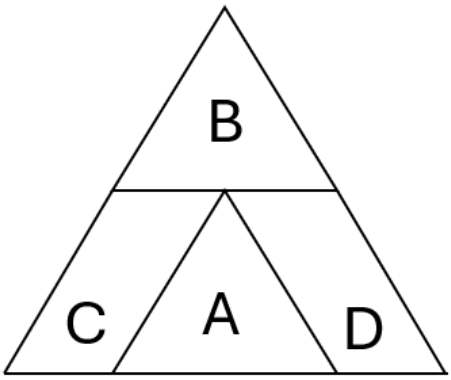
Maths Challenge - Week 293 – Problems

Welcome to week 293 of our weekly maths challenge, with problems and puzzles posed by David Browning, Rod Marshall, Ian Stewart, Annie Stothers and the u3a Maths and Stats Subject Adviser - David Martin. If you would like to share your ideas on how to solve these puzzles please join our learning forum or discuss within your u3a and interest group. Check back each week for the solutions and let us know how you get on by contacting the u3a office. New maths puzzles will go up onto the website every Thursday.

Question 1.

In the diagram, the large equilateral triangle is divided into two identical equilateral triangles A and B, and two parallelograms C and D which are mirror images of each other. What is the ratio of area D to area B?



Question 2.

In a sequence of six numbers, every term after the second term is the sum of the previous two terms. Also, the last term is four times the first term, and the sum of all six terms is 13. What are the first two terms?

Question 3.

(a) What is the maximum possible sum of the visible faces if you stack n dice on top of each other on a table to form a tower?

(b) What is the maximum possible sum of the visible faces if you use eight dice to make a 2 x 2 x 2 cube on the table?

Question 4.

A ball of diameter 2 cm is placed into an inverted cone. A ball of diameter 6 cm is then placed into the cone. The two balls do not touch each other and the shortest distance between the two balls is 1 cm. A lid is then placed on the cone, and this lid touches the top of the larger ball. What percentage of the volume of the cone is occupied by the two balls?