks]

Answer: $-\frac{7}{\sqrt{50}}$

Trigonometric Quadrant: 2

Pythagorean Ratio: $-\frac{7}{\sqrt{50}}$

Worked example 3 | 2 marks

Catalog reference: adv_jr24_trigonometric_identity_proof | seed 41001 | mapping adv-t2-2

Trigonometric identity

Prove $(\cot u + \operatorname{cosec} u) / (\tan u + \sin u) = \cot u \operatorname{cosec} u$.

(a) Give a complete algebraic proof of the identity. [2 marks]

Answer: $\cos(x) / (\sin(x)^2)$

Rewrite Trigonometric Ratios: express every ratio using sine and cosine

Simplify Identity: $\cos(nx) / \sin(nx)^2$

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.