A SPECIAL MESSAGE

The Society is raising a fund of $2,000 to be donated to the universities in Singapore. The proceeds from this sum will be used as annual book prizes to be awarded to outstanding mathematics students in the universities. We appeal to our members to donate generously to the fund. Please send your contributions to the Hon. Secretary, Singapore Mathematical Society.

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ABSTRACT OF THE TALK ON "AN ISOMORPHISM PROBLEM FOR FINITE NILPOTENT GROUPS"

Leong Yu Kiang
Department of Mathematics
University of Singapore

The talk gives an outline of the solution to the isomorphism problem for odd order nilpotent groups of class two with cyclic centre. The relevant concepts in group theory are introduced from first principles and the necessary group-theoretic constructions are developed in the course of the talk. Based on a description of finite p-groups of class two with cyclic centre by J.M.Brady (see *Bull. Austral. Math. Soc.* 1 (1959), 403 - 416), the solution given is elementary and also provides a complete classification of the groups under consideration. The details of this talk will presently appear in the *Journal of the Australian Mathematical Society*.

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PROBLEMS SECTION

Readers are invited to submit solutions of the following problems. These should be sent to Dr. L.H.Y. Chen, Department of Mathematics, University of Singapore, within three months. We welcome further problems from readers for inclusion in this section. Original problems are preferred while in other cases sources should be stated if known. It would be appreciated if Junior Members would indicate that they are such when submitting problems or solutions.

P 1/73. If x and y are positive and unequal, prove that

(i) $$\frac{x}{2y+x} + \frac{y}{2x+y} > \frac{2}{3} ,$$

(ii) $$\frac{x}{y+2x} + \frac{y}{x+2y} < \frac{2}{3} .$$

(P.H.Diananda)

P 2/73. Find the largest number that can be obtained as a product of two positive integers whose sum is a given positive integer s. (L.Y.H.Yap)

P 3/73. Let $m_1, m_2, \ldots$ be a sequence of positive integers. Must $\frac{m_1^2+\ldots+m_n^2}{(m_1+\ldots+m_n)^2}$ necessarily converge to zero as n tends to infinity? If not, what is a necessary and sufficient condition for it to converge to zero? Can this problem be generalised? (L.H.Y. Chen)

P 4/73. Prove $$\int_0^x \frac{t^n}{1+t}\,dt = \int_0^x \frac{(x-t)^n}{(1+t)^{n+1}}\,dt .$$

(K.M. Chan)

P 5/73. Let $p(x) = a_0 + a_1x + \ldots + a_nx^n$ be a polynomial with integral coefficients, and let x_1 be an even integer and x_2 an odd integer. If $p(x_1)$ and $p(x_2)$ are both odd, prove that $p(x)= 0$ has no integral roots.

[Hint: Try, for example $x_1 = 0$, $x_2 = 1$.] (T.A.Peng)

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