Core Pure 2

$$1^2 + 2^2 + 3^2 + \ldots \ldots n^2 = \frac{n(n+1)(2n+1)}{6}$$

Complex Numbers

Euler's relation, De Movire's theorem, complex series, geometrical problems, proving trigonometric identities, powers of trigonometric functions.

Series

Method of differences, repeated differentiation, Maclaurin and Taylor series.

Methods of Integration

Improper integrals, mean value theorem, differentiation of inverse functions, integration using trigonometric substitutions, integration using partial fractions.

Volumes of Revolution

Volumes of revolution about the x and y axis which more advanced integration required, parametric equations.
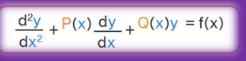
Polar coordinates

Converting from cartesian to polar coordinates, polar and cartesian equations for curves, areas of polar curves, parallel and perpendicular tangents.

Hyperbolic functions

Relationships to exponential functions, inverse hyperbolic functions, logarithmic equivalents of inverse hyperbolic functions, differentiation and integration.

Differential Equations

First order separable differential equations, first order linear differential equations, integrating factor, family of curves.

2nd order Differential equation

Non-homogeneous second order differential equations. Homogeneous second order differential equations, complementary functions, particular integrals, boundary conditions.

Applications of Differential Equations

Using differential equations to solve problems in mechanics, Simple Harmonic Motion, Systems of Differential equations.

Revision

Exam questions.

$$\frac{d^2y}{dx^2} + P(x)\frac{dy}{dx} + Q(x)y = f(x)$$