

Personalised Learning Checklist

MEI A Level Maths/Further Maths

Module C4

1. Algebra

Be able to form the binomial expansion of $(a + b)^n$ where n is any rational number and find a particular term.

where n is any rational

Be able to write $(a + b)^n$ in the form $\sum_{r=0}^n \binom{n}{r} a^{n-r} b^r$ prior to an expansion

in the form

a^n

prior to an

Be able to simplify rational expressions.

Be able to solve equations involving algebraic fractions.

Know how to express algebraic fractions as partial fractions.

Know how to use partial fractions with the binomial expansion to find the power series for an algebraic fraction.

2. Trigonometry

Know the definitions of the sec, cosec and cot functions.

Understand the relationship between the graphs of the sin, cos, tan, cosec, sec and cot functions.

Know the relationships $\sin^2 \theta + \cos^2 \theta = 1$ and $\tan^2 \theta + 1 = \sec^2 \theta$

and

Be able to use the identities for $\sin^2 \theta = \frac{1 - \cos 2\theta}{2}$, $\cos^2 \theta = \frac{1 + \cos 2\theta}{2}$, $\tan^2 \theta = \frac{1 - \cos 2\theta}{1 + \cos 2\theta}$

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Be able to use identities for $\sin 2\theta = 2 \sin \theta \cos \theta$, $\cos 2\theta = \cos^2 \theta - \sin^2 \theta$, $\tan 2\theta = \frac{2 \tan \theta}{1 - \tan^2 \theta}$ (3 versions),

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(3 versions),

Be able to solve simple trigonometrical equations within a given range including the use of trigonometrical identities.

Know how to write the function $y = a \sin(bx + c) + d$ in the forms $y = A \sin(Bx + C) + D$ and $y = A \cos(Bx + C) + D$

in the forms

Know how to use these to sketch the graph of the function, find its maximum and minimum values and to solve equations.

3. Parametric Equations

Understand the meaning of the terms parameter and parametric equations.

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Be able to find the equivalent cartesian equation for parametric equations.			
Recognise the parametric form of a circle.			
Be able to find the gradient at a point on a curve defined in terms of a parameter by differentiation.			
4. Calculus			
Be able to use the trapezium rule to find an integral to a given level of accuracy.			
Be able to use the method of partial fractions in integration.			
Be able to calculate the volumes of solids generated by rotating a plane region about the x -axis or the y -axis.			
Be able to formulate first order differential equations.			
Be able to solve first order differential equations.			
5. Vectors			
Understand the language of vectors in two and three dimensions.			
Be able to add vectors, multiply a vector by a scalar, and express a vector as a combination of others.			
Know how to calculate the scalar product of two vectors, and use it to find the angle between two vectors.			
Be able to find the distance between two points, the midpoint and other points of simple division of a line.			
Be able to form and use the equation of a line.			
Be able to form and use the equation of a plane.			
Know that a vector which is perpendicular to a plane is perpendicular to any line in the plane.			
Know that the angle between two planes is the same as the angle between their normals.			
Be able to find the intersection of a line and a plane.			
6. Comprehension			

Be able to follow mathematical arguments and descriptions of the solutions of problems when given in writing.

Understand the modelling cycle and realise that it can be applied across many branches of mathematics.
