

Historical Frontiers of Number Theory

Number Theory · Answer Key · 10 Questions

1. Which ancient civilization is credited with the earliest known systematic study of number theory, including the concept of prime numbers, in texts like the Rhind Papyrus?

- A) Ancient Greece
- B) Ancient Mesopotamia (Babylonians)
- C) Ancient Egypt**
- D) Ancient India

2. The development of modular arithmetic, a cornerstone of modern number theory, is primarily attributed to the groundbreaking work of which 18th-century mathematician?

- A) Pierre de Fermat
- B) Leonhard Euler
- C) Carl Friedrich Gauss**
- D) Gottfried Wilhelm Leibniz

3. Fermat's Last Theorem, famously stated by Pierre de Fermat in the margin of a book, remained unproven for over 350 years until its resolution by which mathematician in 1994?

- A) Andrew Wiles**
- B) Grigori Perelman
- C) Shing-Tung Yau
- D) Paul Cohen

4. The concept of the Riemann Zeta Function, central to the distribution of prime numbers, was first introduced by which mathematician in the mid-19th century?

- A) Augustin-Louis Cauchy
- B) Peter Gustav Lejeune Dirichlet
- C) Bernhard Riemann**
- D) Gotthold Eisenstein

5. Which ancient Greek mathematician's work, 'Elements', contains significant early propositions and proofs related to number theory, including the Euclidean algorithm for finding the greatest common divisor?

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

6. The study of quadratic reciprocity, a fundamental theorem relating the solvability of quadratic congruences, was a major focus for which pair of mathematicians in the late 18th and early 19th centuries?

- A) Euler and Lagrange
- B) Gauss and Legendre**
- C) Dirichlet and Kummer
- D) Jacobi and Eisenstein

7. The p-adic numbers, a system of numbers that generalizes the properties of integers, were developed by which mathematician in the early 20th century?

- A) Emmy Noether
- B) Kurt Hensel**
- C) David Hilbert
- D) Henri Poincaré

8. The proof of Dirichlet's theorem on arithmetic progressions, which states that certain arithmetic progressions contain infinitely many prime numbers, was published by Peter Gustav Lejeune Dirichlet in which decade?

- A) 1820s
- B) 1840s**
- C) 1860s
- D) 1880s

9. Which Indian mathematician of the 17th century made significant contributions to number theory, including work on indeterminate equations and infinite series, often without the benefit of proof techniques common in Europe at the time?

- A) Aryabhata
- B) Brahmagupta
- C) Bhaskara II**
- D) Srinivasa Ramanujan

10. The concept of ideals in ring theory, which has profound implications for number theory (particularly algebraic number theory), was introduced by which mathematician in the 19th century?

- A) Richard Dedekind**
- B) Ernst Kummer
- C) Leopold Kronecker
- D) Georg Cantor