

Unit FP2

Further Pure Mathematics 2

Candidates will be expected to be familiar with the knowledge, skills and understanding implicit in Units C1, C2, C3, C4 and FP1.

Topics	Notes
1. Further partial fractions.	To include denominators $(ax + b)(cx + d)(ex + f)$ and $(ax + b)(cx^2 + d)$.
2. Knowledge and use of de Moivre's Theorem.	Proof by induction of de Moivre's Theorem for positive integer values of n .
Applications to trigonometry.	For example, showing that $\cos 4\theta = 8 \cos^4 \theta - 8 \cos^2 \theta + 1$ and $\cos^4 \theta = \frac{1}{8}(\cos 4\theta + 4 \cos 2\theta + 3)$.
Calculation of the n th roots of complex numbers.	
3. Trigonometric equations.	Questions aimed solely at proving identities will not be set.
Use of formulae for $\sin A \pm \sin B$, $\cos A \pm \cos B$ and for $\sin x$, $\cos x$ and $\tan x$ in terms of t , where $t = \tan \frac{1}{2}x$.	For example, $\cos \theta + \cos 2\theta + \cos 3\theta = 0$ and $2 \sin x - \tan \frac{1}{2}x = 0$.
General solution of trigonometric equations.	
4. Real functions. The language of set theory, image and inverse image of a set under a function.	Notation to be used for image and inverse image: $f(A) = \{f(x) : x \in A \text{ and } f(x) \text{ is defined}\}$ $f^{-1}(B) = \{x : f(x) \text{ is defined and } f(x) \in B\}$
Odd functions, even functions, strictly increasing functions, strictly decreasing functions, bounded functions.	
Functions defined piecewise on their domain.	Informal treatment only.

Topics	Notes
The idea of continuity.	
Sketching graphs of rational functions, including those in which the degree of the numerator exceeds that of the denominator.	For example: $y = \frac{9(x-3)}{(x+1)(x-2)}; \quad y = \frac{(x+1)^2}{(2x-3)}$
Asymptotes.	Including asymptotes which are not parallel to a coordinate axis.
5. Loci in Cartesian and parametric form. Finding intersections, chords, tangents and normals using algebra and calculus.	Candidates will be expected to translate geometrical ideas into algebraic form and vice versa, and should know basic methods of general application.
The derivation of the standard forms of the equations of conics including the focus-directrix properties. Forms derived from these by translation.	Apart from the focus-directrix properties of conics, no knowledge of particular curves other than the circle will be expected.
6. Further integration.	To include the use of partial fractions.
Basic properties of the definite integral.	To include differentiation of an integral with respect to a variable limit.
Integration of $\frac{1}{\sqrt{a^2 - x^2}} \text{ and } \frac{1}{a^2 + x^2}.$	