The Scottish Mathematical Council

www.scot-maths.co.uk

MATHEMATICAL CHALLENGE 2025−2026

Golden Jubilee Year

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 and Gryffe High School.

Middle Division: Problems 2

M1. Jessie drank 5 glasses of apple juice from a large container, and then added water to the container up to the original level of the apple juice. The next day she drank 6 glasses of liquid from the container, and observed that she had drunk the same amount of undiluted apple juice as on the first day.
How many glasses of apple juice were there in the container at the start?

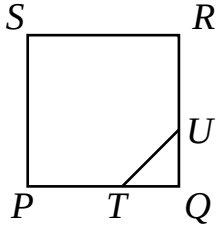
M2. The numbers 1 to 25 are arranged in a square in 5 rows and 5 columns as shown below:

1	2	3	4	5
10	9	8	7	6
11	12	13	14	15
20	19	18	17	16
21	22	23	24	25

Note that the numbers **snake back and forth** across the rows.

What is the smallest possible total that can be made by choosing 5 of these numbers such that no two numbers come from the same row and no two numbers come from the same column? Give an example of how to achieve this smallest possible total, and explain how you know that this is the smallest possible total.

M3. In the diagram, $PQRS$ is a square and TU is parallel to PR.



If the areas of $PTURS$ and $PQRS$ are in a ratio of 15 : 16, what is the ratio TU : PQ?

SEE OVER FOR QUESTIONS M4 AND M5,

SMC

Mathematical Challenge Problems 2

MIDDLE DIVISION 2025-2026

PLEASE USE CAPITALS TO COMPLETE

SURNAME	
OTHER NAME(S) (underline the one you prefer)	
SCHOOL	
AGE	
YEAR OF STUDY	S

FOR OFFICIAL USE

Marker

Marks

1	2	3	4	5

Total	

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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.

Middle Division: Problems 2 continued

M4. In triangle ABC, angle B is twice angle A. Suppose that $BC = a$, $AC = b$ and $AB = c$. Prove that $a(a + c) = b^2$.

M5. If $2x^2 - 2xy + y^2 = 289$ where x and y are integers and $x \geqslant 0$, find all ordered pairs (x, y) which satisfy this equation.

END OF PROBLEM SET 2

CLOSING DATE FOR RECEIPT OF SOLUTIONS :

27 February 2026

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**