

The Scottish Mathematical Council

www.scot-maths.co.uk

MATHEMATICAL CHALLENGE 2024–2025

Entries must be the unaided efforts of individual pupils.

Solutions must include explanations and answers without explanation will be given no credit.

Do not feel that you must hand in answers to all the questions.

CURRENT AND RECENT SPONSORS OF MATHEMATICAL CHALLENGE ARE

The Edinburgh Mathematical Society, The Maxwell Foundation,

The London Mathematical Society and The Scottish International Education Trust.

The Scottish Mathematical Council is indebted to the above for their generous support and gratefully acknowledges financial and other assistance from schools, universities and education authorities.

Particular thanks are due to the Universities of Aberdeen, Edinburgh Napier, Moray House, St Andrews, Stirling, Strathclyde and to George Heriot's School, Gryffe High School and Kelvinside Academy.

Junior Division: Problems 1

J1. Over coffee the other day my friend MacAngus and I were mulling over the passing of time. 'Four years ago', MacAngus said, 'I was four times as old as young Callum and now I'm only three times as old.' 'If you go on like that' I said, 'you'll soon both be the same age.' When we finished laughing over this fallacy, it occurred to me that from what MacAngus said it would be possible to figure out his age. How old is my friend MacAngus?

- J2. Four explorers wish to get one of their number as far as possible into the wilderness from their base. Each explorer can carry supplies for up to 10 days. At any time supplies can be transferred between explorers and individual explorers can return to base, provided they have sufficient supplies for the return journey. Supplies cannot be left unattended in the wilderness. What is the greatest number of days the lead explorer can travel from the base so that all return safely?
- **J3.** An integer *n*, between 100 and 999 inclusive, is chosen at random. What is the probability that the sum of the digits of *n* is 23?
- J4. A van delivering maths textbooks travels to a school at an average speed of 60mph. Due to a mechanical problem the van could only do the return journey at an average speed of 40mph. What was the van's average speed over the entire journey?
- J5.



In the diagram, points *B*, *P*, *Q* and *C* lie on line segment *AD*. The semi-circle with diameter *AC* has centre *P* and the semi-circle with diameter *BD* has centre *Q*. The two semi-circles intersect at *R*. If $\angle PRQ = 30$ degrees, determine the size of $\angle ARD$.

END OF PROBLEM SET 1

CLOSING DATE FOR RECEIPT OF SOLUTIONS :

1 November 2024

Look out for Problems 2 in late November! SEE OVER FOR LINKS TO THE MATHS CHALLENGES ARCHIVES



Mathematical Challenge Problems 1

JUNIOR DIVISION 2024-2025

PLEASE USE CAPITALS TO COMPLETE

SURNAME		FOR	OF	FIC	IAL	USE
OTHER NAME(S) (underline the one you prefer)		Mar	ker			
SCHOOL		1	2	3	4	5
AGE	YEAR OF STUDY S	Tota	al			

- CUT ALONG HERE - -

Please write your solutions on A4 paper and staple the above form to them. PLEASE WRITE YOUR NAME ON EVERY PAGE. Send your entry through your school to the section organiser.

For further information on the competition, please see the School Materials which have been distributed to schools. A copy of these Materials can be obtained from

http://www.wpr3.co.uk/MC/materials/index.html

There are separate links for primary and secondary schools. This page also includes a list of authorities in each section and names and addresses of section organisers.

For information about Mathematical Challenge, look on the MC web site:

www.scot-maths.co.uk

MATHS CHALLENGES ARCHIVES

There are archives of previous questions on: www.wpr3.co.uk/MC-archive/J/index-J.html

Here is a shortcut for your smartphone or tablet

