**A2 Level Core 4**

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|  | **What You Need To Know** | pe03020_[1] | pe03018_[1] | pe03019_[1] |
| 1. Algebra and Functions
 | * Rational functions
* Simplification of rational expressions including factorising and cancelling.
* Algebraic division and solving function involving algebraic fractions.
* Partial Fractions
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| 1. 2D Coordinate Geometry
 | * Knowledge of Cartesian and parametric equation of curves and conversion between the two forms.
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| 1. Sequences and Series
 | * Binomial series for any ration power of n.
* Series expansion of rational functions including the use of partial fractions.
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| 1. Trigonometry
 | * Use the formulae for $\sin(\left(A\pm B\right), \cos((A\pm B)))$ and $\tan((A\pm B))$.
* Use expressions for $a\cos(θ)+b\sin(θ)$ in the equivalent form of $r\sin((θ\pm α))$ or $r\sin((θ\pm α))$.
* Find solutions of trigonometric equation in a given interval.
* Knowledge and use of double angle formulae and simple identities.
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| 1. Exponentials and Logarithms
 | * Understand exponential growth and decay.
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| 1. Differentiation and Integration
 | * Formation of simple differential equations, including in the context of growth and decay.
* Analytical solution of simple first order differential equations with separable variable, including in application of practical problems.
* Differentiation of simple functions defined implicitly or parametrically. This does not apply to 2nd order differentials.
* Equations of tangents and normals for curves specified implicitly or in parametric form.
* Simple cases of integration using partial fractions.
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| 1. Vectors
 | * Understand vector in 2 and 3 dimensions.
* Magnitude of vectors
* Algebraic operations of vector addition and multiplication by scalars, and the geometrical interpretations.
* Position vectors
* The distance between two points.
* Vector equations of lines. Including the intersection of two straight lines in 2 and 3 dimensions; and parallel lines.
* The scalar product and its use for calculating the angle between two lines.
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