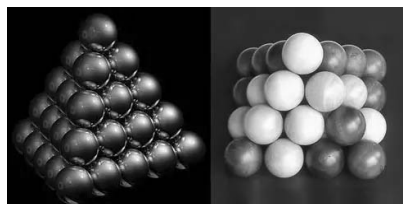


5. PYRAMID OF GOB-STOPPERS

In a Window display a number of 'Gob-Stoppers' are arranged in a square pyramid.

It was later discovered that the number of 'Gob-Stoppers' in



the display was also a square number.

As this number was greater than one how many 'Gob-Stoppers' were there?

6. CHOCOLATE DROPS



Fred recently took part in a sponsored chocolate drop eat. His mother agreed to give him 10p per drop for all the drops which he could eat, one at a time, in ten minutes.

He shared this money equally between two charities and the number of pence received by each was a perfect square.

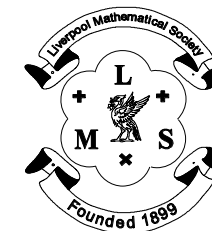
If the money had been shared equally between three charities then the number of pence received by each would have been a perfect cube.

How many chocolate drops did Fred eat?

The competition is promoted by Liverpool Mathematical Society (LivMS) www.livmathssoc.org.uk
The competition is sponsored by the Worshipful Company of Actuaries Charitable Trust
The MA is a Registered Charity (No. 313281). Drawings by P. H. Ackerley.



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(INCORPORATING THE LIVERPOOL BRANCH OF THE MA AND THE ATM)

Open Challenge '25 For Year 13 or below

Rules

It should be attempted at home during February half term.

Your entry must be your own work.

For individual entries only. You should attempt all questions.

Entries without any working out at all or written on this sheet will not be marked.

It is possible to win a prize even if you have not completed all of the questions, so hand in your entry even if it is not quite finished.

You must print your name, date of birth and school in neat, legible writing on the front sheet.

Pupils under 15 years of age should only attempt this in exceptional circumstances.

Either you or your maths teacher needs to **return your entry by 7 March** to this address:

Open Challenge '25 Entries

Mrs A. Carter

Danes Court

Mudhouse Lane

Burton

Neston

CH64 5TS

An evening of online activities will be held in early May during which there will be a virtual prizegiving.
Prizes and certificates **will be posted** to schools and colleges.
Solutions will be posted on www.livmathssoc.org.uk shortly afterwards.
We hope that you enjoy the questions.

1. TAKE YOUR PICK



A box of chocolates contains milk, white and plain varieties.

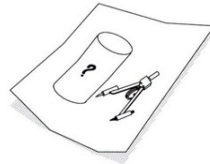
The number of plain chocolates is at least half the number of white and at most one third the number of milk.

Given that the total number of plain and white chocolates exceeds 55, find the minimum number of milk chocolates in the box.

2. CANDY-COATED PENCILS

A special one off pack of Candy-Coated Pencils consisted of a large cylinder, radius A , which contained three identical smaller cylinders, radius a , which just fitted into the larger cylinder. What is the radius of the smaller cylinders compared to the larger one?

The central section trapped between the three smaller cylinders is to be made of solid chocolate. If all the cylinders are of height h what is the volume of the solid chocolate?



3. WHO'S WHO

Eight children at a party ate 32 Cavity-Filling Caramels between them.

Ann ate one, Betty two, Claire three and Doris four. Frank Smith ate as many as his sister, Mark Brown ate twice as many as his sister, Glyn Jones three times as many as his sister and Harry Robinson four times as many as his sister. Who's whose sister?



4. MELTING MOMENTS

One day, during hot weather, Gran thought her family would like a treat and decided to share the special chocolate bar she had been saving. This bar was twice as wide as it was high and twice as long as it was wide.

As Gran fetched the bar from the cupboard the clock struck an hour, and she remarked that it had done this when she put it in the cupboard. However, whilst the slab had been in the cupboard, it had melted in the hot weather into a new shape. It was still cuboid and the new length was similarly twice the new width, but its height was not good.

Grandad remarked that a slab had been left in the cupboard in similar weather for five whole days, and the height had dwindled away to nothing.

The volume had remained the same throughout, though, he said cheerily.

The family decided to divide the whole slab into an exact number of chunks, by making a number of equally spaced slices along the length and width.

Each chunk would be the height of the melted slab, and have a square cross-section with its side being four times the height.

How many chunks were there, and how long had the slab been in the cupboard?

