SACE Stage 2 Specialist Mathematics Formula Sheet

Original worked revision examples with notes on units and assumptions.

Use the board PDF below for the official sheet. Coverage of examples varies by subject.

Official reference material

SACE Board 2025 Specialist Mathematics exam PDF, formula sheet on page 33

What to work out beyond the sheet

A scalar component is a signed length. Multiply by the unit vector to express the vector projection.

Formulas and worked examples

Vectors · projection component

Formula or reference: The scalar component of u along v is $(u \cdot v)/|v|$.

Units and conditions: v is nonzero. A negative component points opposite v.

Worked example: For u = (4,3,1) and v = (0,2,0), the component along v is 6 ÷ 2 = 3.

Calculus · derivative of an inverse tangent

Formula or reference: $d(\arctan x)/dx = 1/(1 + x^2)$.

Units and conditions: The result is defined for every real x, with angles in radians.

Worked example: For $y = \arctan(3x)$, the gradient is $3/(1 + 9x^2)$, so $y'(1) = 0.30$.