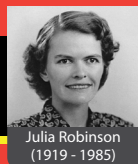




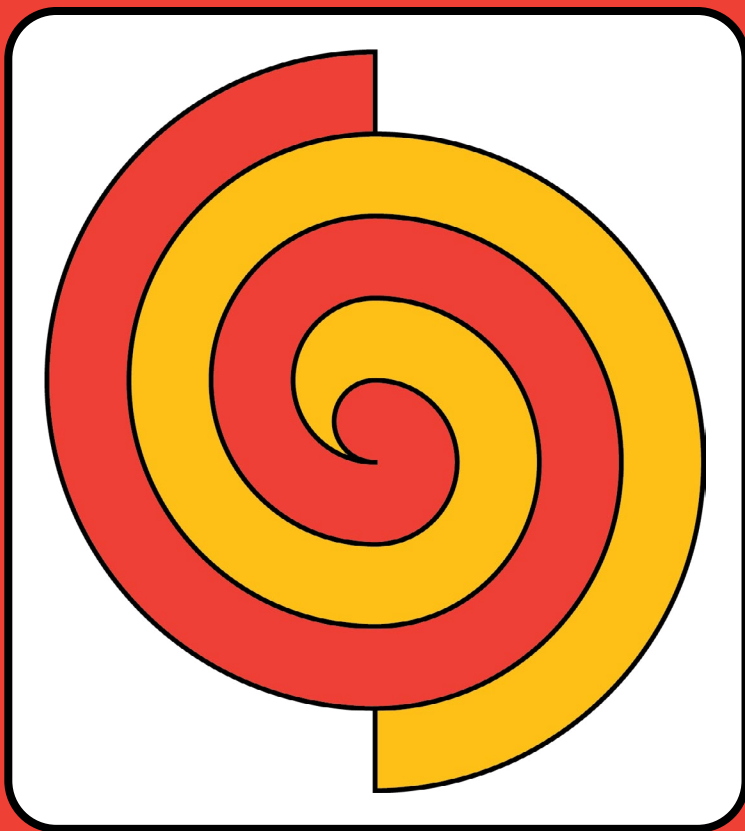
Julia Robinson
Mathematics Festival.

Book 13



Julia Robinson
(1919 - 1985)

Shape Rearranging



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Catriona Agg

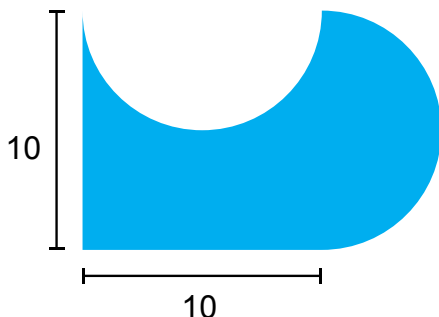
Maths Teacher

Fan of Geometry Puzzles

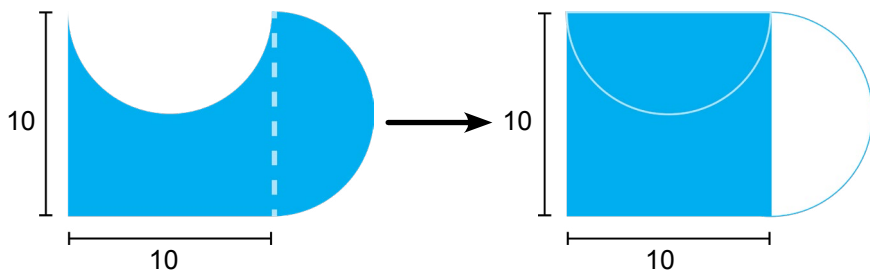
[@Cshearer41](https://twitter.com/Cshearer41)

Making Squares

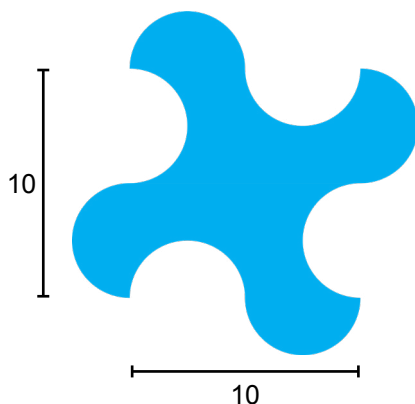
Can you find the area of this shape?



Although this looks unfamiliar, we can answer this question by making a square.

