



Puzzle

How many colours?

Puzzles like this are great for developing mathematical logic skills, as well as training us to be resilient if a solution proves tricky to find...!

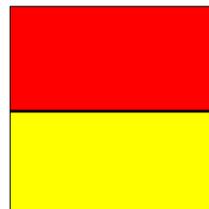
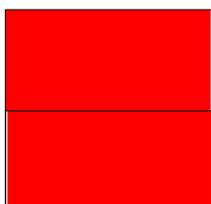
This activity is about colouring, but it will get you thinking!

This investigation will lead you to explore one of the most famous theorems in mathematics!

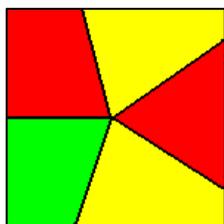
The rules

Today you are going to do some colouring, but with some rules.

1. Two sections sharing the same border *cannot* have the same colour:

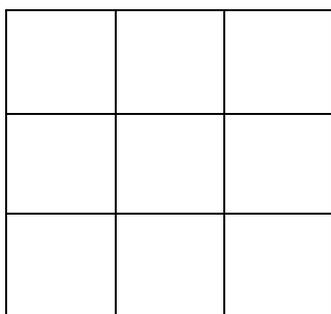


2. Two sections that meet at a point *can* have the same colour:

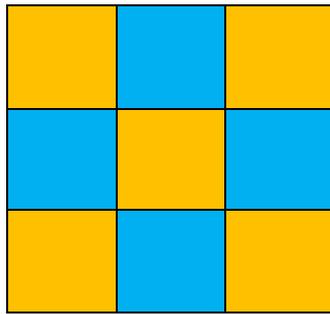


Let's try...

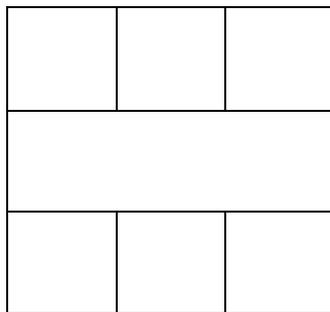
Here is a pattern of 9 squares. What's the smallest number of colours you can use to colour this pattern using the rules?



We can use just 2 colours!



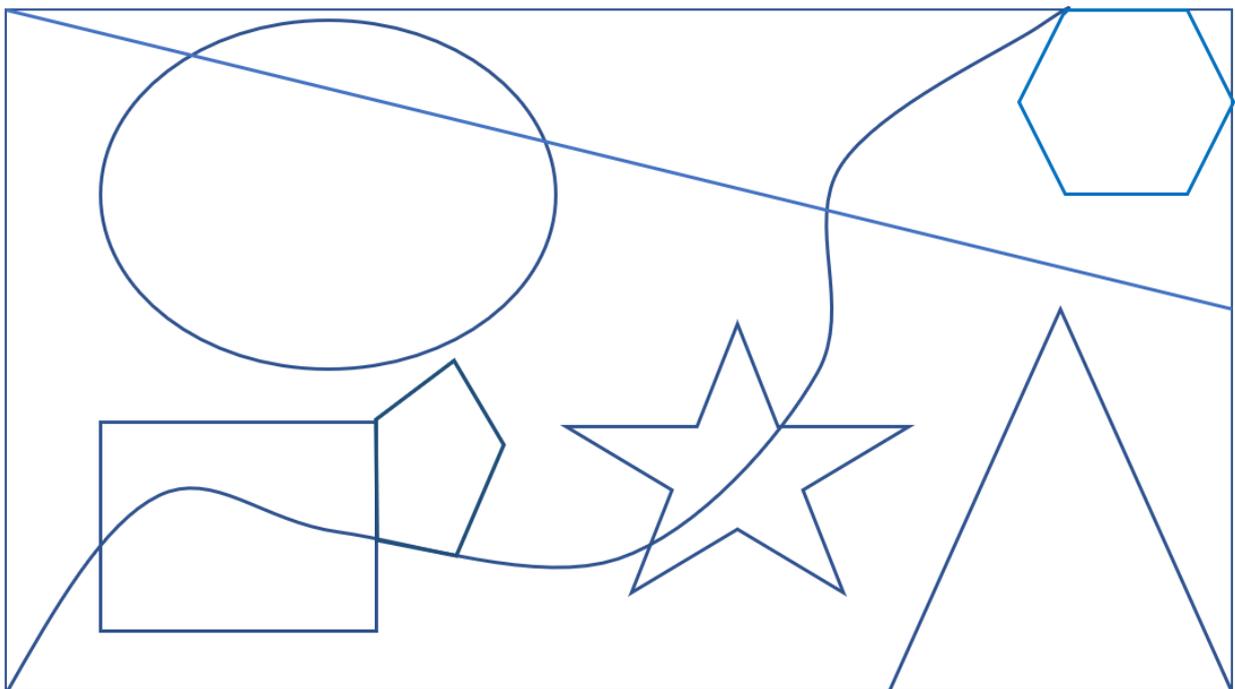
What about this pattern?



Ah, this pattern needs 3 colours. Can you explain why?

Colouring patterns

Either draw your own pattern, or use this one. Find out how many different colours you will need.



Maps

- Maps would look pretty boring if every country was coloured in using the same colour. It might be difficult to tell them apart!
- But how many colours will be needed if no two next-door countries are the same colour?

This question led to a famous maths problem, called the Four Colour Theorem.

- In 1852, a mathematician suggested that you only need 4 colours to colour any map, no matter how many countries! BUT nobody could prove it until 1976, when two people used the help of a computer.
- Use as few colours as possible to colour this map of part of Europe.

Tip! Put a coloured dot in each country to test your ideas.



Can you explain why it wasn't possible to use three colours?