

Our next meeting

**Saturday, June 11th 2016,
2pm for 2:30pm**

**MALL 1, School of Mathematics
University of Leeds**

Maths Mashup

Members of the YBMA have ten minute slots to show us some mathematics that they find particularly interesting.

We'd love to see you, and if you'd like to share, please feel free to bring some maths along with you.

MATHWORLDuk University of Leeds

Schools Competition 2016

MathsWorldUK and the University of Leeds are hosting the MoMath MATRIX conference on September 1st to 3rd 2016.

As part of this Conference the organisers are running a Schools Competition for teams of up to 3 or 4

pupils from Years 9 to 13. Their task is to showcase the work of a great mathematician through video.

Schools must register interest by 8 June 2016, and inform the organisers of how many teams the school intends to enter. Video submissions must be made by 8 July.

To register interest go to:

<http://mathsworlduk.com/matrix-conference-2016/school-competition> where you can find full details of the competition.

LAMB-FEST Garden Party

hosted by Geoff and Zakiah Wain

to raise money for MATHSWORLDuk

Sunday, 26 June 2016
1pm-5pm

at 39 Jackson Avenue
Leeds, LS8 1NP

Entrance by donation - £20 minimum per person is suggested. Cheques payable to MathsWorldUK.

RSVP: g.t.wain@geowain.demon.co.uk
by 10th June.

Non-members will be welcome at these meetings. Please bring them to the attention of your colleagues and friends and encourage them to come along. Our meetings are very friendly and include refreshments.

Anyone who would like to be added to our email list should send their name and email address to a.slomson@leeds.ac.uk

For more information about the Yorkshire Branch of the Mathematical Association, please go to our website <http://ybma.org.uk>.

Officers of the Yorkshire Branch of the Mathematical Association 2015-16

President: Alan Slomson (a.slomson@leeds.ac.uk)

Secretary: Bill Bardelang (rgb@bardelang.plus.com)

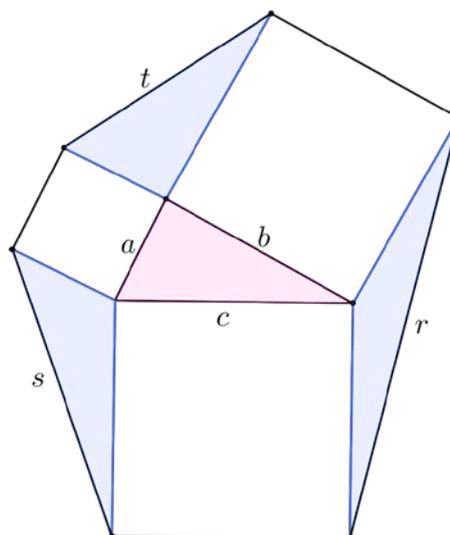
Treasurer: Jane Turnbull (da.turnbull@ntlworld.com)

see overleaf for Mathematics in the Classroom.

Mathematics in the Classroom

Triangles and Squares

Consider the triangle, coloured pink, with side lengths a , b and c . Squares are constructed on the sides of this triangle as shown. The vertices of the square that are not vertices of the pink triangle are used to construct the blue triangles.



We suppose that the sides of the blue triangles that are not sides of the squares have lengths r , s and t , as shown.

Prove that

$$r^2 + s^2 + t^2 = 3(a^2 + b^2 + c^2).$$

What is the relationship between the areas of the blue triangles and the area of the pink triangle?

Proof without words

In the last Newsletter we asked for a proof without words of the formula

$$1^3 + 2^3 + \dots + n^3 = (1 + 2 + \dots + n)^2,$$

or, equivalently,

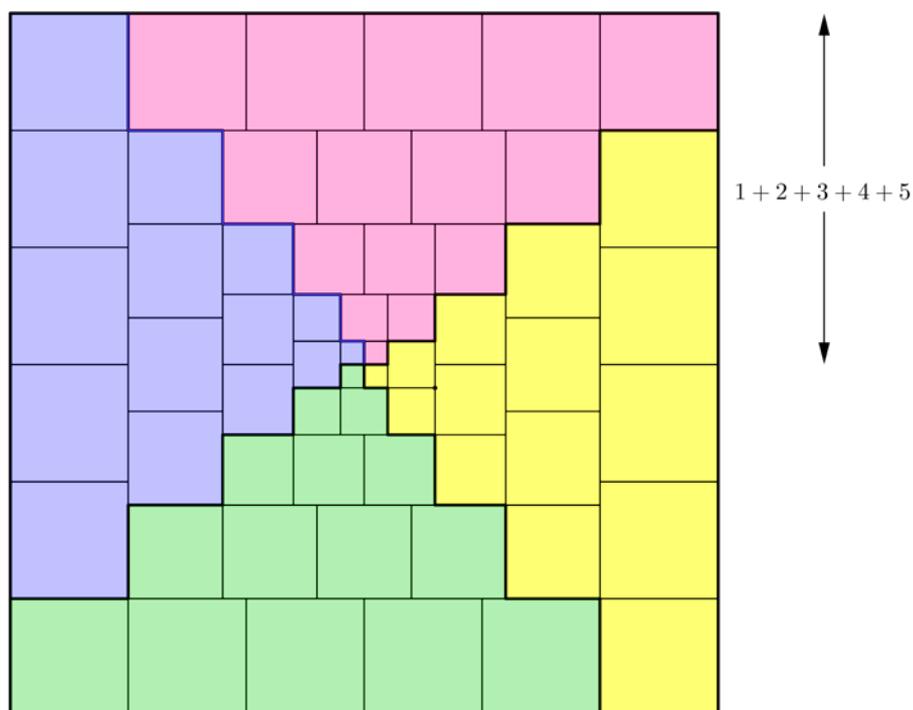
$$1^3 + 2^3 + \dots + n^3 = \frac{1}{4}n^2(n + 1)^2,$$

for the sum of the first n cubes.

Here is one way to do this.

This is taken from an article *A Geometric Proof of a Famous Identity* by Solomon Golomb in the *Mathematical Gazette*, Volume 49, no. 368, May 1965, pages 198-200.

In this article Golomb attributes the diagram given here to Warren Lushbaugh.



It can be seen that in this diagram a square with side length $2 \times (1 + 2 + 3 + 4 + 5)$ is made up of four congruent polygons. Each of these polygons is made up of one 1×1 square, two 2×2 squares, three 3×3 squares, four 4×4 squares, and five 5×5 squares. So each polygon has area $1^3 + 2^3 + 3^3 + 4^3 + 5^3$. It follows that $4 \times (1^3 + 2^3 + 3^3 + 4^3 + 5^3) = [2 \times (1 + 2 + 3 + 4 + 5)]^2$ and hence that

$$1^3 + 2^3 + 3^3 + 4^3 + 5^3 = (1 + 2 + 3 + 4 + 5)^2.$$

This may be generalized. It follows that, for each positive integer n ,

$$1^3 + 2^3 + \dots + n^3 = (1 + 2 + \dots + n)^2.$$