

Our next meeting

Wednesday, 3 February 2016,
7pm for 7.30pm
MALL 1, School of Mathematics
University of Leeds

How Mathematics is taught in China

Kathryn Greenhalgh
Maths Lead, Yorkshire and the
Humber Maths Hub



35 Maths Hubs have been funded by the DfE across the country. They are all led by practising teacher-leaders of maths. The aim is to improve how maths is taught nationally.

A huge part of the Maths Hubs' work has been about learning from high performing jurisdictions, such as China. Two large England/China exchanges have taken place and schools are embracing and sharing what they have learned.

So... What is the difference that makes the difference?

W.P.Milne Lecture for Sixth Formers

The Mathematics of Animal Locomotion

Martyn Parker
Keele University

Wednesday, March 23rd 2016
at 2.30pm

This lecture forms part of a Mathematics Day for post GCSE pupils which takes place during the Leeds Festival of Science. Details may be found on the Festival website:

<http://www.leeds.ac.uk/festivalofscience>

Schools should book places for their pupils by emailing:

FestivalofScience@leeds.ac.uk

YBMA members should book places for themselves (and friends) by emailing:

a.slomson@leeds.ac.uk

Coming

Saturday, April 23rd at 1:30pm for 2pm, MALL 1, School of Mathematics, University of Leeds

Paul Rowlandson
(Trinity Academy Halifax)

Using iPads in the classroom

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

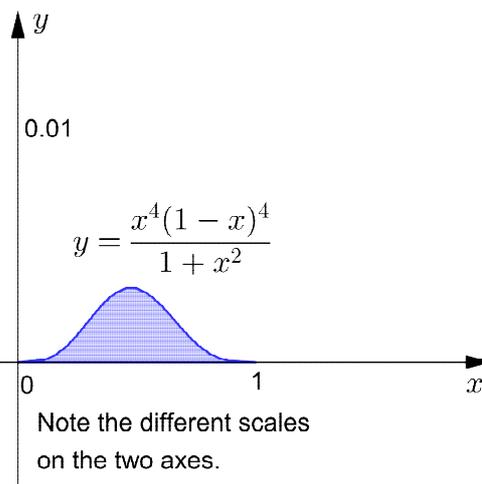
A curious integral

Evaluate the integral $\int_0^1 \frac{x^4(1-x)^4}{1+x^2} dx$

What can you deduce?

It will cut down the work to know that

$$\frac{x^4(1-x)^4}{1+x^2} = x^6 - 4x^5 + 5x^4 - 4x^2 + 4 - \frac{4}{1+x^2}$$



An enveloped area

We posed this problem in the previous Newsletter.

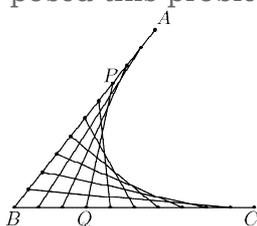


Figure 1

In Figure 1 the point P divides the line segment AB in the same ratio as the point Q divides BC , that is, $AP : PB = BQ : QC$. If pairs of points with these properties are joined, they envelope a curve which is a parabola.

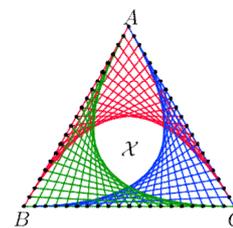


Figure 2

In Figure 2, ABC is an equilateral triangle in which three of these parabolic envelopes have been drawn. They bound the region marked X . What is the ratio of the area of X to the area of the triangle ABC ?

Outline solution

We only have space here for an outline solution. For a detailed solution, please e-mail a.slomson@leeds.ac.uk

We take the triangle ABC to have sides of length 2 and we suppose that its vertices have the coordinates shown in Figure 3.

The envelopes are the parabolas f , g and h which are tangent to the triangle at its vertices.

It may be shown that the equation of f is $y = \frac{\sqrt{3}}{2}(1-x^2)$. We can then find that the co-

ordinates of Q and R are $\left(\frac{1}{3}, \frac{4}{3\sqrt{3}}\right)$ and $\left(-\frac{1}{3}, \frac{4}{3\sqrt{3}}\right)$.

We can use this information to calculate that the area of X is

$\frac{5\sqrt{3}}{27}$. The area of the triangle ABC

is $\sqrt{3}$. Therefore the area of X is

$\frac{5}{27}$ th of the area of triangle ABC .

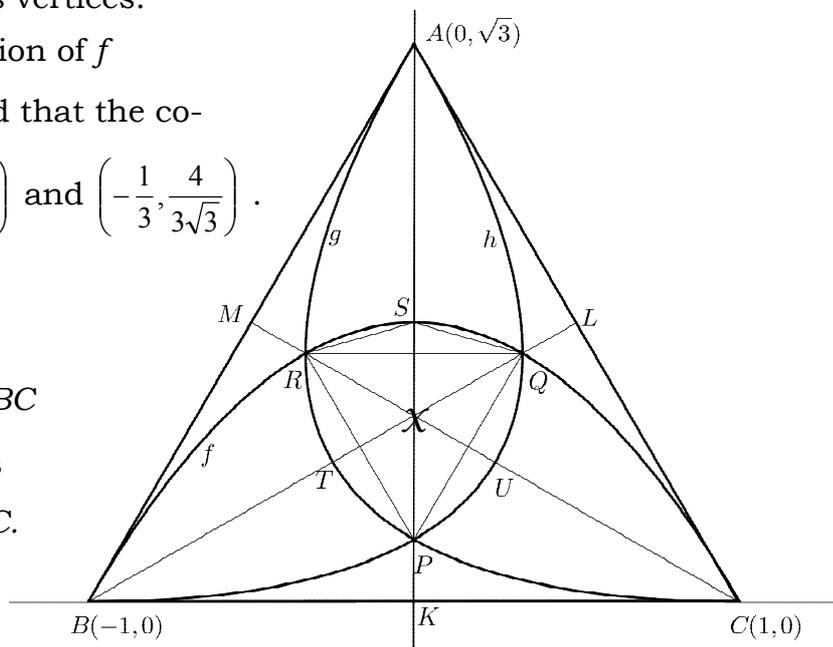


Figure 3