PROBLEMS AND SOLUTIONS.

B. F. FINKEL, CHAIRMAN OF THE COMMITTEE.

PROBLEMS FOR SOLUTION.

Special Notice.—Please reread the requests as to form of solutions on pp. 258–259 of the October 1913 issue. Unless these directions are observed by contributors, solutions must either be entirely rewritten by the committee or else rejected. Put all drawings on separate sheets.

MANAGING EDITOR.

ALGEBRA.

When this issue was made up no solutions had been received for numbers 396 to 400 inclusive. Please give attention to these.

401. Proposed by R. D. CARMICHAEL, Indiana University.

Prove the validity of Borda's series:

$$\log(x+2) = 2\log(x+1) - 2\log(x-1) + \log(x-2) + 2\left[\frac{2}{x^3-3x} + \frac{1}{3}\left(\frac{2}{x^3-3x}\right)^3 + \frac{1}{5}\left(\frac{2}{x^3-3x}\right)^5 + \cdots\right].$$

402. Proposed by R. D. CARMICHAEL, Indiana University.

Obtain other series similar to that of Borda, given in the preceding problem.

403. Proposed by C. N. SCHMALL, New York City.

A torpedo-boat 40 miles from shore strikes a rock, making a rent in her hull which admits water at the rate of 15 tons in 48 minutes. The ship's pumps can expel 12 tons in an hour. If 60 tons of water is sufficient to sink the boat, find the average rate of steaming so that it may reach the shore just as it is about to sink.

404. Proposed by V. M. SPUNAR, Chicago, Illinois.

Show that $(a+b)(a+b-1)\cdots(a+b-n+1) = a(a-1)(a-2)\cdots(a-n+1) + \binom{n}{1}a(a-1)(a-2)\cdots(a-n+1)b + \binom{n}{2}a(a-1)(a-2)\cdots(a-n+1)b(b-1) + \cdots + b(b-1)(b-2)\cdots(b-n+1)$.

GEOMETRY.

When this issue was made up no solutions had been received for numbers 417, 421 and 425 to 430 inclusive. Please give attention to these.

431. Proposed by F. M. MORGAN, Dartmouth College.

Trisect the angles of the triangle ABC and let the trisectors nearest each side meet in the respective points M, N, P. Prove by trigonometry that the triangle MNP is equilateral.

432. Proposed by ELMER SCHUYLER, Brooklyn, N. Y.

Having given the edges of a tetrahedron, a, b, c, d, e, f, find an expression for the radius of the sphere which is tangent to the six edges.

433. Proposed by W. H. BUSSEY, University of Minnesota.

A transformation of the plane keeping the radius of curvature of all curves invariant is either (1) a real or imaginary motion or reflexion, or (2) not a point transformation.

CALCULUS.

When this issue was made up no solutions had been received for numbers 335, 337, 338, 340, 342, 348, 350, and 352.