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IRISH MATHEMATICAL SOCIETY

Minutes of the Ordinary Meeting held at 12.15 on 31 March, 1983 in DIAS.

1. There were 15 members present. The President, A.G. O' Farrell, took the chair. The minutes of the previous ordinary meeting on 21st December, 1983, were read. A change in one item was agreed. Item 8 was amended to read "R. Bates mentioned that the Irish Mechanics Group might amalgamate with the IMS". The minutes were then signed.
2. The motion "that the Society abandon the idea of a prize for outstanding papers in the Proceedings of the Royal Irish Academy" was passed by ten votes to one with two abstentions.
3. The change in the constitution to allow two extra committee members was confirmed by seven votes to zero with seven abstentions.
4. The Secretary mentioned that the committee was considering entering into a reciprocity agreement with the Irish Mathematics Teachers Association, which would involve a reduction of approximately £1.50 in the subscriptions of reciprocal members. No objections were raised to this plan.
5. P. Boland mentioned that the committee was considering writing to the Department of Education protesting about recent changes in the regulations for maintenance allowances for post-graduate students. After some discussion, it was agreed that the President should draft such a letter mentioning only the anomaly that those with a B.A. degree in Mathematical Sciences from N.U.I. did not qualify for these allowances, while those with an almost identical B.Sc. degree did qualify. With the approval of

the committee, the letter could then be sent to the Minister for Education.

6. R. Enright drew attention to items in the Newsletter about prompt payment of subscriptions and about the 33% reduction on the Proceedings of the Royal Irish Academy available to members of the IMS. He also urged those present to encourage more institutions to join. He noted also the improved terms for institutional members agreed by the committee on 30th March.
7. With regard to the Irish Mechanics Group, it was announced that this organisation was to meet on June 2nd and 3rd in U.C.C.

*R. Timoney (Secretary)*

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NEWS AND REPORTS

1983 Irish National Mathematics Contest

The fifth Irish National Mathematics Contest was held on March 1, 1983, and attracted 1797 entries from 116 schools, as against 1539 entries from 77 schools last year. The increase in interest in the competition is due in some part to the co-operation we received from the Department of Education which issued a circular about the contest to all schools under its aegis.

This year's winner is:

Patrick Joseph Gaffney,  
Christian Brothers' College,  
St. Patrick's Place,  
Cork,

who scored 116. Patrick was placed second last year. In common with the top scorer from each of the foreign countries that use the American High School Mathematics Examination (AHSME) materials for their national contests, Patrick will receive an Honor Pin from the Mathematical Association of America Committee on High School Contests.

The highest team score (sum of the highest three scores by individual contestants) was returned by:

Coleraine Academical Institution,  
Castlerock Road,  
Coleraine,

which entered 35 students, of whom 17 scored 85 or more. Blair R. Cameron, Andrew R. Clark and Christopher A. Hunter/Michael N. Bacon made up the winning team and between them achieved 311.

In the United States and Canada, the downward trend in

participation which began last year continued. Only 407133 entries (versus 418009 in 1982) were received from 6190 schools (versus 6623 in 1982), a consequence possibly of the difficulty of the three previous examinations. However, the somewhat less difficult nature of this year's examination has been very well received and enrolment figures are expected to increase again in 1984, when the examination will be similar in difficulty to this year's.

The top scorer in the United States and Canada was:

James Yeh,  
Mountain Brook High School,  
Alabama.

James obtained full marks, i.e. 150, and becomes the 22nd student in the United States and Canada to do a perfect paper in the 34 year history of the competition.

With the addition of China, Mexico and Singapore, Ireland is now one of 15 foreign countries that participate in the AHSME. China's top scorer was:

Xiao-dong Che,  
Tian She High School,  
Shanghai.

Xiao-dong also returned a perfect paper.

