P 50. (Corrected) Let $A(t)$ be an $n \times n$ matrix which is continuous on an interval I: $a < t < b$ of the real t-axis. Show that on a subinterval of I there exists a complex continuously differentiable and non-singular matrix $T(t)$ such that the substitution $x = T(t)y$ transforms the linear and homogeneous system of n differential equations $\frac{dx}{dt} = A(t)x$ into a similar system $\frac{dy}{dt} = B(t)y$ with $B(t)$ continuous and skew-symmetric.

H. Helfenstein, University of Ottawa

P 55. Let P be a regular polygon and S a concentric sphere. Prove that the sum of the squares of the distances from a variable point of S to the vertices of P is a constant.

L. Moser, University of Alberta

P 56. If $x \neq 0$ prove that

$$y + y^2 = x + x^2 + x^3$$

has no solutions in integers.

W. J. Blundon,
Memorial University of Newfoundland

P 57. Let m, n be relatively prime positive integers: $(m, n) = 1$. Write

$$f(x) = \frac{(1-x^{mn})(1-x)}{(1-x^m)(1-x^n)},$$

and show

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(i) $f(x)$ is a polynomial of degree $(m-1)(n-1)$ whose non-zero coefficients are alternately $+1$ and -1,

(ii) the number of non-zero coefficients is

$$Mm + Nn - 2MN$$

where M, N are integers defined by $Mm - Nn = 1$, $0 < M < n$.

J. D. Dixon
California Institute of Technology

P 58. (Conjecture) A graph of $\binom{k}{2} + t$ edges with $0 \leq t < k$ has at most $\binom{k}{3} + \binom{t}{2}$ triangles.

J. W. Moon and L. Moser,
University of Alberta

SOLUTIONS

P 43. (Corrected) Let G be a group generated by P and Q, and let H be the cyclic subgroup generated by T. If P and Q satisfy only the relations $P^2QP = Q^2$ and $Q^2PQ^{-4} = P^k$ for some k, then the index of H in G is 1 or 7.

N. S. Mendelsohn, University of Manitoba

Solution by F. A. Sherk, University of Toronto. Enumerating cosets of H by the Todd-Coxeter method (Coxeter and Moser, Generators and Relations for Discrete Groups, Ergebn. Math. 14 (1957) Chapter 2), we obtain the tables