

irregular, polygons circumscribed about a circle or inscribed in a circle, also figures bounded by straight lines and arcs of circles, all are examined in regard to their forms when their areas or perimeters have maximum or minimum values. Pairs of right triangles are also treated in a few special cases. The sum of the distances and the sum of the squares of the distances of a point from n points in a plane is minimized and some interesting conclusions are drawn. The theorem is given for the sum of the h th powers of the distances when $n = 3$. The minimum perimeter is found for a triangle inscribed in a given triangle and for a quadrilateral inscribed in a quadrilateral that is inscribed in a circle. There are several quite unexpected results in connection with this problem.

Part two treats of solid geometry. Prisms and tetrahedrons are studied in the same detail as the triangles in part one.

In most respects the book reads very smoothly. The number of very slightly different cases treated makes some parts of it almost tiresome, but the detail is no doubt justifiable. On the other hand, one finds a severe brevity of statement in some places, but these are rather few. Typographical errors are not many, but the following may be noted: near the bottom of page 15, read $U - 2c$ for $U - 2C$. In line 4 from the bottom of page 18, read "innerem" for "äusserem." Just below theorem 57, page 41, read $\rho > \rho'$. In the middle of page 47, read 60 for 69. In the first line of § 6, page 51, read 43 for 41. The value of $ABCD$ on page 73 is incorrect. In the value of $\angle O_1B_1O_2$, page 75, read $C_2B_1O_2$ for $B_1C_1O_2$ and CBO for BCO . In the value for A_1B_1' , page 86, β_1 and β_1' are somewhat confused. On page 114, opposite figure 30, read B for B_1 . On page 30, the author seems not to notice the possibility of $C + D$ being equal to 180° but this does not vitiate his conclusions.

J. V. McKELVEY.

Advanced Shop Mathematics. By EARLE B. NORRIS and RALPH T. CRAIGO. New York, McGraw-Hill Book Company, 1913. xi+214 pp.

THIS volume presents the second half of the instruction papers in shop mathematics as developed and used in the extension division of the University of Wisconsin. The intention of the authors as stated in the preface is "to present such of the principles of algebra, geometry, trigonometry and

logarithms as have been found to be of practical value in the shop, showing some of the better known applications and making the presentation as practical as possible." The statement is made that the course has proved to be "a good mathematical preparation for advanced technical study."

It has been of interest to the reviewer to note the ability with which the mathematical difficulties have been overcome by a clearness and simplicity of statement and style. Proofs are almost entirely absent. The purpose is to show how things are done. Formulas are given ex cathedra with a "this is so" accompaniment. The uses of algebra, geometry, and trigonometry are displayed to the reader, with the evident intention of arousing interest in one who has not pursued the usual elementary courses. It would seem, however, that the scope of the book would be inadequate as a basis for "advanced technical study."

As an example of text books intended for technical high schools, and as indicating the mathematical training which in the near future a number of candidates for admission to college will undoubtedly offer, the volume is of exceptional interest.

The direction to "scribe an arc" is novel and the construction given on page 84 for a flat circular arc results in an ellipse.

PERCEY F. SMITH.

Wahrscheinlichkeitsrechnung. Von E. CZUBER. Zweite Auflage in zwei Bänden. I. Band: *Wahrscheinlichkeitstheorie, Fehlerausgleichung und Kollektivmasslehre.* 1908. x+410 pp. II. Band: *Mathematische Statistik, Mathematische Grundlagen der Lebensversicherung.* 1910. x+470 pp. B. G. Teubner, Leipzig und Berlin.

THIS is the second edition of the well known work of Czuber on probability. If material for a course is wanted, possibly no better reference could be given than to these books. The first volume contains the general theory with such applications as are mainly of mathematical interest. At the end of this volume are four and seven place tables of the probability function and a four place table of its derivatives. The second volume contains the applications to questions of statistics and insurance with tables relating to those topics.

In the first volume occurs a series of problems continuously numbered and solved as applications of the theory. In this