1.

With the aim of promoting tourism, the county has chosen 32 interesting tourist routes. The first one is 1km long, the second is 2km long… and the 32nd is 32km long. The county wants its two electric vehicles to travel along all these interesting tourist routes. Each of the routes needs to be covered just once by either one of the two vehicles. Calculate the number of possible ways that this can be achieved if we want both vehicles to travel an equal amount of total kilometers on these roads?

Example: if the county has only 7 tourist routes (with lengths of 1km, 2km… to 7km), vehicles A and B would be able to travel along them in 4 different ways if the vehicles travel the same total number of kilometers: A(1, 6, 7) B(2, 3, 4, 5); A(2, 5, 7) B(1, 3, 4, 6); A(3, 4, 7) B(1, 2, 5, 6); A(1, 2, 4, 7) B(3, 5, 6)

2.

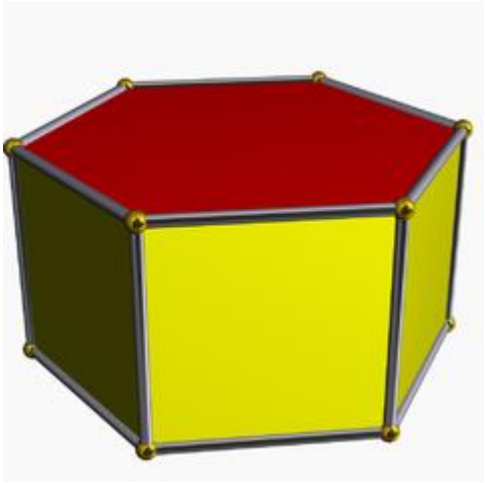
In a square of size 4 x 4, odd numbers from 1 to 31 have to be entered. In how many ways is it possible to achieve this if the sums of all the rows and columns of the square are to be equal? (combinations that can be obtained by rotation or mirroring also count as different ways)

3.

On the path of a circle are a number (n) of different randomly defined points. Each of the points is to be linked to each other point by a line. In how many areas is the circle divided by those lines for n = 7?

For n = 1, P(n) = 1; for n = 2, P(n) =2; for n = 3, P(n) = 4; for n = 4, P(n) = 8; for n = 5, P(n) = 16…

4.



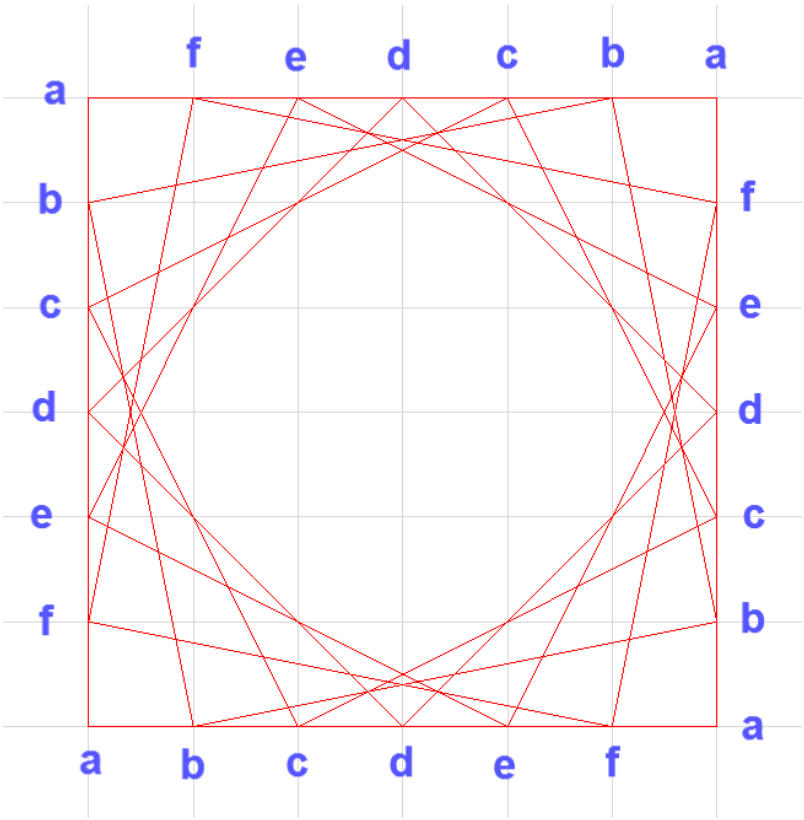
A container has the shape of a regular vertical hexagonal prism.

The base is a regular hexagon with side a = 5.58 cm and the container height h = 7.54 cm. Calculate the number of balls the container will hold if the ball diameter d = 1 cm.

5.

On a square are drawn additional lines that link adjacent sides (as shown in the diagram). Determine the surface area of the 'empty area' inside the square if the square has dimensions 32 x 32.

Example: For a square of size 6 x 6 are, the surface area of the central 'empty area' inside the square is 16.



6.

A group of 16 people (person a, person b… person p) always work in 4 teams of 4 people. Every week each team has different lineup. There are 5 rotations and it is important that each person should not be on a team with the same person more than once. Teams for the 1st rotation are defined as shown in the diagram. Your task is to determine the team lineups for the 4 remaining rotations:

	1. rotation
Team 1	a, b, c, d
Team 2	e, f, g, h
Team 3	i, j, k, l
Team 4	m, n, o, p