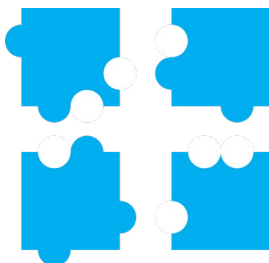


Since we were able to make a 10×10 square, we know that the original shape must have an area of 100 square units. Can you find the area of the shape below by making a square?

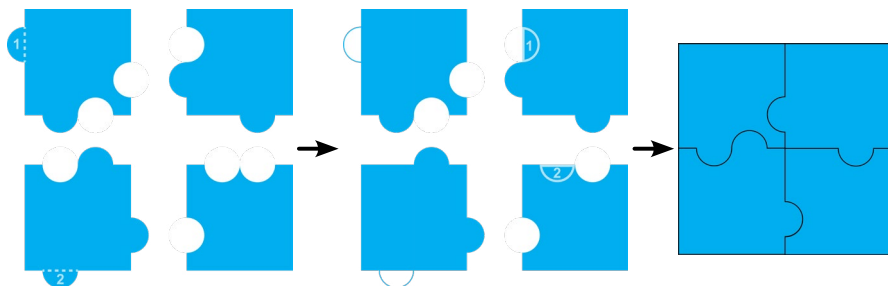


Imperfect Puzzle Pieces

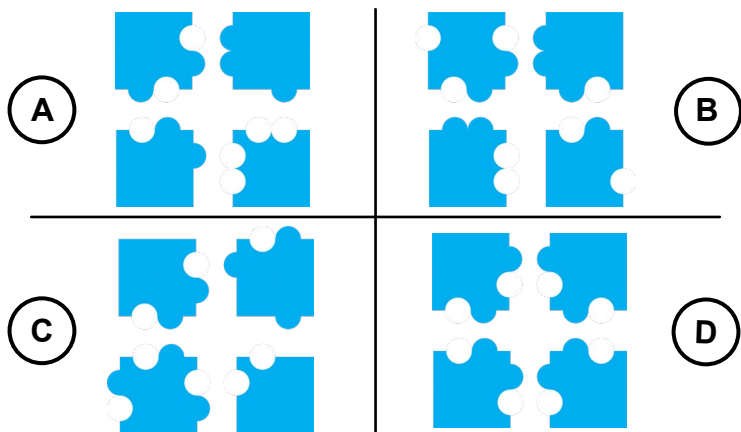
The puzzle pieces below are imperfect, because they don't fit together.



However, by making 2 cuts and rearranging the pieces, these imperfect puzzle pieces can be made to create a square.



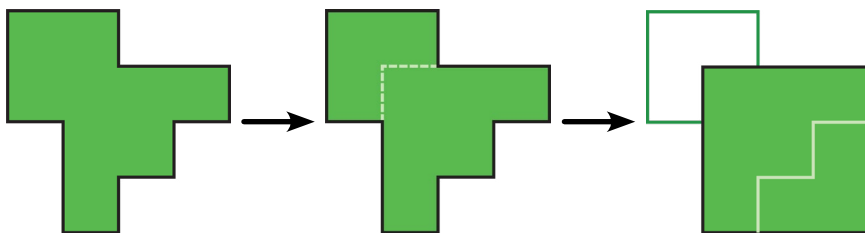
For each of the sets of puzzle pieces below, can you figure out how to fit the four puzzle pieces into a square using as few cuts as possible? Remember that you can move and rotate puzzle pieces.



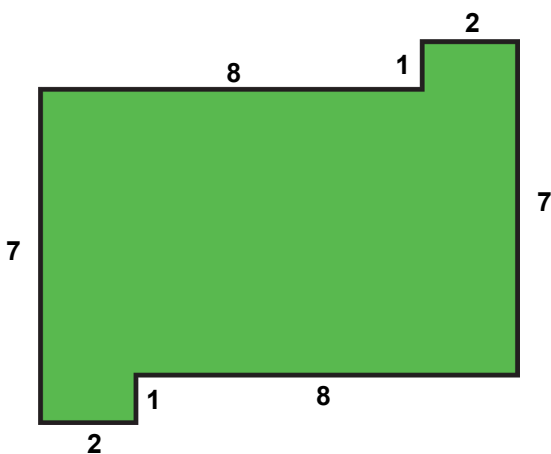
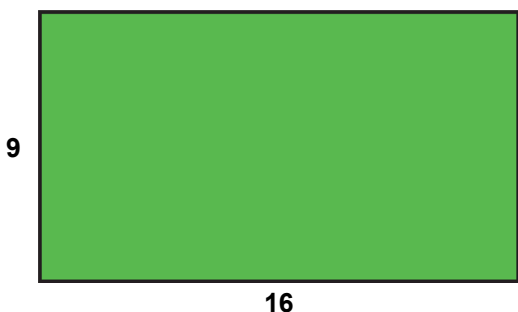
Can you create your own set of imperfect puzzle pieces? Can you create a set that requires the largest number of cuts?

