Via Arts to Mathematics

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By means of **logic operations with inequalities** we are able to shade regions in the plane using *DERIVE*.

Two examples:

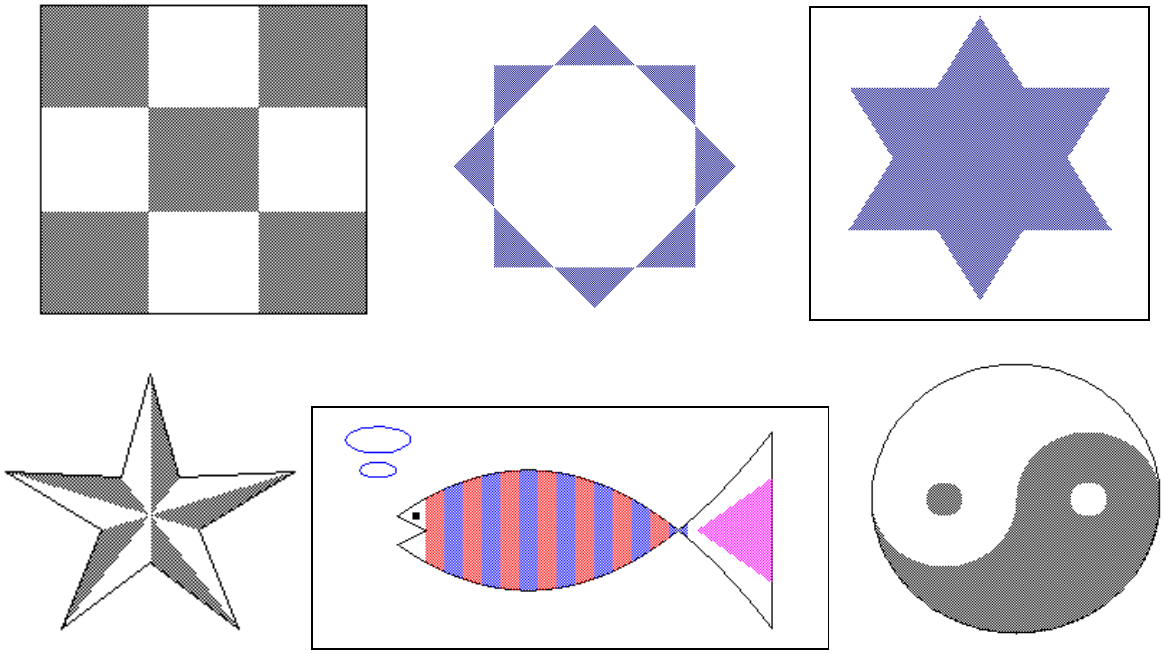
`0 <= x <= 4 and 0 <= y <= 4` describes a square,
`x^2 + y^2 >= 9 and x^2 + y^2 <= 25` describes a .....

Working on the Voyage 200 one has to use the `shade`-function:

```
shade Func1,Func2,[lower bound],[upper bound],[pattern],[resolution]
```

shades the region where `Func1` < `Func2`.
For `pattern` 1,2,3,4 is possible (vertical, horizontal, 45° decreasing, 45° increasing);
`resolution` runs from 1 (black) to 10 (9 Pixels distance between the shading lines)

Ideas for posing problems:



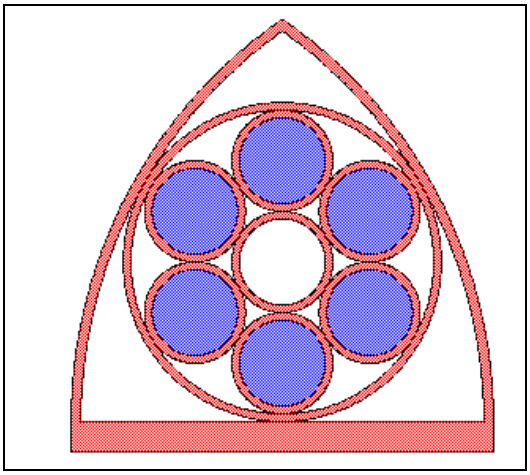
References

[1] Mabel Sykes, *Source Book of Problems for Geometry*, Dale Seymour Publ.