#### The First Irish Invitational Mathematics Contest

All those who scored 85 or more in the Irish National Mathematics Contest were invited to participate in the Invitational Mathematics Contest (IIMC). This was held on Tuesday, March 22, 1983. It was a 2½ hour, 15-question, short-answer examination, not multiple choice. The questions were prepared by the Mathematical Association of America Committee on High Schools Contests for the First Annual American Invitational Mathematics Examination.

Here are a few sample questions:

1. What is the product of the real roots of the equation

$$x^2 + 18x + 30 = 2\sqrt{(x^2 + 18x + 45)} ?$$

2. Let  $a_n = 6^n + 8^n$ . Determine the remainder on dividing  $a_8$  by 49.

3. What is the largest 2-digit prime factor of the integer

$$n = \binom{200}{100} ?$$

4. Find the minimum value of

$$f(x) = \frac{9x^2 \sin^2 x + 4}{x \sin x}$$

for  $0 < x < \pi$ .

5. For  $\{1, 2, 3, \dots, n\}$  and each of its nonempty subsets, a unique *alternating sum* is defined as follows: Arrange the numbers in the subset in decreasing order and then, beginning with the largest, alternatively add and subtract successive numbers (for example, the alternating sum for  $\{1, 2, 4, 6, 9\}$  is  $9 - 6 + 4 - 2 + 1 = 6$  and for  $\{5\}$  it is simply 5). Find the sum of all such alternating sums for  $n = 7$ .

While 67 qualified for the Irish Invitational Mathematics Contest, only 53 were able to compete, for one reason or another. Results were returned on behalf of 47 contestants. The list was headed by

Kathleen McCormack,  
C.B.S.,  
Kilrush,  
Co. Clare,

with a score of 8 out of a possible 15. This was a fine performance. Professor Mientka, Executive Director, AHSME, informed me that if Kathleen resided in the U.S.A., she would have been invited to their three-week International Mathematical Olympiad training session. This, I think, lends persp-

ective to her achievement.

By comparison, only those who scored 95 or above on the AHSME were invited to take the American Invitational Mathematics Examination. A total of 1823 students qualified to compete in this examination, and 54 of these scored at least 10. These were invited to participate in the U.S. AMO which was held on May 3, 1983.

Here are two out of the five questions that were set for this:

1. Prove that the roots of

$$x^5 + ax^4 + bx^3 + cx^2 + dx + c = 0$$

cannot all be real if  $2a^2 < 5b$ .

2. Consider an open interval of length  $1/n$  on the real number line where  $n$  is a positive integer. Prove that the number of irreducible fractions  $p/q$ , with  $1 \leq q \leq n$ , contained in the given interval is at most  $\frac{1}{2}(n+1)$ .

*Finkann Holland*

Below are listed the first six students in the Individual Roll of Honour for the Irish National Mathematics Contest 1983.

<u>Rank</u>	<u>Score</u>	<u>Student Name</u>	<u>School</u>
1	116	Gaffney, Patrick Joseph	Christian Brothers' College, St. Patrick's Place, Cork.
2	111	Cameron, Blair R	Coleraine Academical Institution, Coleraine.
2	111	Murphy, John A	Oatlands College, Mount Merrion, Blackrock, Dublin.

3	107	O'Connell, John	C.B.S., The Green, Tralee, Co. Kerry.
4	105	Ferry, Denis	Pobalscoil Choich Cheannfhaola, Falcarragh, Co. Donegal.
5	104	Holahan, Shane A.	Belvedere College, Dublin,

The following schools attained the first three places in the School Roll of Honour

<u>Rank</u>	<u>Score</u>	<u>Name of School</u>	<u>Team Members</u>
1	311	Coleraine Academical Institution, Coleraine, Co. Londonderry.	Blair R. Cameron Andrew R. Clarke Christopher R. Hunter/ Michael N. Bacon
2	305	O'Connell School, Dublin 1.	Thomas J. Shortall Stephen. P. Dunne Michael. J. Murray
3	298	Pobalscoil Chioich Cheannfhaola, Falcarragh, Co. Donegal.	Denis J. Ferry Kevin. J. Gallagher Seamus A. McBride