### **JEE Main Mathematics Syllabus**

Candidates can check the mathematics syllabus here from the below table.

| **Unit Number** | **Chapters** | **Topics Covered** |
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| Unit 1 | Sets, Relations, And Functions | Sets and their representation: Union, intersection, and complement of sets and their algebraic properties; Power set; Relation, Type of relations, equivalence relations, functions; one-one, into and onto functions, the composition of functions. |
| Unit 2 | Complex Numbers And Quadratic Equations | Complex numbers as ordered pairs of reals, Representation of complex numbers in the form a + ib and their representation in a plane,algebra of complex number, modulus, and argument (or amplitude) of a complex number, Relations between roots and coefficient, nature of roots, the formation of quadratic equations with given roots, Argand diagram, Quadratic equations in real and complex number system and their solutions |
| Unit 3 | Matrices And Determinants | Matrices, algebra of matrices, type of matrices, evaluation of determinants, area of triangles using determinants, Adjoint, and evaluation of inverse of a square matrix using determinants and, determinants, and matrices of order two and three, Test of consistency and solution of simultaneous linear equations in two or three variables using matrices |
| Unit 4 | Permutations And Combinations | The fundamental principle of counting, permutation as an arrangement and combination as section, Meaning of P (n,r) and C (n,r), simple applications |
| Unit 5 | Binomial Theorem And Its Simple Applications | Binomial theorem for a positive integral index, general term and middle term, and simple applications |
| Unit 6 | Sequence And Series | Arithmetic and Geometric progressions, geometric means between two given numbers, insertion of arithmetic, Relation between A.M and G.M |
| Unit 7 | Limit, Continuity, And Differentiability | Real–valued functions, algebra of functions, polynomials, rational, trigonometric, logarithmic, and exponential functions, inverse function. Graphs of simple functions. Applications of derivatives: Rate of change of quantities, monotonic-increasing and decreasing functions, Differentiation of the sum, difference, product, and quotient of two functions. Differentiation of trigonometric, inverse trigonometric, logarithmic, exponential, composite, and implicit functions; Limits, continuity, and differentiability, derivatives of order up to two, Maxima and minima of functions of one variable |
| Unit 8 | Integral Calculus | Integrations by substitution, by parts, and by partial functions. Integral as an antiderivative, trigonometric, exponential, and logarithmic functions. Integration using trigonometric identities, Fundamental integral involving algebraic,Evaluation of definite integrals, The fundamental theorem of calculus, and properties of definite integrals. Determining areas of the regions bounded by simple curves in standard form |
| Unit 9 | Differential Equations | Ordinary differential equations, their order, and degree, the solution of differential equation by the method of separation of variables, solution of a homogeneous and linear differential equation of the type |
| Unit 10 | Coordinate Geometry | Cartesian system of rectangular coordinates in a plane, distance formula, sections formula, locus, and its equation, the slope of a line, parallel and perpendicular lines, intercepts of a line on the coordinate axis.Circle, conic sectionsA standard form of equations of a circle, the general form of the equation of a circle, its radius and central, equation of a circle when the endpoints of a diameter are given, points of intersection of a line and a circle with the centre at the origin and sections of conics, equations of conic sections (parabola, ellipse, and hyperbola) in standard formsStraight lineVarious forms of equations of a line, intersection of lines, angles between two lines, conditions for concurrence of three lines, the distance of a point from a line, coordinate of the centroid, orthocentre, and circumcentre of a triangle |
| Unit 11 | Three Dimensional Geometry | Coordinates of a point in space, the distance between two points, section formula, directions ratios, and direction cosines, and the angle between two intersecting lines. Skew lines, the shortest distance between them, and its equation. Equations of a line |
| Unit 12 | Vector Algebra  | Vectors and scalars, the addition of vectors, components of a vector in two dimensions and three-dimensional space, scalar and vector products |
| Unit 13 | Statistics And Probability | Probability: Probability of an event, addition and multiplication theorems of probability, probability distribution of a random variate, Bayes theoremMeasures of discretion; variance, and mean deviation for grouped and ungrouped data, calculation of mean, median, mode of grouped and ungrouped data calculation of standard deviation, |
| Unit 14 | Trigonometry | Trigonometric identities and trigonometric functions, inverse trigonometric functions, and their properties |