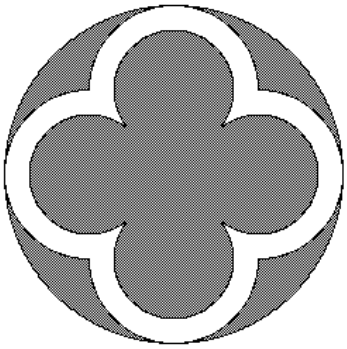
[2] *Gotische Maßwerkfenster im Geometrieunterricht,* MU-Der Mathematikunterricht, Jg 41, Heft 3

[3] Eberhard Lehmann, *Mathematiklehren mit Computeralgebrasystem-Bausteinen*, franzbecker 2002

Visiting Gothic Buildings



Threefoil and Quadrifoil (Dreipass und Vierpass)



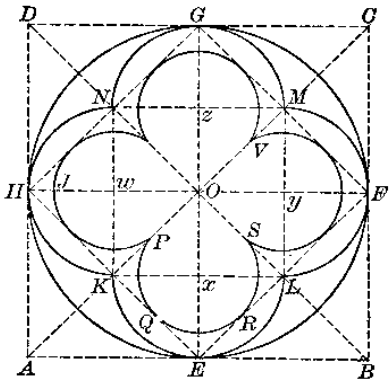
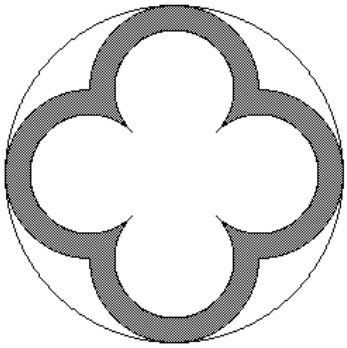
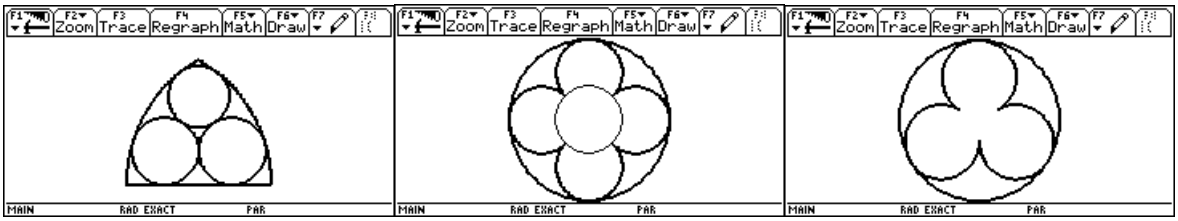
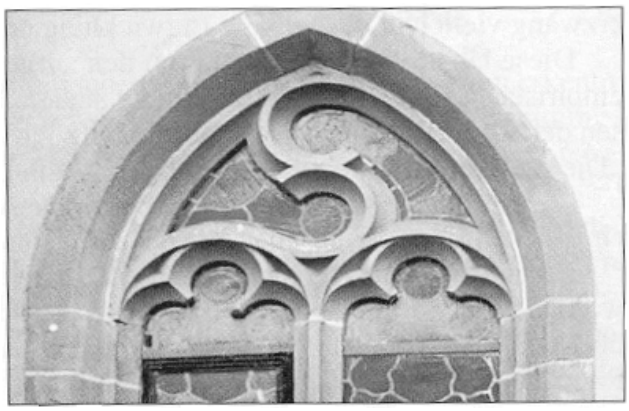


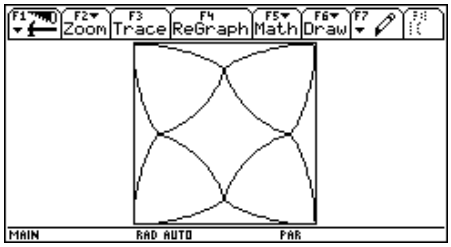
Fig. 149. — From Stone Cutting on the Front of the Church of Our Lady of Good Counsel, New York City.



