



IIT JAM Mathematics - MA Syllabus



राष्ट्रीय परीक्षा एजेंसी
National Testing Agency
Excellence in Assessment

MATHEMATICS (MA)

Real Analysis:

Sequences and Series of Real Numbers: convergence of sequences, bounded and monotone sequences, Cauchy sequences, Bolzano-Weierstrass theorem, absolute convergence, tests of convergence for series – comparison test, ratio test, root test; Power series (of one real variable), radius

and interval of convergence, term-wise differentiation and integration of power series.

Functions of One Real Variable: limit, continuity, intermediate value property, differentiation, Rolle's

Theorem, mean value theorem, L'Hospital rule, Taylor's theorem, Taylor's series, maxima and minima,

Riemann integration (definite integrals and their properties), fundamental theorem of calculus.

Multivariable Calculus and Differential Equations:

Functions of Two or Three Real Variables: limit, continuity, partial derivatives, total derivative, maxima and minima.

Integral Calculus: double and triple integrals, change of order of integration, calculating surface areas

and volumes using double integrals, calculating volumes using triple integrals.

Differential Equations: Bernoulli's equation, exact differential equations, integrating factors, orthogonal

trajectories, homogeneous differential equations, method of separation of variables, linear differential

equations of second order with constant coefficients, method of variation of parameters, Cauchy-Euler

equation.

Linear Algebra and Algebra:

Matrices: systems of linear equations, rank, nullity, rank-nullity theorem, inverse, determinant,

eigenvalues, eigenvectors.

Finite Dimensional Vector Spaces: linear independence of vectors, basis, dimension, linear transformations, matrix representation, range space, null space, rank-nullity theorem.

Groups: cyclic groups, abelian groups, non-abelian groups, permutation groups, normal subgroups,

quotient groups, Lagrange's theorem for finite groups, group homomorphisms.

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