MathsJam Shout

March 2023

David Singmaster
(compiled by Peter Rowlett)

David Singmaster (1938–2023), noted recreational mathematician, historian and self-described metagrobologist (studier of puzzles), sadly passed away in February. This month's Shout is dedicated to David and shares a few of his interests.

Play Rubik's Cube

Consider a side of a Rubik's cube, where a, b, c and d are four colours (not necessarily distinct). a' is the colour opposite a. Can you arrange the cube to make the following patterns?

- all six faces a=b=c ('spot')
- all six faces a=d=b'=c' ('cross')
- four spot faces and two solid faces
- four faces a'=b=c=d ('plus') and two cross faces

David was an early adopter and enthusiastic promoter of the Rubik's Cube. These puzzles are taken from his 1979/80 Notes on (the/Rubik's) 'Magic Cube', *the first mathematical treatment of the cube.*

Puzzle

Round Pegs in Square Holes and Vice Versa

Which is larger: the ratio of the area of a circle to the area of the circumscribed square or the ratio of the area of a square to the area of the circumscribed circle?

David's first published paper was a study of this problem, including in higher dimensions, and was cited by Martin Gardner in his Scientific American *column.*

Explore

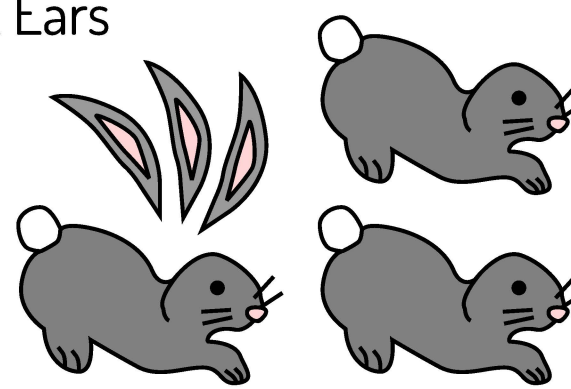
Sum = Product

$2 \times 2 = 2 + 2$ and $1 \times 2 \times 3 = 1 + 2 + 3$ are examples of 'Sum = Product Sequences', studied by David in the late 1980s. Finding these leads to many interesting questions. For example: is there a Sum = Product Sequence of size n for every n?

Make Rabbits & Ears

Cut out these three rabbits and three ears and arrange them so that each rabbit has two ears.

This puzzle appears in many cultures around the world but its origin is uncertain. David started collecting and sharing examples around 2000.



MathsJam Shout is a monthly sheet of ideas for activities to do at a MathsJam night. It's created using suggestions from a different MathsJam each month, and if you'd like to submit suggestions for a month in the future, email **katie@mathsjam.com** for details.

MathsJam is a monthly opportunity for like-minded self-confessed maths enthusiasts to get together in a pub and share stuff they like. Puzzles, games, problems, or just anything they think is cool or interesting. Monthly MathsJam nights happen in over 70 locations around the world, on the second-to-last Tuesday of each month. To find your nearest MathsJam, visit the website at **www.mathsjam.com**.