But, if the original triangle has area A, the total area of the inaccessible triangles is:

$$\tfrac{1}{4}A + 3\cdot\tfrac{1}{16}A + 9\cdot\tfrac{1}{64}A + \cdots,$$

an infinite geometric progression which sums to $\frac{1}{4}A/(1-\frac{3}{4}) = A$; the whole area! Thus the pattern builds up from nothing to one which occupies zero area!

Mathematicians, of course, are used to such goings-on, indeed the situation here resembles the argument that Cantor's ternary set (which also has a rich internal structure) is a null set; in the classroom it has stimulated informal discussion at all levels on topics such as:

★ Different types of infinity and the distinction between a sequence and its limit. (Which points on the sides of the triangle are reachable? Is the pattern ever "completed"? Is it completable?)
★ The imperfections of computer graphics.
★ What would happen if we vary the starting conditions?

For example, an arbitrary starting triangle produces a pattern which is the obvious affine transformation of the pattern for an equilateral triangle and a regular n-gon (n odd) gives a pattern with an inaccessible smaller central n-gon whose area is $\sin^4(\pi/2n)\sec^2(\pi/n)$ times the area of the initial n-gon.

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Obituary

Ida Winifred Busbridge

1908–1988

Dr Ida Busbridge was a tutor in mathematics at Oxford from 1935 until her retirement in 1970. Her student career had been outstandingly successful. From Christ's Hospital she went to Royal Holloway College where she won the Lubbock Prize in 1929 for the best First Class honours of any internal or external candidate and, that year, she headed the mathematics degree list for the whole of London University. She stayed in London to work for an M.Sc. and this she was awarded with a distinction; G. H. Hardy was the external examiner. She went to Oxford in 1935 to take over tutorial responsibility for the small band of undergraduates reading mathematics in five women's colleges while, at the same time, working for a D.Phil. with E. C. Titchmarsh. Throughout her life, she remained a classical analyst of great distinction and, in 1962, she was awarded the rare honour of a D.Sc. by the University of Oxford. Her research extended into the field of integral equations and radiative transfer. She was, for many years, a Fellow of the Royal Astronomical Society.

During the war, Ida Busbridge (with a handful of tutors from the men's colleges) taught, lectured and examined without respite not only for the mathematicians but also physicists and engineers. After the war, she started to build up the number of women admitted to the University to read mathematics. She was elected to a Fellowship at St Hugh's College in 1946 but she retained her responsibility for the selection and supervision of undergraduates in the other four for women's colleges until they too had appointed their own tutors. Even after all the five had their own Fellows, she remained the spokeswoman for women mathematicians in the University until she retired.

Ida Busbridge was a superb lecturer; her voice could be heard clearly in the largest lecture theatre; her material was perfectly prepared; her handwriting was immaculate. Her proofs and explanations left nothing to chance. But it is as a tutor that she is most affectionately and gratefully remembered. She had no greater praise for any young person than that he or she was a good mathematician and she gave all her time and attention during term to ensure that her pupils were successful. Undergraduates knew that she would always scrutinise their written work and that false arguments would be spotted but, at the same time, in tutorials she would always provide patient, careful and clear answers to their questions. At St Hugh's, she created a mathematics school of the highest quality. Not all her students came to the University with the most glowing examination result but she had a remarkable gift for selecting those who would flourish in the University and who would catch her own infectious passion for mathematics. Tutors at other Colleges considered themselves very fortunate when she could find time to fit in tutorials for those of their undergraduates who had encountered difficulties in pure mathematics. Her view of undergraduate mathematics was vividly described in her presidential address to the Mathematical Association given in April 1965.

Her interest in her pupils' well-being was not limited to their mathematical progress and she was generous with advice and practical help in any times of difficulty. She was immensely hospitable and her College room—looking out on to the beautiful garden for which she was responsible—was a frequent meeting place for students and for colleagues. She maintained contact with her pupils long after they left the University and spoke with pride of their achievements and their families.

Ida Busbridge was an enthusiastic member of the Mathematical Association. She was a member of the Committee which produced the report on the Teaching of Calculus in Schools in 1954, and also of the Committee which prepared the Report on Analysis (Course I in 1957 and Course II in 1962). The Analysis Committee met on Saturday afternoons at St Hugh's and was sustained by wonderful teas which Ida provided.

She was President of the Association from 1964 and 1965 and it gave her particular pleasure that the Annual Conference was held in Oxford in 1965 and that her Presidential address was given in the Sheldonian Theatre.

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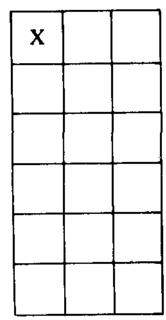
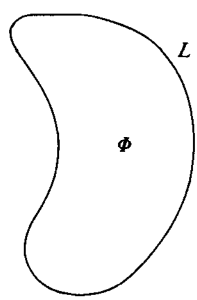
Problem corner

Solutions are invited to the following problems. They should be addressed to Graham Hoare at Dr Challoner's Grammar School, Chesham Road, Amersham, Bucks HP6 5HA, and arrive not later than February 10 please.

73.G (Anthony C. Robin). A bar of chocolate has 3×6 squares, with the corner one poisoned. Each player in turn breaks the chocolate (in a straight line along the grooves) and eats the piece he breaks off. The player to leave his opponent with the single poisoned square is the winner. Describe the strategy to ensure winning (or find the "L states"; see the proposer's article, *Games—a look at Strategies*, on p 306). What would happen with a 3-dimensional version of this problem, where we start with a block $l \times m \times n$?



73.H (Dmitry P. Mavlo). Prove that an arbitrary plane figure Φ, whose boundary is a continuous curve of length L (see figure) can be placed completely within an n-gon whose perimeter P_n is not greater than $L \sec(\pi/n)$. Consider all cases when equality holds.



Solutions and comments on 73.C and 73.D (June 1989)

73.C Prove that if $n \geqslant 3$ then between n and $n!$ there are at least $3\left[\frac{n}{2}\right]$ prime numbers. $\left(\left[\frac{n}{2}\right]\right.$ represents the integral part of $\left.\frac{n}{2}\right)$

A variety of ingenious solutions were submitted but the argument given by the proposer, Florentin Smarandache, the core of which follows, is especially direct and concise. Suppose $n = 2k + 1$. We consider $k \geqslant 2$, since the result is clearly valid for $k = 1$. Now,

$$\begin{aligned} n! &= 2^k.(k!).3.5.\cdots(2k-1).n \\ &> 2^{3k-3}.(k!)n \\ &\geqslant 2^{3k-2}n. \end{aligned}$$

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