

VI. Euler's recursion formula for the sum of the divisors of  $n$ . VII. Mathematical induction. Some non-routine applications, such as the following one: "If the polygon  $P$  is convex and contained in the polygon  $Q$ , the perimeter of  $P$  is shorter than the perimeter of  $Q$ ." VIII. Maxima and minima, with, again, several ingenious, non-routine applications. IX. Minimum principles from optics and mechanics. X. The isoperimetric problem. XI. Miscellaneous problems. Sample: if the intersection of a solid sphere with a solid cylinder whose axis passes through the center is removed from the sphere, find the volume of the remainder in terms of the radius of the sphere and the height of the cylindrical hole.

The second volume is quite different from the first. The problems occupy less space (less than a third of the volume) and play a less important role. Their character is also different. Sample: "Check Heron's formula [for the area of a triangle in terms of the sides] as many ways as you can." Chapter XII discusses the "fundamental inductive pattern" and some of its variations. (If  $A$  implies  $B$ , then the discovery that  $B$  is true makes  $A$  more credible.) There is an interesting discussion of the author's teaching methods, centered around the formula for the area of the lateral surface of the frustum of a right circular cone. Chapter XIII continues in the same vein. By way of an example there is a long discussion of judicial proof with many details of a murder case. The best part of the volume for the mathematician is about a dozen pages (in the examples and comments on Chapter XIII) that discuss some of Pólya's own work with historical and psychological side lights. Chapters XIV and XV concern probability, mostly from a non-mathematical point of view. The main emphasis of the last chapter, Chapter XVI, is on the applications of the preceding discussion to pedagogic methods.

Neither volume has an index; there is, instead, a very detailed analytical table of contents. The physical appearance of the volumes is excellent. The style throughout is informal and charming.

PAUL R. HALMOS

P.S. The sequence 11, 31, 41, 61, 71, 101, 131,  $\dots$  consists of the primes ending in 1.

*Elements of algebra.* By Howard Levi. New York, Chelsea, 1954. 160 pp. \$3.25.

This book is addressed to beginning students of mathematics; it is, roughly speaking, a text on freshman algebra. It is a text on freshman algebra in the sense that it talks about the removal of parentheses and