

chapter titled 'Microsporidia: eukaryotic intracellular parasites shaped by gene loss and horizontal gene transfers' explains how the microsporidian genome has evolved and its implication in cellular pathogenesis under selection pressure. *Bacillus anthracis* is an etiological agent of anthrax that results in disease among livestock and has the potential to pose a threat on human health. Anthrax toxin comprises protective antigen (PA), edema factor (EF) and lethal factor (LF), and association of PA with either LF or EF which determine the mode of pathogenesis. The chapter titled 'Anthrax pathogenesis' summarizes the results from various studies to provide insights into the mechanism underlying anthrax pathogenesis.

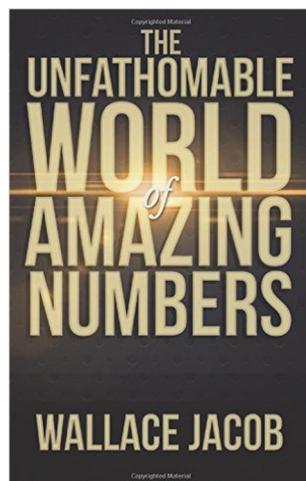
Septins play an important role in asymmetric division, the chapter titled 'Septins and generation of asymmetries in fungal cells' explains the mechanisms and processes underlying septin-mediated polar growth in fungi. The chapter titled 'Lytic cycle of *Toxoplasma gondii*: 15 Years Later' provides an overview of research that has evolved in the last decade or so to explain lytic cycle of parasites.

Plasmodium results in human death and remains a major burden on social healthcare systems across the world. To achieve a better and rapid diagnosis or discovery of novel drug targets, it is imperative to decipher the parasite life cycle inside the host post-infection. Chapter titled 'Ion regulation in the malaria parasite' explores that how sodium and potassium ion homeostasis across the erythrocyte cell wall is altered post-invasion.

Pore-forming toxins assemble large beta-barrel pores on the target membrane; however, how such a large assembly is facilitated with such efficiency remains a challenging question. The chapter titled 'The unique molecular choreography of giant pore formation by the cholesterol-dependent cytolysins of gram-positive bacteria' explains the mechanism underlying cholesterol-dependent pore formation by cytolysins.

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The Unfathomable World of Amazing Numbers. Wallace Jacob. Notion Press, Chennai, 2014. xx + 354 pp, Price: Rs 345. ISBN: 9789384391324.

What is special about the numbers 23, 27, 37, 47, 751, 2519, 11,826, 37,037, 1,741,725, 1,274,953,680, 8,549,176,320, 36,085,288,503,684,007,860? Can the Fibonacci series be used for converting miles to kilometres? Is there any relationship between the terms of the Fibonacci series and Pythagorean triplets? Who coined the terms googol and googolplex? Which is the smallest positive number (>1) which can be expressed as a first power, second power, third power, fourth power, fifth power, sixth power, seventh power, eighth power and ninth power? What is meant by aliquot sum of an integer? Can we find the greater of the two numbers 31^{11} and 17^{14} without actually computing the values of 31^{11} and 17^{14} ? Can we determine the unit's digit of $3^{2001} - 2^{2001}$ without computing the values of 3^{2001} and 2^{2001} ? What are Diophantine equations? What is the significance of e (also known as Euler's number or Naper's constant) in the real world (in fact, 7 February is celebrated as the e -day)? The tome under review contains well-researched and elaborated answers to the aforementioned questions.

The book is a mesmerizing three-leg odyssey which provides interesting and novel learnings. Part A of the book explores the properties of 76 interesting numbers. Part B contains 54 mind-rattling puzzles and Part C dwells on a few esoteric concepts which have been simplified. The book can be helpful in developing a mathematical temperament. In fact, a person does not need be a

mathematics expert in order to understand the concepts explained in the book. It explains the properties of numbers as small as 6 and as large as 31,415,926,535,897,932,384,626,433,832,795,028,841.

The book dwells on Fibonacci numbers, Tribonacci series, Lucas series, Tetranacci series, special numbers such as narcissistic numbers, Armstrong numbers, Filzian numbers, factorion, sphenic numbers, pronic numbers, Leyland number, Lucas-Carmichael number, automorphic numbers, trimorphic numbers, amicable numbers, triangular numbers, etc.

In the domain of prime numbers alone, the book dissects emirp, primorial numbers, father prime, Sophie Germain prime, prime quadruplet, prime quintuplet, prime sextuplet, Wilson prime, Weiferich prime, Woodall prime, Euclid-Mullin sequence, pi-prime, circular prime numbers, palindromic prime number, interprime numbers, twin primes, Fermat primes, Mersenne primes, prime triplets, left-truncatable primes, right-truncatable primes, two-sided primes, permutable primes, titanic primes, gigantic primes, megaprimes and Cullen primes.

Some questions which have been solved in the book are indeed lengthy. Part B has ten solved questions on cryptarithms. The solution to one of the questions on cryptarithms is worked out on approximately 11 pages (pp. 159–169). A question based on an equation has been solved over about 90 pages (pp. 176–263). Needless to say, the question has been examined from three different perspectives.

Approximately 22 pages in the book have been devoted to the concepts of magic squares. The book provides a step-by-step visual explanation of constructing a magic square of odd-order as well as of even-order. It also provides information on alphamagic squares, templar magic squares, Concentric or bordered magic squares, antimagic squares and Ramanujan's magic square. In the domain of Pythagorean triplets, the author has listed methods of generating Pythagorean triplets using two odd integers which differ by 2, two even integers which differ by 2, and two fractions or whole numbers whose product is 2. The book also enlists Euclid's and Plato's methods of generating Pythagorean triplets. The concept of leap year (also known as intercalary year) has been discussed in great detail (pp. 303–304).

BOOK REVIEWS

The book contains several interesting facts, e.g. the infinity symbol ' ∞ ' is also known as lemniscate and was introduced in 1655 by John Wallis; the Gregorian calendar was first proposed by Aloysius Lilius.

The book will be especially useful to the champions of number theory, fundamental logic development and problem-

solving. There are certain unsolved/unanswered questions in the book. The reader will be in a position to write his/her own book, if he/she is able to answer them. A shortcoming of the book is that it lacks an index. However, it provides cues for developing unique mathematical projects and is likely to whet the reader's appetite for numbers.

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