

History of Number Theory

Number Theory · Practice Test · 25 Questions

1. Which ancient clay tablet, dating to the Old Babylonian period, contains a list of Pythagorean triples?

- A) Plimpton 322
- B) Rhind Papyrus
- C) Moscow Papyrus
- D) Berlin Papyrus

2. Who is credited with providing the first rigorous proof of the Infinitude of Primes in his work 'Elements'?

- A) Archimedes
- B) Euclid
- C) Pythagoras
- D) Diophantus

3. Pierre de Fermat famously claimed to have a proof for which theorem in the margin of his copy of Diophantus's 'Arithmetica'?

- A) Fermat's Little Theorem
- B) Fermat's Polygonal Number Theorem
- C) Fermat's Last Theorem
- D) Fermat's Two-Square Theorem

4. Which mathematician finally proved Fermat's Last Theorem in 1994?

- A) Andrew Wiles
- B) Leonhard Euler
- C) Carl Friedrich Gauss
- D) Kurt Gödel

5. The study of modular arithmetic was formalized in the 1801 book 'Disquisitiones Arithmeticae' by which mathematician?

- A) Bernhard Riemann
- B) Joseph-Louis Lagrange
- C) Carl Friedrich Gauss
- D) Augustin-Louis Cauchy

6. Which 18th-century mathematician discovered the formula relating the sum of the reciprocals of primes to the natural logarithm?

- A) Leonhard Euler
- B) Isaac Newton
- C) Gottfried Leibniz
- D) Brook Taylor

7. The Goldbach Conjecture, proposed in 1742, suggests that every even integer greater than 2 is the sum of two what?

- A) Perfect numbers
- B) Prime numbers
- C) Triangular numbers
- D) Square numbers

8. What is the name of the function, denoted by $\phi(n)$, that counts the positive integers up to n that are relatively prime to n ?

- A) Euler's totient function
- B) Riemann zeta function
- C) Mobius function
- D) Dirichlet function

9. Which mathematician developed the 'Sieve of Eratosthenes', an ancient algorithm for finding all prime numbers up to any given limit?

- A) Eratosthenes of Cyrene
- B) Hypatia of Alexandria
- C) Pappus of Alexandria
- D) Apollonius of Perga

10. The 'Arithmetica', a major work on number theory that influenced Fermat and others, was written by whom?

- A) Diophantus
- B) Plato
- C) Thales
- D) Hipparchus

11. In 1859, Bernhard Riemann published a paper that introduced which famous function, central to the study of prime number distribution?

- A) Riemann zeta function
- B) Gamma function
- C) Beta function
- D) Elliptic function

12. The 'Prime Number Theorem', describing the asymptotic distribution of prime numbers, was independently proved in 1896 by which two mathematicians?

- A) Hadamard and de la Vallée Poussin
- B) Hardy and Littlewood
- C) Hilbert and Cantor
- D) Cauchy and Abel

13. Which English mathematician is known for his extensive work on the distribution of primes and his collaboration with Ramanujan?

- A) G.H. Hardy
- B) Alan Turing
- C) Charles Babbage
- D) Bertrand Russell

14. Srinivasa Ramanujan, a self-taught mathematical genius, made significant contributions to number theory from which country?

- A) India
- B) Japan
- C) Brazil
- D) South Africa

15. The 'Law of Quadratic Reciprocity' was first conjectured by Euler and Legendre, but the first published proof was provided by whom?

- A) Carl Friedrich Gauss
- B) Pierre de Fermat
- C) Blaise Pascal
- D) Joseph Fourier

16. Which 17th-century French mathematician and monk conducted extensive correspondence on number theory and is the namesake of the Mersenne primes?

- A) Marin Mersenne
- B) René Descartes
- C) Blaise Pascal
- D) Pierre Gassendi

17. Sophie Germain made a major breakthrough toward proving Fermat's Last Theorem by proving the result for a specific class of primes now known as:

- A) Sophie Germain primes
- B) Gaussian primes
- C) Mersenne primes
- D) Fermat primes

18. What is the name of the constant, denoted by gamma, that appears in the context of the harmonic series and Euler-Mascheroni?

- A) Euler-Mascheroni constant
- B) Feigenbaum constant
- C) Khinchin constant
- D) Landau constant

19. The 'ABC conjecture', a major unsolved problem in number theory, deals with the relationship between the radical of the product of three coprime integers, and was proposed in:

- A) 1985
- B) 1750
- C) 1920
- D) 2005

20. Which mathematician introduced the concept of 'Gaussian integers' (numbers of the form $a + bi$ where a and b are integers)?

- A) Carl Friedrich Gauss
- B) Augustin-Louis Cauchy
- C) Niels Henrik Abel
- D) Évariste Galois

21. The 'Four-Square Theorem', stating that every natural number can be represented as the sum of four integer squares, was proved by:

- A) Joseph-Louis Lagrange
- B) Pierre de Fermat
- C) John Wallis
- D) Isaac Barrow

22. What is the name of the 19th-century mathematician who contributed significantly to number theory through his work on the 'Dirichlet series'?

- A) Peter Gustav Lejeune Dirichlet
- B) Carl Jacobi
- C) Karl Weierstrass
- D) Bernhard Riemann

23. A 'Perfect number' is a positive integer that is equal to the sum of its proper divisors. Which is the smallest perfect number?

- A) 6
- B) 8
- C) 10
- D) 12

24. Which mathematician formulated the 'Prime Number Theorem' as a conjecture based on analyzing tables of primes?

- A) Adrien-Marie Legendre
- B) Carl Friedrich Gauss
- C) Leonhard Euler
- D) Joseph-Louis Lagrange

25. The 'Wolfskehl Prize' was established in 1908 to reward the proof of which famous mathematical problem?

- A) Fermat's Last Theorem
- B) Goldbach Conjecture
- C) Twin Prime Conjecture
- D) Riemann Hypothesis