September 2005
Regulars

Puzzle page

A knight's nightmare

Imagine a chess board with $n \times n$ squares, n on each side. Now imagine a knight moving around the board − only using the moves that are allowed to a knight of course − so that each square of the board is visited exactly once, and so that the knight ends up on the same square as it started. Such a tour is called a *closed knight's tour* (it's *closed* because the knight ends where it started). If you start experimenting on an ordinary

chess board, you'll soon see that it's no easy feat to find a closed knight's tour. People have been entertaining themselves with this pursuit for centuries. The earliest recorded example of a knight's tour on the ordinary 8×8 board came from al−Adli ar−Rumi, who lived in Baghdad around 840AD. There are also example of knight's tours of But no−one has ever found a closed knight's tour on an $n \times n$ board when n is odd. Can you prove why this is, in fact, impossible? Hint

If you're poetically minded, try this one: find a knight's tour on this 8×8 board, so that the syllables on the squares, when read in the sequence of the tour, form a verse (note that this time you're *not* asked for a *closed* knight's tour − it does not have to end at the same place it started). Hint

With	white	−gle	from	−lant	black	a	star−
square	the	knight	and	sin−	−ted	gal−	of
did	nerve	And	−where	And	twice	He	−sing
prove	Nor	king's	on	it	−ny	land	A
of	once	he	back	−ting	−main	mis−	might
came	to	res−	do−	a−	to	fire	the
a−	steel	his	−gain	To	heart	−full	−out
all	a−	−spire	and	power−	With−	roam	of

This puzzle was published in 1884 in the book *Chess Fruits* by T. B. Rowlands and his wife Frideswide F. Rowlands. Crossword puzzles had not been invented at that time, and this kind of puzzle was very popular.

If you are stumped by last issue's puzzle, here is the solution.

For some challenging mathematical puzzles, see the NRICH puzzles from this month or last month.

Plus is part of the family of activities in the Millennium Mathematics Project, which also includes the NRICH and MOTIVATE sites.