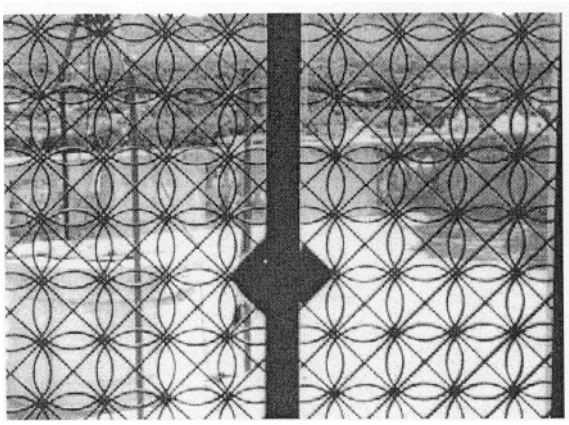


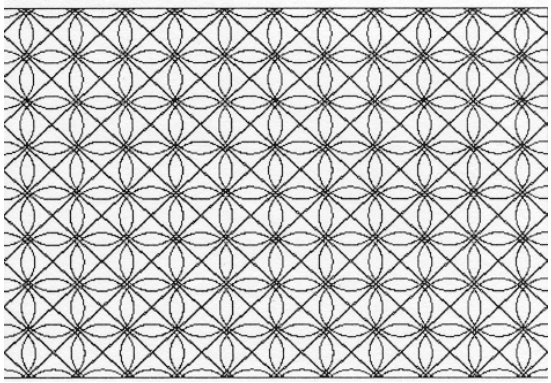


Parameter form is necessary and it makes sense to parameterize **all** occuring curves in the same way, e.g. $0 \le t \le 1$.



View through a wrought-iron door and its model





Another problem found in Sykes' book:

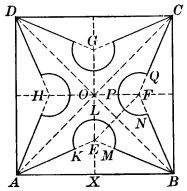


Fig. 114.

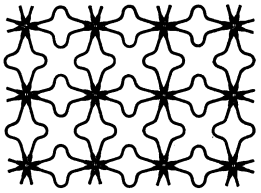
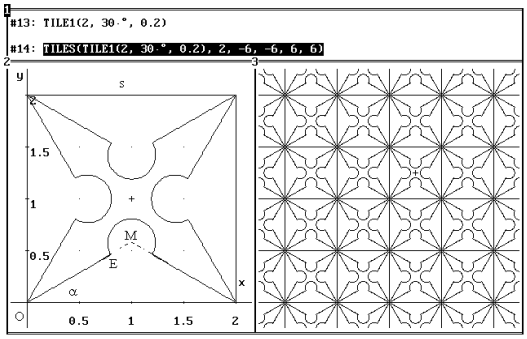
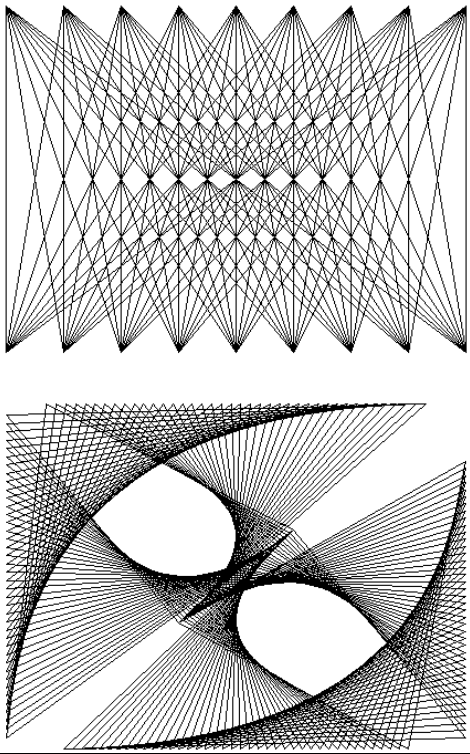


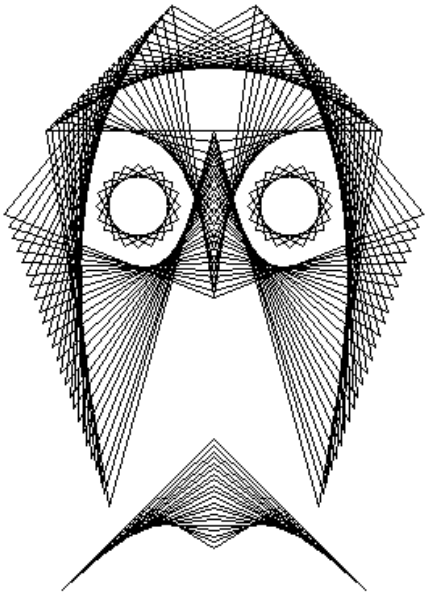
Fig. 114a. — Counter Railing Design.

