

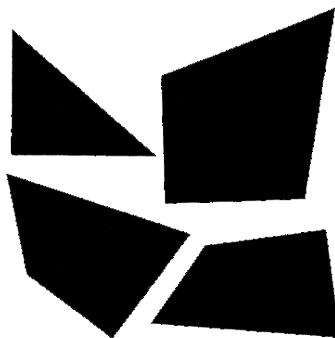
From One Shape to Another

Article by NRICH team

[David Hilbert](#) (1862-1943) was a famous German mathematician who developed theories in number and geometry. He set twenty-three problems, known as [Hilbert's Problems](#), for mathematicians to solve. He believed that solving the problems would lead to new discoveries and ideas in mathematics. Some people believe that Hilbert worked out all the field equations for 'general relativity' before Albert Einstein, but he didn't claim credit for this now very famous work.



Hilbert proved that any polygon could be cut up into a certain number of pieces that could be put back together to form any other polygon of equal area. For example, this means that you can take a square, and work out a way to cut it up so the pieces can be put together to make a hexagon. Or it could be cut up a different way to make a triangle, or a rhombus, and so on.



A puzzle created by Henry Ernest Dudeney (1847-1930) uses this idea. Make a copy of the four pieces, perhaps by printing the page. Can you work out how to **make a square** out of the pieces. Can you **make an equilateral triangle** from the same four pieces? If you like doing this kind of puzzle, you may want to try the many tangram challenges on NRICH.