

Math4U

김동기 ^{선생} 수학교실 SINCE 1981



Calculus

Review of limits and derivatives of exponential, logarithmic and rational functions. Trigonometric functions and their inverses. The derivatives of the trig functions and their inverses. L'Hospital's rules. The definite integral. Fundamental theorem of Calculus. Simple substitution. Applications including areas of regions and volumes of solids of revolution.

Integration by parts, partial fractions, integral tables, geometric series, harmonic series, Taylor series with applications, arc length of parametric and polar curves, first order linear and separable differential equations with applications.

Pre-University Calculus

The concepts included are limits, derivatives, antiderivatives and definite integrals. These concepts will be applied to solve problems of rates of change, maximum and minimum, curve sketching and areas. The classes of functions used to develop these concepts and applications are: polynomial, rational, trigonometric, exponential and logarithmic.

Introductory Calculus for Arts and Social Science

An introduction to applications of calculus in business, the behavioural sciences, and the social sciences. The models studied will involve polynomial, rational, exponential and logarithmic functions. The major concepts introduced to solve problems are rate of change, optimization, growth and decay, and integration.

Calculus 1 for Engineering

Functions of engineering importance; review of polynomial, exponential, and logarithmic functions; trigonometric functions and identities. Inverse functions (logarithmic and trigonometric). Limits and continuity. Derivatives, rules of differentiation; derivatives of elementary functions. Applications of the derivative, max-min problems, Mean Value Theorem. Antiderivatives, the Riemann definite integral, Fundamental Theorems. Methods of integration, approximation, applications, improper integrals.

Calculus 1 for the Sciences

Functions of a real variable: powers, rational functions, trigonometric, exponential and logarithmic

functions, their properties and inverses. Intuitive discussion of limits and continuity. Definition and interpretation of the derivative, derivatives of elementary functions, derivative rules and applications. Riemann sums and other approximations to the definite integral. Fundamental Theorems and antiderivatives; change of variable. Applications to area, rates, average value.

Calculus 1 for Honours Mathematics

Rational, trigonometric, exponential, and power functions of a real variable; composites and inverses. Absolute values and inequalities. Limits and continuity. Derivatives and the linear approximation. Applications of the derivative, including curve sketching, optimization, related rates, and Newton's method. The Mean Value Theorem and error bounds. Introduction to the Riemann Integral and approximations. Antiderivatives and the Fundamental Theorem. Change of variable, areas and rate integrals. Suitable topics are illustrated using computer software.

Calculus 2 for Engineering

Elementary approximation methods: interpolation; Taylor polynomials and remainder; Newton's method, Landau order symbol, applications. Infinite series: Taylor series and Taylor's Remainder Theorem, geometric series, convergence test, power series, applications. Functions of several variables: partial derivatives, linear approximation and differential, gradient and directional derivative, optimization and Lagrange multipliers. Vector-valued functions: parametric representation of curves, tangent and normal vectors, line integrals and applications.

Calculus 2 for the Sciences

Transforming and evaluating definite integrals; further applications to volumes, arc length, improper integrals. Separable and linear first order differential equations and applications. Convergence of series; Taylor polynomials, Taylor's Remainder Theorem, Taylor series and applications. Parametric/vector representation of curves, particle motion, arc length, line integrals and work. Polar coordinates in the plane. Functions of two variables, partial derivatives, the linear approximation/tangent plane, chain rule, directional derivative and the gradient.

Calculus 2 for Honours Mathematics

Riemann sums and the integral. Antiderivatives and the Fundamental Theorem of Calculus. Applications of the integral. Transforming and evaluating integrals. Improper integrals. Numerical approximation of integrals. Taylor's theorem and polynomial approximation. Convergence of series. Tests for convergence. Functions defined as power series. Taylor series.