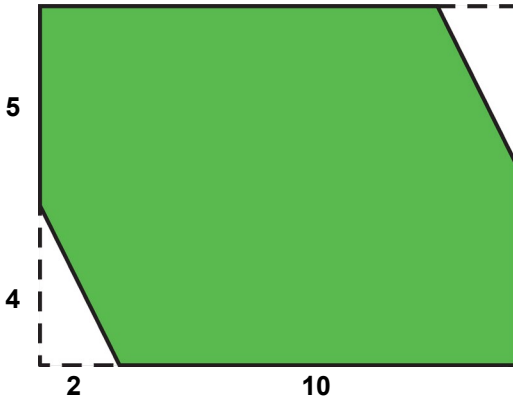
Making More Squares

Some shapes, like the one below, can be turned into a square after making a single cut and doing some creative rearranging.

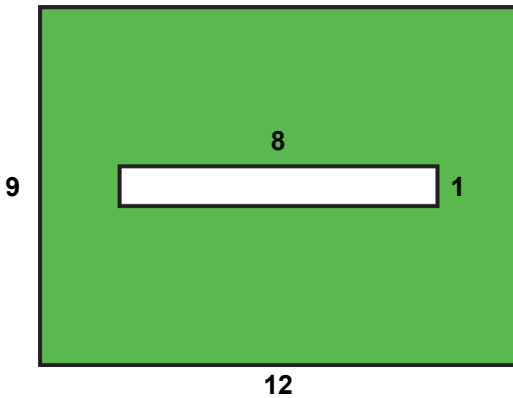


Can you arrange the next three shapes into a square after making exactly one cut? Remember that the cut doesn't need to be in a straight line.

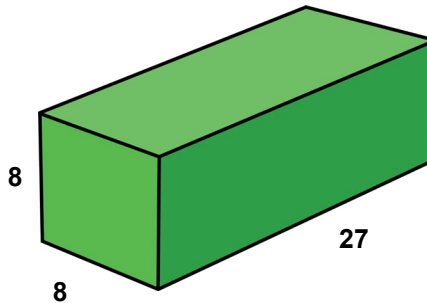




Can you arrange the shape below into a square after making exactly two cuts?

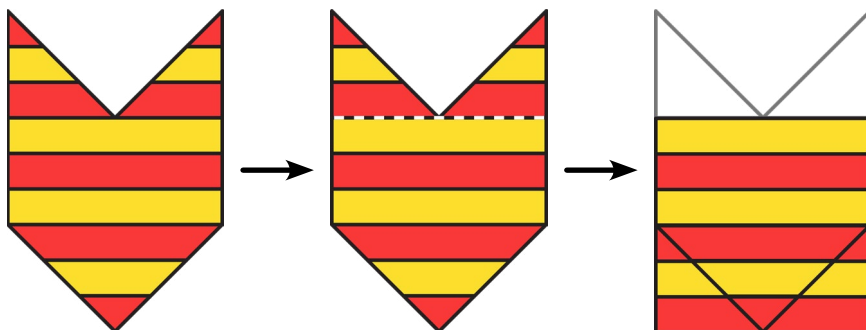


Can you arrange the rectangular prism below into a cube after making some cuts? Can you do it in as few cuts as possible?

