Year 12 Further Maths – Further Pure 1Option

Topic		Ref	Ex
Further Vectors	**The Vector Product** • Find the vector product of two vectors **a** x **b** • Find a vector perpendicular to two other vectors using the vector product	FP3.1	1A
	Finding Areas • Use the vector product to find the area of a triangle and the area of a parallelogram	FP3.2	1B
	Scalar Triple Product • Find the scalar triple product **a**.**b** x **c** • Use the scalar triple product to find the volume of a tetrahedron and the volume of a parallelepiped	FP3.3	1C
Conic Sections	**Parabolas** • Know and use the Cartesian equation for the parabola • Know and use the parametric equations for the parabola, including a general point on the curve • Understand the focus-directrix property of the parabola – i.e. it it the locus of points equidistant from the focus and directrix.	FP2.1 FP2.2 FP2.3	2B 2C
	Rectangular Hyperbola • Know and use the Cartesian equation for the rectangular hyperbola • Know and use the parametric equations for the rectangular hyperbola, including a general point on the curve	FP2.1 FP2.2 FP2.3	2D
	Tangents and Normals • Find the equations of tangents and normals to parabolas and rectangular hyperbolas. • Note: for AS level, the gradient function dy/dx will be provided for a parabola.	FP2.4	2E 2F
	Loci • Use the focus-directrix property of a parabola to derive its general equation from a given point (focus) and straight line (directrix)	FP2.5	2G
The t-formulae	**The t-formulae** • Derive and use the t-formulae: $\sin x = \frac{2t}{1+t^2}$ *and* $\cos x = \frac{1-t^2}{1+t^2}$ *and* $\tan x = \frac{2t}{1-t^2}$ *where* $t = \tan\frac{x}{2}$ • Knowledge of the reciprocal trig functions sec x, cosec x and cot x is required.	FP1.1	5A
	Applying to Trigonometric Identities • Use the t-formulae to prove trigonometric identities	FP1.2	5B
	Applying to Trigonometric Identities • Use the t-formulae to solve trigonometric equations	FP1.3	5C

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Topic		Ref	Ex
Inequalities	**Solving Inequalities** • Solve inequalities involving polynomials and rational functions. • Solve using an algebraic method which considers critical values. • Solve by sketching graphs	FP5.1	4A 4B

Numerical Methods	**Solving First Order Differential Equations**
	• Use the following methods to find numerical solutions to first order Des:
	  ○ Euler's method
	  ○ The midpoint method
		FP4.1	8A
			8B

	Solving Second Order Differential Equations • Find numerical solutions to second order DEs using an extended Euler's method.	FP4.1	8C