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May 2001

Regulars



## Mathematical mysteries: Painting the Plane

by Helen Joyce



Suppose you have an infinitely large sheet of paper (mathematicians refer to this hypothetical object as the *plane*). You also have a number of different colours – pots of paint, perhaps. Your aim is to colour every point on the plane using the colours available. That is, each point must be assigned one colour.

Can you do this so that, for any two points on the plane which are exactly 1cm apart, they are given different colours?

It's not too hard to prove that you can't paint the plane in this way with only 3 colours, no matter how hard you try, and that it *can* be done with 7 colours. But no-one knows whether it's possible to do it with 4, 5 or 6 colours. This problem is from the branch of mathematics known as Ramsey Theory. Maybe you can solve it!

See if you can prove that no way of painting the plane in 3 colours can work, and try to find a way of doing it with 7 colours – or find out how [here](#) if you get stuck.

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### About the author

**Helen Joyce** is an assistant editor of Plus.

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