

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.

Middle Division: Problems 1

M1. 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?

M2.



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 $\angle ARD$.

M3. A cross country track is in the form of a capital letter L.
The short side, which comes at the beginning of the race, is 2 miles long. When the runners have gone 1½ miles along the other side they are as far from the starting point (as the crow flies) as they are from the winning post.

How far (as the crow flies) is the distance from the starting point to the winning post?

M4. In the addition sum below, only one out of the five decimal points is in the correct position.

47.5	
38.627	
125.4	
1583.3	
4508.57	

Find all the possible ways to alter the four incorrect decimal places and make the sum add up correctly.

SEE OVER FOR QUESTION M5.



Mathematical Challenge Problems 1

MIDDLE DIVISION 2024-2025

PLEASE USE CAPITALS T	O COMPLETE
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SURNAME		FOR OFFICIAL USE				
OTHER NAME(S) (underline the one you prefer)		Mar	ker ks			
SCHOOL		1	2	3	4	5
AGE	YEAR OF STUDY S	Total				

- 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.

M5. When Oliver walks briskly down a downward moving escalator he takes 60 steps of the escalator to reach the bottom. When Oliver walks slowly down the escalator at half his previous speed he takes 42 steps of the escalator to reach the bottom. Assuming constant speeds for walking briskly, walking slowly and the movement of the escalator, find how many steps the escalator shows when it is stationary.

END OF PROBLEM SET 1

CLOSING DATE FOR RECEIPT OF SOLUTIONS :

1 November 2024

Look out for Problems 2 in late November!

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

www.scot-maths.co.uk

LINKS TO THE MATHS CHALLENGES ARCHIVES

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

Here is a shortcut for your smartphone or tablet

