

Cambridge AICE Calculus Mechanics 2

12th Grade

- PS 1 Apply methods of upper level algebra involving solutions of moduli and division and factorisation of polynomials.
- PS 2 Understand logarithmic and index relationships and properties, including transformation to linear form.
- PS 3 Use the derivatives of e^x , $\ln x$.
- PS 4 Extend the idea of 'reverse differentiation' to include the integration of e^{ax+b} and $1/ax+b$, including the use of substitution where appropriate.
- PS 5 Understand the relationships of six trigonometric functions and use their identities for simplification.
- PS 6 Use the derivatives of $\sin x$, $\cos x$, $\tan x$.
- PS 7 Extend the idea of 'reverse differentiation' to include the integration of $\sin(ax+b)$, $\cos(ax+b)$ and $\sec^2(ax+b)$ and use trigonometrical relationships (such as double-angle formulae) to facilitate the integration of functions such as $\cos^2 x$, including the use of substitution where appropriate.
- PS 8 Differentiate products and quotients.
- PS 9 Use simple iterative formulae to estimate the roots of an equation.
- PS 10 Use derivatives of functions defined parametrically.
- PS 11 Use derivatives of functions defined implicitly.
- PS 12 Use the trapezium rule to estimate the value of a definite integral, and use sketch graphs in simple cases to determine whether the trapezium rule gives an over-estimate or an under-estimate.
- PS 13 Understand multiple forms of vectors and how to use equations of lines and planes.
- PS 14 Recall an appropriate form for expressing rational functions in partial fractions, and carry out the decomposition, in cases where the denominator is no more complicated than $(ax+b)(cx+d)(ex+f)$, $(ax+b)(cx+d)^2$, or $(ax+b)(x^2+c^2)$, and where the degree of the numerator does not exceed the degree of the denominator.
- PS 15 Use the expansion of $(1+x)^n$, where n is a rational number and $|x| < 1$ (finding a general term is not included, but adapting the standard series to expand e.g. $(2 - \frac{1}{2}x)^{-1}$ is included).
- PS 16 Integrate rational functions by means of decomposition into partial fractions (restricted to the types of partial fractions specified in PM3.1.4).
- PS 17 Carry out operations with complex numbers in multiple forms.
- PS 18 Recognize when an integrand can usefully be regarded as a product, and use integration by parts to integrate, for example, $x \sin 2x$, $x^2 e^x$ or $\ln x$.
- PS 19 Formulate, solve, and interpret differential equations.
- PS 20 Model and derive the motion of a projectile.
- PS 21 Understand and calculate aspects of the equilibrium of a rigid body.
- PS 22 Understand uniform motion in a circle.
- PS 23 Understand and apply Hooke's Law.
- PS 24 Use derivation to solve problems involving linear motion under a variable force.
- PS 25 Understand and apply basic understanding of limits and their application.