139. In Fig. 114 ABCD is a square with diameters EG and FH and diagonals AC and BD. KE = EM = FN = FQ, etc., and ∠EAB = ∠EBA = ∠FBC = ∠FCB = ∠GCD, etc.

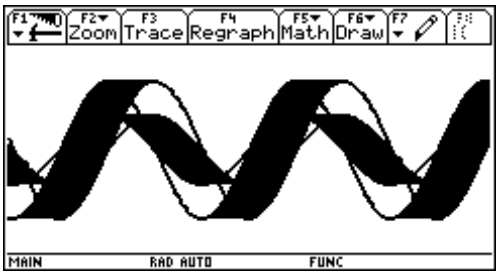


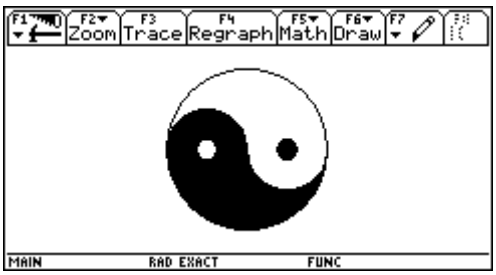
By means of sequences of points on segments, parabolas and other arcs one can design wonderful „Thread Graphics"

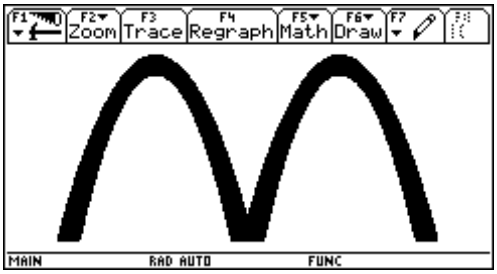


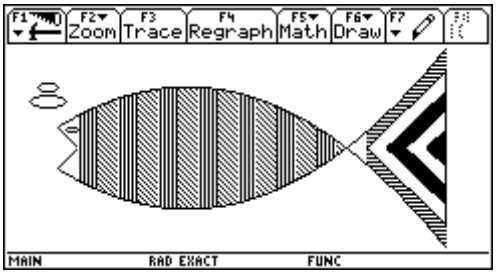


Owl of Wisdom

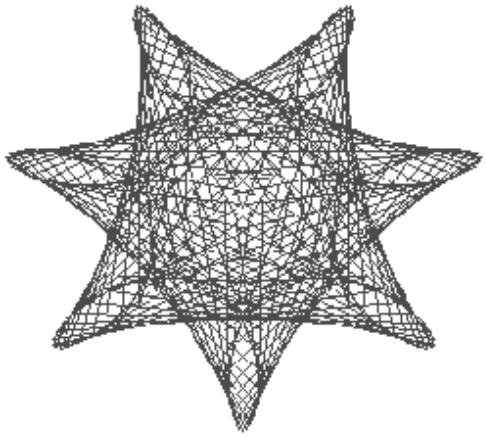




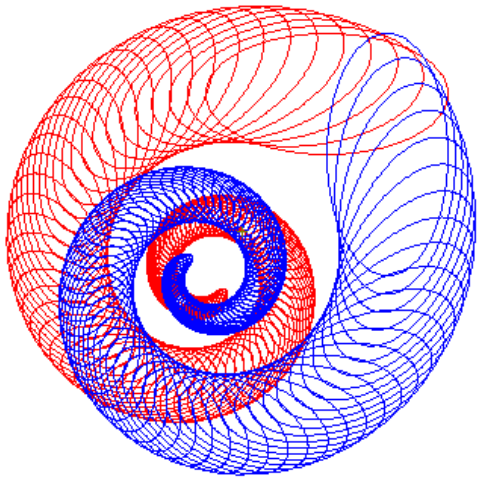




Some graphs on the *Voyage 200*. Trade Marks are a rich resource.



Polarform inspires to
create fancy graphics



Eberhard Lehmann´s LOGO
(Trade Mark)