Number Theory - GeeksforGeeks

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Courses Tutorials Practice Jobs Number System Algebra Set Theory Geometry Linear Algebra Trigonometry Logarithms Statistics Probability Calculus Discrete Mathematics Engineering Math Practice Problems Ace GATE 2027 Linear Algebra Matrices Row Echelon Form Eigenvalues and Eigenvectors System of Linear Equations Matrix Diagonalization LU Decomposition Finding Inverse of a Square Matrix using Cayley Hamilton Theorem in MATLAB Sequence & Series Mathematics | Sequence, Series and Summations Binomial Theorem Finding nth term of any Polynomial Sequence Calculus Limits, Continuity and Differentiability Cauchy's Mean Value Theorem Taylor Series Inverse functions and composition of functions Definite Integral Application of Derivative - Maxima and Minima Probability & Statistics Mean, Variance and Standard Deviation Conditional Probability Bayes' Theorem Probability Distribution - Function, Formula, Table Covariance and Correlation Practice Questions Last Minute Notes - Engineering Mathematics Engineering Mathematics - GATE CSE Previous Year Questions GATE Preparation Explore Number Theory Last Updated : 19 Sep, 2025 Number theory is a branch of mathematics that studies numbers, particularly whole numbers, and their properties and relationships. It explores patterns, structures, and the behaviors of numbers in different situations. Some Applications of Number Theory in Computer Science: Number theory deals with the following key concepts: Prime Numbers : Properties, distribution, and applications of prime numbers. Divisibility : Rules and relationships of numbers dividing each other. GCD and LCM : Finding common factors and multiples. Modular Arithmetic : Remainders and clock arithmetic. Number Patterns : Squares, cubes, and other numerical sequences. Congruences : Relationships between numbers in modular systems. Number System The Number System explains different kinds of numbers used in mathematics, from natural to complex numbers, and various number systems like binary and decimal. Natural Numbers Whole Numbers Integers Rational Numbers Irrational Numbers Real Numbers Imaginary Numbers Complex Numbers The four common types of number systems are: Binary Number System Octal Number System Decimal Number System Hexadecimal Number System Basic Concepts Foundational tools of Number Theory: Divisors & Multiples Divisibility Rules Sum of Divisors Number of Divisors HCF and LCM Prime Numbers Modular Arithmetic Fermat's Little Theorem Euler's Totient Function Co-Prime Numbers Advanced Concepts Dive into deeper number theory topics such as the Chinese Remainder Theorem, Diophantine equations, and number-theoretic identities. Chinese Remainder Theorem Wilson's Theorem Diophantine Equations Linear Diophantine Equations Pell's Equation Bezout's Identity Mobius Function & Mobius Inversion Prime Distribution Understand how prime numbers are spread across the number line and explore interesting patterns and famous conjectures related to them. Distribution of Primes Theorems & Conjectures Goldbach's Conjecture Patterns in Primes Twin Primes Cousin Primes Prime Triplets Prime Quadruplets Miscellaneous Topics of Number Theory This section includes special and fascinating types of numbers and principles like Fibonacci numbers, perfect numbers, and the Pigeonhole Principle. Catalan Numbers Fibonacci Sequence Farey Sequences Pigeonhole Principle Perfect Numbers Deficient Numbers Abundant Numbers Amicable Numbers Automorphic Numbers Magic Numbers Triangular Numbers Tetrahedral Number Hexagonal Numbers Lucas Primes Hardy-Ramanujan Numbers Number Theory For Programmers Practice number theory through programming with code examples that solve problems like GCD, LCM, primality testing, and more. Find the GCD of two numbers Find the LCM of two numbers Calculate the Factorial of a number Basic and Extended Euclidean algorithms Primality Test : [Fermat Method] | [Miller–Rabin] | [Solovay-Strassen] Comment Article Tags: Article Tags: Engineering Mathematics Maths Tutorials Maths-Categories Math Tutorials + 1 More