BOOK REVIEWS

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FIBONACCI AND LUCAS NUMBERS

Verner E. Hoggatt, Jr.

Houghton Mifflin Company has just released a 92-page booklet in its Enrichment Series entitled "Fibonacci and Lucas Numbers" by our Editor, V. E. Hoggatt, Jr.

If a first impression is valid, this contribution to mathematical literature might be characterized by three words: richness, variety, lucidity. Richness and variety are manifest in relating the Fibonacci and Lucas numbers to many interesting facets of mathematics. The Golden Section Ratio and some unusual geometry receive attention in the early part of the book. Number theory comes into play in the periodic properties of the Fibonacci and Lucas numbers. The prolific Pascal triangle receives its share of attention. The algebra of simple matrices and representation of integers open up many doors to further research and study. Finally, relations with nature round off the treatment and point to the mysterious connection of mathematics with the real world which has fascinated man for untold centuries.

Some examples of lucidity would be the very slick way in which the Binet formulas are introduced; the handling of asymptotic ratios and their relation to the Golden Section in Chapters 5 and 6; the treatment of periodicity of remainders in Chapter 8; the explanation of Fibonacci numbers in nature in Chapter 13.

A helpful feature of the book is an appendix giving solutions of many of the problems in the book.

This book should prove a boon to young and old who wish to enter that magic door which leads to the wonderful world of Fibonacci. All too often we receive pleas for books and materials dealing with this field. There is now a ready answer to these requests for help.

This booklet lists for $1.40, and is also available from the Fibonacci Association.

INVITATION TO NUMBER THEORY

Oystein Ore

As part of its New Mathematical Library, Random House (The L. W. Singer Company) has just released a booklet, "Invitation to Number Theory," by Oystein Ore.

As everyone knows, number theory is a type of mathematics which has fascinated amateur and professional over the centuries. The questions it raises are often quite easy to understand and therefore appealing to the mathematical enthusiast who does not have a great background in mathematics.

The booklet takes up aspects of number theory that are within the range of a good high school student: primes, divisors of numbers, greatest common divisor and least common multiple, the Pythagorean problem, numeration systems, and congruences.

One of the noteworthy features is the way in which the author relates his treatment to the history of mathematics. The following examples bring out this

point: figurate numbers, the Euclidean algorithm for finding the greatest common divisor, perfect numbers, amicable numbers, the Pythagorean problem, ancient systems of numeration, and Mersenne numbers.

On the other hand, up-to-date developments are not neglected. There is an interesting discussion of the largest primes discovered by the factorization of Mersenne numbers. In connection with number bases, computers and their mode of arithmetic are introduced.

Finally, the author has introduced interest features throughout the book: magic squares, games with digits, days of the week as related to congruences, tournament schedules.

The book contains problems to be solved and has a section entitled "Solutions to Selected Problems."

The list price is $1.95.

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SOLUTIONS TO PROBLEMS

2. $2(-1)^n$

3. $L_{2n} + (-1)^n$

4. $L_{4n} + (-1)^n L_{2n} + 1$

5. $L_{2n} + (-1)^{n+1}$

6. $L_{4n} + (-1)^{n+1} L_{2n} + 1$

7. $T_n = \frac{10 + \sqrt{5}}{5} r^n + \frac{10 - \sqrt{5}}{5} s^n$

8. $F_n = 2^{-n+1}\left[n + 5\binom{n}{3} + 5^2\binom{n}{5} + 5^3\binom{n}{7} \cdots\right]$

9 $L_n = 2^{-n+1}\left[1 + 5\binom{n}{2} + 5^2\binom{n}{4} + 5^3\binom{n}{6} \cdots\right]$

10. F_{2n+1} .

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