PROBLEMS FOR SOLUTION

P. 149. Find all solutions, other than the trivial solution $(a, b, c) = (1, 1, c)$ of the simultaneous congruences:

$ab \equiv 1 \mod c$, $bc \equiv 1 \mod a$, $ca \equiv 1 \mod b$ where a, b, c are positive integers with $a \leq b \leq c$.

G.K. White, University of British Columbia

P. 150. Let S be a set of commuting permutations acting transitively on set Ω. Prove that S is a sharply transitive abelian group.

A. Bruen, University of Toronto

P. 151. Given 8 points in the Euclidean plane forming two squares ABCD and A'B'C'D', neither congruent nor homothetic, use a ruler not more than ten times to locate their centre of similarity (that is, O such that $\triangle OAB \sim \triangle OA'B'$, etc.)

A. L. Steger, University of Toronto

P. 152. The classical Jordan-Dirichlet theorem states that if $f: [-\pi, \pi] \to R$ is continuous and of bounded variation, then the Fourier series of f converges to f uniformly. Find an example of a continuous f which is not of bounded variation, but whose Fourier series converges pointwise. Can you find one whose Fourier series converges uniformly ?

J. Marsden, University of California, Berkeley

SOLUTIONS

P. 141. Let $\nu_i = (\alpha_{i1}, \ldots, \alpha_{in})$, $i = 1, \ldots, m$ be vectors where α_{ij} are integers such that the greatest common divisor of all the α_{ij} is 1. Prove that there exist integers k_i such that the greatest common divisor of the components of $\nu = k_1 \nu_1 + \ldots + k_m \nu_m$ is 1.

A.M. Rhemtulla, University of Alberta

Solution by D. Ž. Djoković, University of Waterloo

If A is the matrix (α_{ij}) then the assertion of the problem is that there exists a row vector K and a column vector R such that $KAR = 1$. This follows from well-known theorems about the canonical form

https://doi.org/10.1017/S000843950002988X Published online by Cambridge University Press