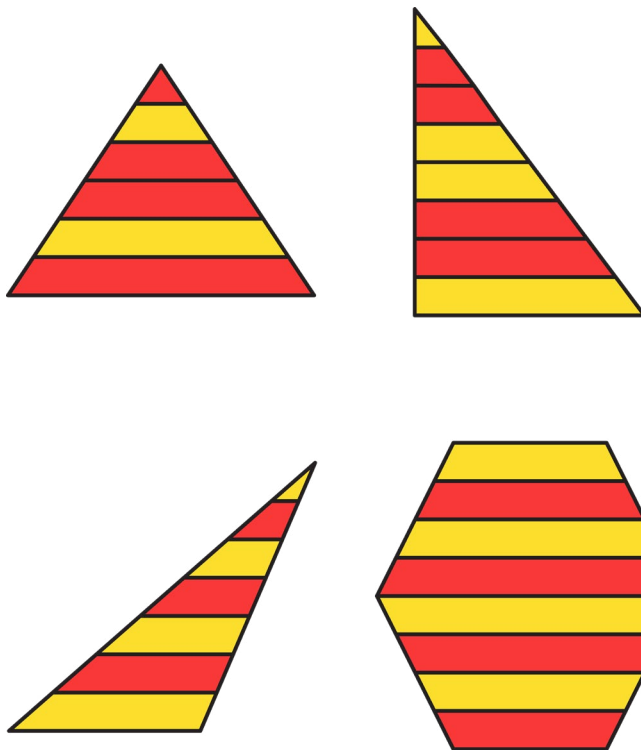


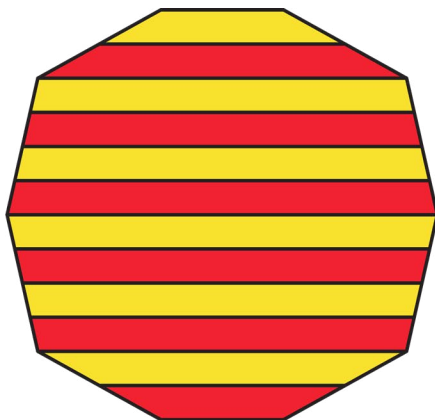
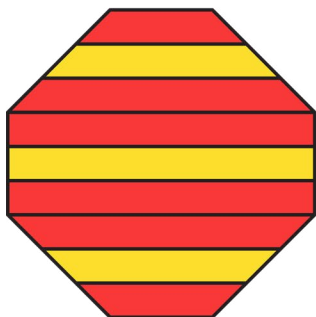
Changing One's Stripes

What fraction of the shape below is red? Because the shape looks unfamiliar, this seems like a hard question. Let's cut and rearrange the shape to make this question easier.



Now that we've made a rectangle, it's a lot easier to see that exactly half of the shape is red. For each of the following shapes, can you figure out what fraction of the shape is red?





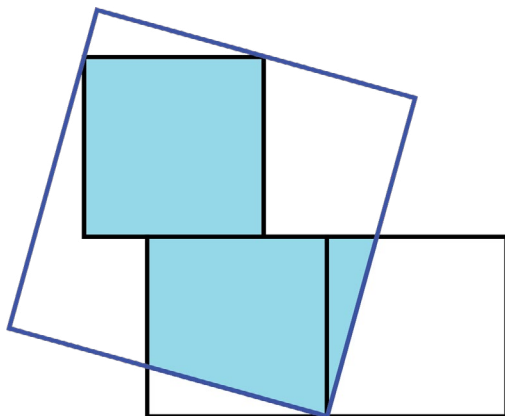
Can you create your own stripy puzzles? Try using different shapes, vertical stripes, diagonal stripes, or more than two colors.

The puzzles on pages 1, 7, 8, and 9 were designed by Catriona Agg and these, on pages 5 and 6, were inspired by her. You can find more fun geometry puzzles like these on her Twitter @CShearer41.

Five Favorites

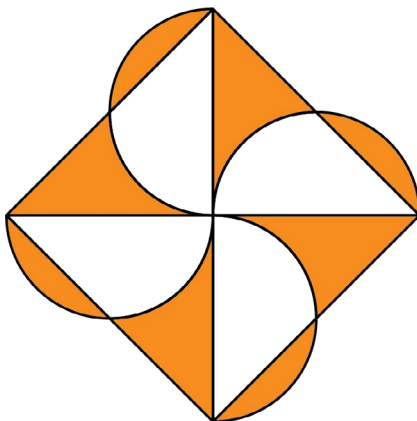
Here are five of my favorite puzzles. Can you solve each of them by cutting and rearranging the shapes?

