

# Contents

|                                                                                                                                                                |      |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| Preface                                                                                                                                                        | xv   |
| Conference banquet in honour of Richard K. Guy                                                                                                                 | xvii |
| List of lectures                                                                                                                                               | xxi  |
| List of registrants                                                                                                                                            | xxix |
| Rational curves with zero self intersection on certain $K3$ surfaces<br><i>Arthur Baragar</i>                                                                  | 1    |
| Notes on Ramanujan's singular moduli<br><i>Bruce C. Berndt and Heng Huat Chan</i>                                                                              | 7    |
| The operator $x + (1/x) - 2$ and the reciprocal integers<br><i>M.-J. Bertin</i>                                                                                | 17   |
| Integral points on cubic surfaces<br><i>Frits Beukers</i>                                                                                                      | 25   |
| The last exhaustive computation of class groups of complex quadratic number fields<br><i>Duncan A. Buell</i>                                                   | 35   |
| Diophantine approximation in projective space<br><i>Kwok-Kwong Choi and Jeffrey D. Vaaler</i>                                                                  | 55   |
| Bounds for odd perfect numbers<br><i>R.J. Cook</i>                                                                                                             | 67   |
| Automorphic $L$ -functions in level aspect<br><i>W. Duke</i>                                                                                                   | 73   |
| The number field sieve on many computers<br><i>R.-M. Elkenbracht-Huizing, Peter L. Montgomery, R.D. Silverman,<br/>R.K. Wackerbarth and S.S. Wagstaff, Jr.</i> | 81   |
| On the order of $a \pmod{p}$<br><i>Pál Erdős and M. Ram Murty</i>                                                                                              | 87   |
| A special case of Cohen-Lenstra heuristics in function fields<br><i>Christian Friesen</i>                                                                      | 99   |

|                                                                                                                                           |     |
|-------------------------------------------------------------------------------------------------------------------------------------------|-----|
| An asymptotic expansion of Ramanujan<br><i>William F. Galway</i>                                                                          | 107 |
| Improving Ramachandra's and Levesque's unit index<br><i>Cornelius Greither</i>                                                            | 111 |
| On the middle factor of the period polynomial for finite fields<br><i>S. Gurak</i>                                                        | 121 |
| On the distribution of champs<br><i>Aleksandar Ivić and Carl Pomerance</i>                                                                | 133 |
| Sextic number fields with discriminant $(-1)^j 2^a 3^b$<br><i>John W. Jones and David P. Roberts</i>                                      | 141 |
| Traces of singular moduli and the Fourier coefficients of the elliptic modular function $j(\tau)$<br><i>Masanobu Kaneko</i>               | 173 |
| Problème d'Eisenstein pour le conducteur 3<br><i>Pierre Kaplan</i>                                                                        | 177 |
| Liens entre le théorème de Mason et la conjecture (abc)<br><i>Michel Langevin</i>                                                         | 187 |
| On the trace of Hecke operators for Maass forms<br><i>Xian-Jin Li</i>                                                                     | 215 |
| An analysis of Shanks's algorithm for computing square roots in finite fields<br><i>Scott Lindhurst</i>                                   | 231 |
| On the equation $a_1 p_1 + a_2 p_2 + a_3 p_3 = b$ with prime variables in arithmetic progressions<br><i>Ming-Chit Liu and Tianze Wang</i> | 243 |
| Solutions to $x^2 - Dy^2 = Q$<br><i>S. Louboutin and R.A. Mollin</i>                                                                      | 265 |
| Integers represented by ternary quadratic forms<br><i>Ken Ono and K. Soundararajan</i>                                                    | 281 |
| Some uniformity results following from the Lang conjectures<br><i>Patricia L. Pacelli</i>                                                 | 291 |
| Fourier coefficients of cusp forms<br><i>Yiannis N. Petridis</i>                                                                          | 297 |
| Beer and continued fractions with periodic periods<br><i>A.J. van der Poorten</i>                                                         | 309 |
| An inequality for polynomials<br><i>C.J. Smyth</i>                                                                                        | 315 |

|                                                                                                             |     |
|-------------------------------------------------------------------------------------------------------------|-----|
| Some integrals of theta functions in Ramanujan's lost notebook<br><i>Seung Hwan Son</i>                     | 323 |
| Arithmetic of a certain Calabi-Yau threefold<br><i>H.A. Verrill</i>                                         | 333 |
| Diophantine approximation in Euclidean spaces<br><i>L.Ya. Vulakh</i>                                        | 341 |
| Transcendance et indépendance algébrique de valeurs de fonctions<br>modulaires<br><i>Michel Waldschmidt</i> | 353 |
| On the rank of ideal class groups<br><i>Siman Wong</i>                                                      | 377 |
| * * *                                                                                                       |     |
| Conference Problems Session conducted by J.L. Selfridge<br><i>Richard K. Guy</i>                            | 385 |
| Homework!<br><i>Paulo Ribenboim</i>                                                                         | 391 |