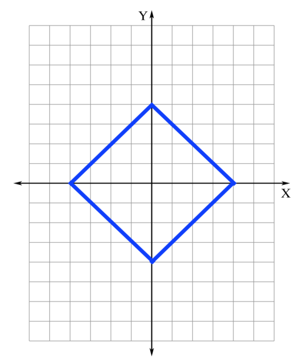
1 Introduction

2 Tangrams



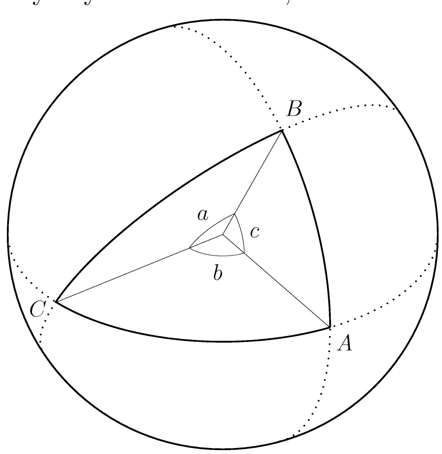
3 Taxis and Crows

Imagine you're a taxi in a big big city. This perfect city is made out of many many streets stretching out both North-South and East-West. This should look pretty familiar; it looks just like a normal graph!

1. Let's say you are sending a customer from the origin(0,0) to point (3,5)? What is the taxi distance? How many different paths of shortest length can you take? Remember, it's as the taxi drives, not the crow flies. *8 units*
2. a crow wants to know all the places it can go that are four units away. Try drawing all the points the crow can go on the left graph. *circle of radius 4*
3. Lets do the same for the taxi. What are all the places it can travel with 4 units of fuel? *look to graph above*
4. If π can be calculated in the crow's map as circumference divided by diameter, what is the "π" of a taxi? $Area = \pi * r^2$ *or* $Circumference = \pi * 2r$ *work,* $\pi = 4$

4 It's a Ball World After All

Maybe you're not a bird, or even a taxi driver. You're and astronaut! And the earth is round. Like this:



1. Can you make two parallel lines? *no, drawing parallel planed circles doesn't count because circles cannot be lines. Look up Great Circles or the definition of line segments if they challenge you*

2. Make a triangle on both maps. How do you even make a triangle on a sphere? *look at above drawing*

3. How do you calculate the side lengths?*might be a bit difficult for them, but essentially a triangle is made of 3 arcs. The arclen can be found with* $2\pi r * \theta/360$ *do this three times for each side.*

5 Color Theorem

Grid:2, Circle:3, Map:4
The main takeaway here is that no matter what the picture looks like the minimum number of colors you will ever need is 4. That's why it's actually called the Four Color Theorem!

6 SUPER Cool Trick: Shoelace Theorem!!

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