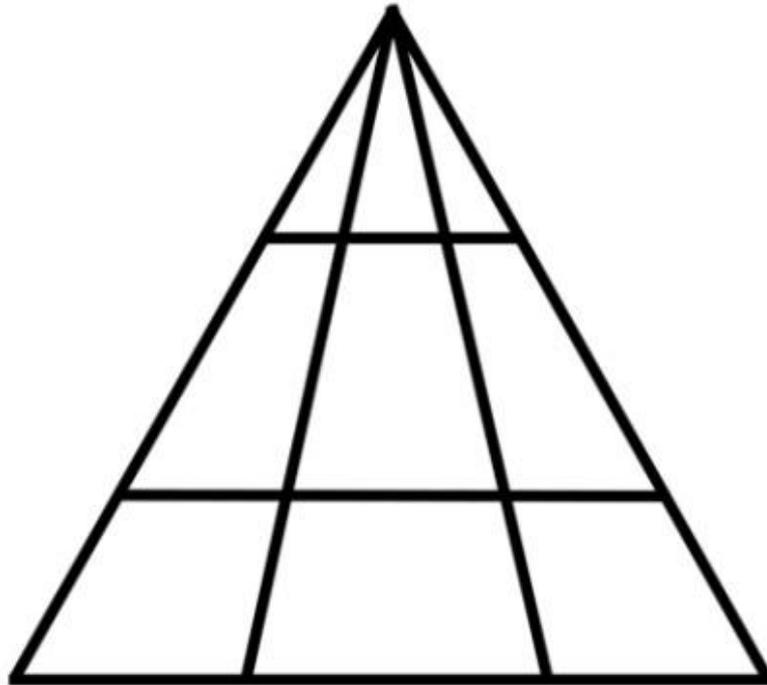


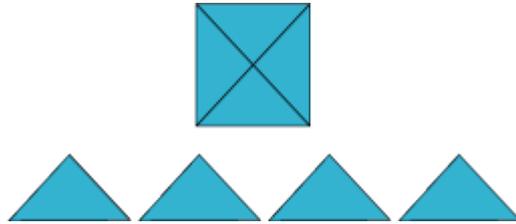
How many triangles?



At first glance this may seem simple but consider the different types and sizes of triangles.

# Four Triangles Puzzle

If you cut a square diagonally from corner to corner you get four right-angled isosceles triangles.



How many different shapes can you make by fitting the four triangles back together?

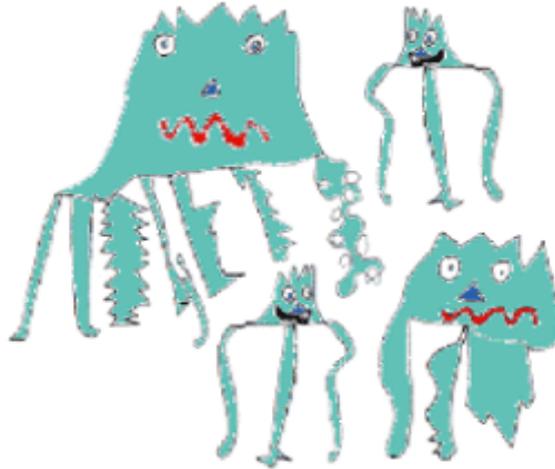
You may only fit long sides to long sides and short sides to short sides.

The whole length of the side must be joined.

You might like to record what you do.

# Zios and Zepts

On the planet Vuv there are two sorts of creatures. The Zios have 3 legs and the Zepts have 7 legs.



The great planetary explorer Nico, who first discovered the planet, saw a crowd of Zios and Zepts. He managed to see that there was more than one of each kind of creature before they saw him. Suddenly they all rolled over onto their backs and put their legs in the air.

He counted 52 legs. How many Zios and how many Zepts were there? Do you think there are any different answers?

