

Statement of Syllabus Topics

Extension One HSC Course

Series and Applications

7.4E Mathematical Induction. Applications

Integration

11.5E Methods of integration, including reduction to standard forms by very simple substitutions.

Trigonometric Functions

13.6E Primitive functions of \sin^2x and \cos^2x .

Applications of Calculus to the Physical World

14.1E Harder rates of change.

14.2E The equation $\frac{dN}{dt} = k(N - P)$

14.3E Velocity and acceleration as functions of x .
Applications in one and two dimensions (projectiles).

14.4E Description of simple harmonic motion from the equation
 $x = a \cos(nt + \alpha)$, $a > 0$, $n > 0$.
The differential equation of the motion.

Inverse Functions and Inverse Trigonometric Functions

15.1E Discussion of inverse function.

The functions $y = \log_a x$ and $y = a^x$ as inverse functions. The relation

$$\frac{dy}{dx} \cdot \frac{dx}{dy} = 1.$$

15.2E The inverse trigonometric functions.

15.3E The graphs of $\sin^{-1}x$, $\cos^{-1}x$, $\tan^{-1}x$.

15.4E Simple properties of the inverse trigonometric functions.

15.5E The derivatives of $\sin^{-1}\left(\frac{x}{a}\right)$, $\cos^{-1}\left(\frac{x}{a}\right)$, $\tan^{-1}\left(\frac{x}{a}\right)$, and the corresponding integrations.

Polynomials

16.4E Iterative methods for numerical estimation of the roots of a polynomial equation.

Binomial Theorem

17.1E Expansion of $(1 + x)^n$ for $n = 2, 3, 4, \dots$

Pascal Triangle.

Proof of the Pascal Triangle relations.

Extension to the expansion $(a + x)^n$.

17.2E Proof by Mathematical Induction of the formula for

${}^n C_k$ (also denoted by $\binom{n}{k}$).

17.3E Finite series and further properties of binomial coefficients.

Permutations and Combinations

18.2E Binomial probabilities and the binomial distribution.