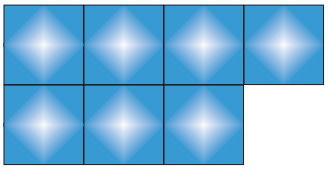
# Puzzle Page

## Symmetrical polyominoes

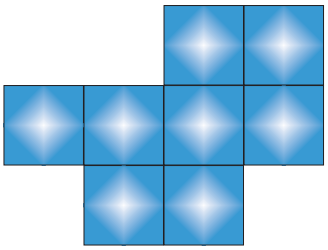
A polyomino is a connected shape composed of identical squares joined exactly edge to edge.

This polyomino has area 7 and perimeter 12.



Rearrange the squares so that the polyomino has the same area and perimeter and also has rotational symmetry.

Now do the same for this polyomino.



Given a polyomino, can you always rearrange the squares to produce a polyomino with the same area and perimeter and with rotational symmetry? If not, when can you do it?

Find a symmetrical polyomino that has area 11 and perimeter 18.

Prove that if a symmetrical polyomino has an odd area and a perimeter that is not a multiple of 4 then it must have an odd number of holes.

There are many more problems like these on 'Colour Squares Problems', one of the six programs on the *Geometry Interactive* CDROM, published by ATM (£50 for a site licence). Three of the programs on the CDROM pose numerous problems to be solved at the computer. The other three are related programs which teachers can use with the whole class to pose their own problems and to explore geometrical concepts.

Derek Ball used to edit ***MT***.

## Where did it all *really* start?

David Cain (*Where did it all start?* ***MT193***) made sense of a piece of the Rhind Papyrus I've been working on for some time:

> *Oh Ahmes, I give you two loops of rope, the one with 30 knots, the other with 36. Pull, pray, the former into a right triangle, the latter into such a figure that, when joined to the former, the figure is still a right triangle, the area doubled.*

(Readers suspicious of the Egyptology should nonetheless:

1 read the original piece – that, if nothing else,
2 attempt the puzzle,
3 go to www.atm.org.uk/mt/ for the neatest-knotted – ie, integral – solution.)

Paul Stephenson runs The Magic Mathworks Travelling Circus, a touring maths lab.
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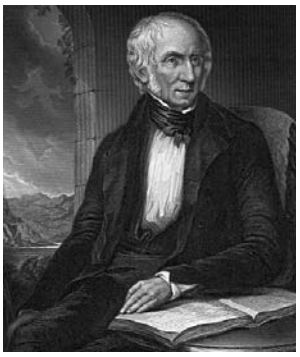

# Wordsworth

Taking A = 1, B = 2, C = 3, etc, any word has a 'wordsworth' equal to the sum of the values of its letters.
eg, MATHS has a wordsworth of 13 + 1 + 20 + 8 + 19 = 61.

M A T H S

**13 + 1 + 20 + 8 + 19 = 61**

1 Which 5-letter English word has the smallest / largest wordsworth?
2 Which 4-letter, 6-letter and 7-letter English words have the smallest / largest wordsworths?
3 Put the numbers ONE to TWENTY in order of their wordsworths?
4 Find a mathematically related word with a wordsworth as close to 100 as you can.
5 What is the first number which when written in letters has a wordsworth equal to the value of the number?

This is adapted from an idea in common circulation.

Colin Foster edits ***MT*** and Stephen Mack lives in Cambridgeshire and enjoys creating and solving various kinds of puzzles.

The Association of Teachers of Mathematics
for mathematics educators
primary, secondary and higher

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