# Chocolate

This challenge is about chocolate. You have to imagine (if necessary!) that everyone involved in this challenge enjoys chocolate and wants to have as much as possible.

There's a room in your school that has three tables in it with plenty of space for chairs to go round. Table 1 has one block of chocolate on it, table 2 has two blocks of chocolate on it and, guess what, table 3 has three blocks of chocolate on it.

Now ... outside the room is a class of children. Thirty of them all lined up ready to go in and eat the chocolate. These children are allowed to come in one at a time and can enter when the person in front of them has sat down. When a child enters the room they ask themselves this question:

***"If the chocolate on the table I sit at is to be shared out equally when I sit down, which would be the best table to sit at?"***



However, the chocolate is not shared out until all the children are in the room so as each one enters they have to ask themselves the same question.

It is fairly easy for the first few children to decide where to sit, but the question gets harder to answer, e.g.

It maybe that when child 9 comes into the room they see:

- 2 people at table 1
- 3 people at table 2
- 3 people at table 3

So, child 9 might think:

*"If I go to:*

- table 1 there will be 3 people altogether, so one block of chocolate would be shared among three and I'll get one third.*
- table 2 there will be 4 people altogether, so two blocks of chocolate would be shared among four and I'll get one half.*
- table 3, there will be 4 people altogether, so three blocks of chocolate would be shared among four and I'll get three quarters.*

*Three quarters is the biggest share, so I'll go to table 3."*

Go ahead and find out how much each child receives as they go to the "best table for them". As you write, draw and suggest ideas, try to keep a note of the different ideas, even if you get rid of some along the way.

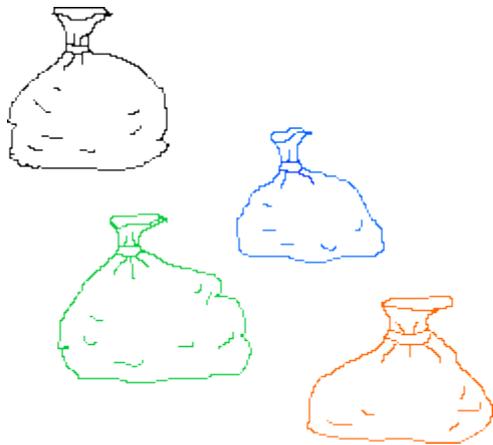
THEN when a number of you have done this, talk to each other about what you have done, for example:

- Compare different methods and say which you think was best.
- Explain why it was the best.
- If you were to do another similar challenge, how would you go about it?

<https://nrich.maths.org/34>

# Money Bags

Ram divided 15 pennies among four small bags.



He labelled each bag with the number of pennies inside it.

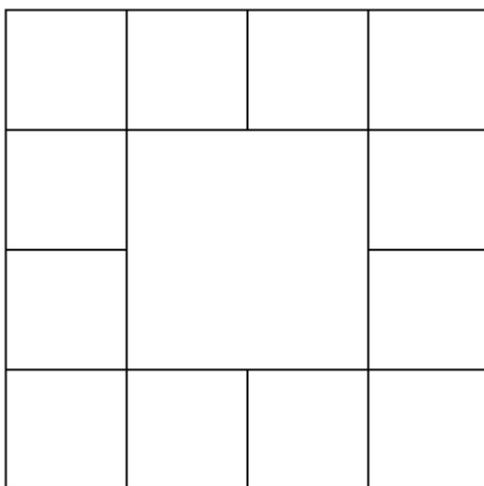
He could then pay any sum of money from 1p to 15p without opening any bag.

How many pennies did Ram put in each bag?

# Prison Cells

There are seventy eight prisoners in a square cell block of twelve cells. There is one prisoner in one of the cells, two in another cell, three in another, four in another and so on up to twelve prisoners in one of the cells.

The clever prison warden made it easy to check if the prisoners were all there by arranging them so there were twenty five along each wall of the prison block. How did he do it?



There's more than one solution!