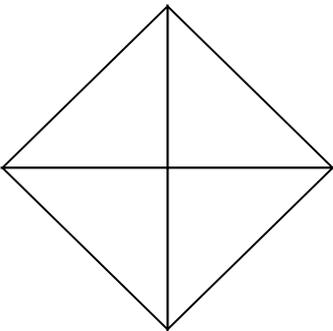


Look at this Christmas bauble. How many different ways could you colour it using only 3 colours? What if you can use each colour only once? What if you can use the colours more than once?



Now look at this decoration. How many different ways could you colour it using only 4 colours? What if you can use each colour only once? What if you can use the colours more than once?

Now make your own decoration and explore how many different versions you can make with different numbers of colours.



4 friends swap Christmas cards. How many cards are given altogether?

What if there were 5 friends or 6 friends?

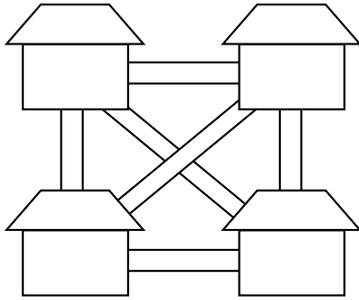
What if everyone in your class exchanged cards?

What if everyone in the whole school exchanged cards?



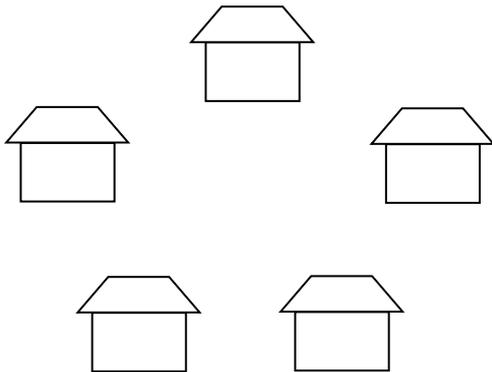
There is a group of houses in Happy Avenue. All the neighbours are great friends and they are always popping in to visit each other.

This winter there has been a very heavy snowfall and the roads and paths are all covered in snow. So the neighbours can still visit each other, they decided to dig some paths through the snow. They make a path between each of the houses so everyone can easily cross a path to reach every other house.



There are 4 houses and the paths look like this.
 There are 6 paths altogether.

Imagine there are 5 houses – how many paths would they need to dig now?



What about 6 houses? What about 7 or 8? (Tip – draw them in a circle)

Look at the number of paths needed for each number of houses and see if you can spot a pattern. Sometimes it can help to record your results in a table.

Work out the number of paths needed for up to 10 houses.

EXTRA CHALLENGE

Now imagine there are even more houses. Can you find out a rule for working out how many paths would be needed for any number of houses?

Can you think of a better way to create paths between 10 houses so it means less digging in the snow? Draw a map showing your paths and explain why it is better.