

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.

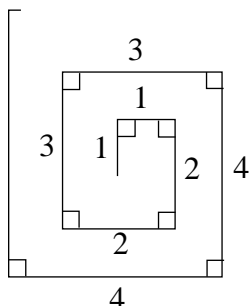
Particular thanks are due to the Universities of Aberdeen, Edinburgh Napier, Moray House, St Andrews, Stirling, Strathclyde and to George Heriot's School and Gryffe High School.

Middle Division: Problems 1

- M1.** There are 8 points on a piece of paper. Exactly 5 of the points are on a straight line. No other straight line passes through more than two of the points. Three points are selected to form the vertices of a triangle.

How many different triangles with non-zero area can be formed in this way?

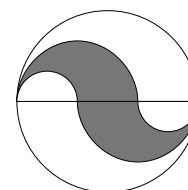
M2.



A “rectangular spiral” consists of line segments of lengths, in cm, 1, 1, 2, 2, 3, 3, 4, 4, ... where each line segment is at right angles to the previous one drawn as shown. On a large sheet of paper Abby draws the rectangular spiral starting from the centre. Her pen runs out of ink after 4000 cm.

What is the length of the longest line segment she draws?

- M3.** In the diagram alongside the diameter of the large circle is divided into three equal parts and half-circles are drawn as shown in the figure. What proportion of the large circle does the shaded area occupy?
(The shaded area is the S-shaped region in the middle stretching from one end of the diameter to the other.)



- M4.** A sealed bottle contains water. It consists of a cylinder of radius 3 cm with another cylinder of radius 1 cm on top, as shown in Figure 1. When the bottle is the right way up the height of the water is 16 cm as shown in the cross section in Figure 2. When the bottle is upside down the height of the water is 22 cm as shown in the cross section in Figure 3. What is the total height of the bottle?

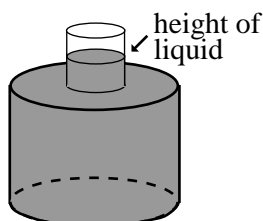


Figure 1

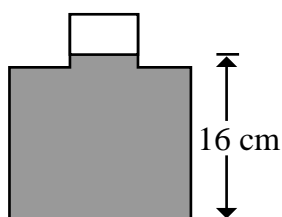


Figure 2

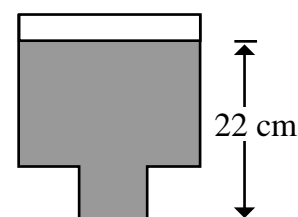


Figure 3

SEE OVER FOR QUESTION M5.



Mathematical Challenge Problems 1

MIDDLE DIVISION 2025-2026

PLEASE USE CAPITALS TO COMPLETE

SURNAME

OTHER NAME(S)
(underline the one
you prefer)

SCHOOL

AGE

YEAR OF STUDY

FOR OFFICIAL USE

Marker

Marks

1	2	3	4	5

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.

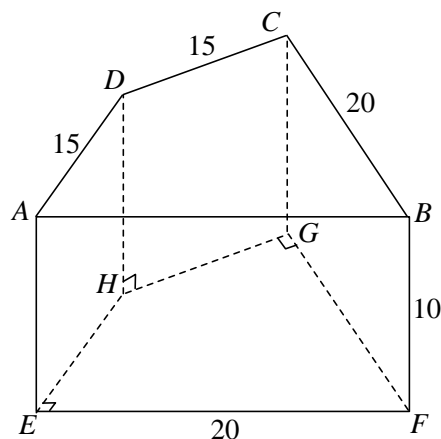
For further information on the competition, please see the School Materials which have been distributed to schools. A copy of these Materials can be obtained from

<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.

Middle Division: Problems 1 continued

- M5.** The diagram shows a right prism with quadrilateral base $EFGH$ which has right angles at E and G . $AD = 15$, $BC = 20$, $CD = 15$ and $EF = 20$ and the height of the prism is 10. Find the distance from A to G .



END OF PROBLEM SET 1

CLOSING DATE FOR RECEIPT OF SOLUTIONS :

31 October 2025

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