Problem 1: Stack of Squares



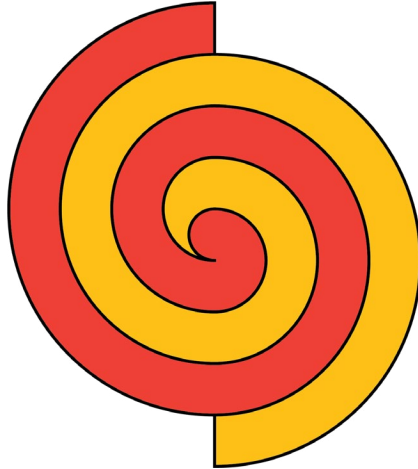
Each of the small squares has an area of 10 square units. Can you find the shaded area?

Problem 2: Orange Slices



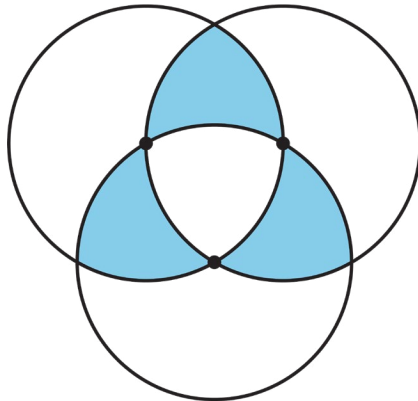
What fraction of the shape is shaded orange?

Problem 3: Ketchup and Mustard



Is more of this design red or yellow?
 This design is really fun to draw: It's just 10 dots equally-spaced vertically that are joined by semicircles.

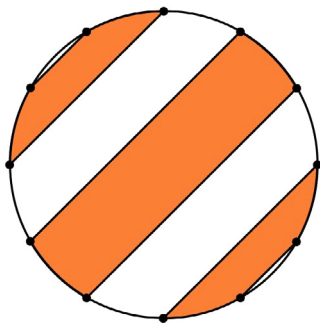
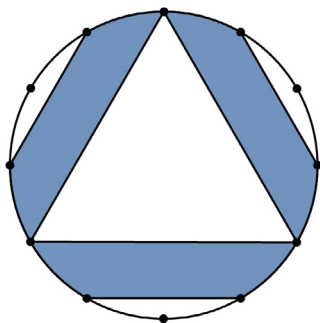
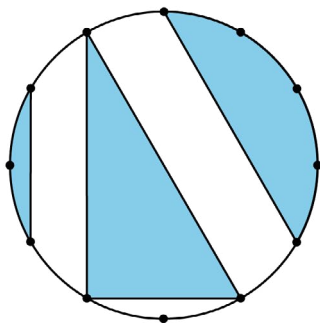
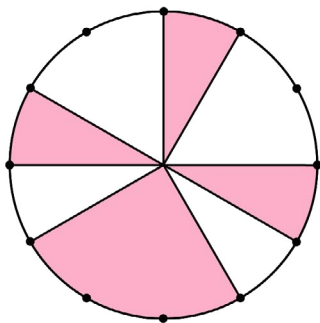
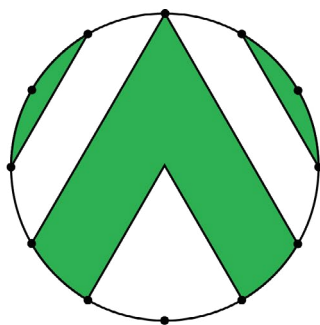
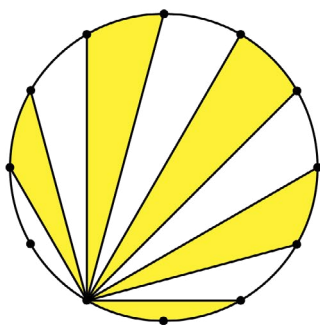
Problem 4: Three Petals



Each circle has an area of 10 square units. Can you find the shaded area?

Problem 5: Circle Mosaics

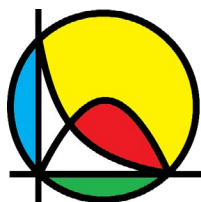
What fraction of each circle is shaded? The 12 dots are equally spaced, and the only point used inside the circle is the center?



Julia Robinson Mathematics Festival

The Julia Robinson Mathematics Festival seeks to inspire joy in mathematics through collaboration, exploration, and discovery. To this end, we engage students and educators through festive events—both in person and online—and make concerted efforts to reach and support underserved and underrepresented populations. Moreover, we pride ourselves in the quality, accessibility, and richness of our educational materials.

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Thank You!



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*~Vi Hart, Mathemusician
youtube.com/user/ViHart*

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