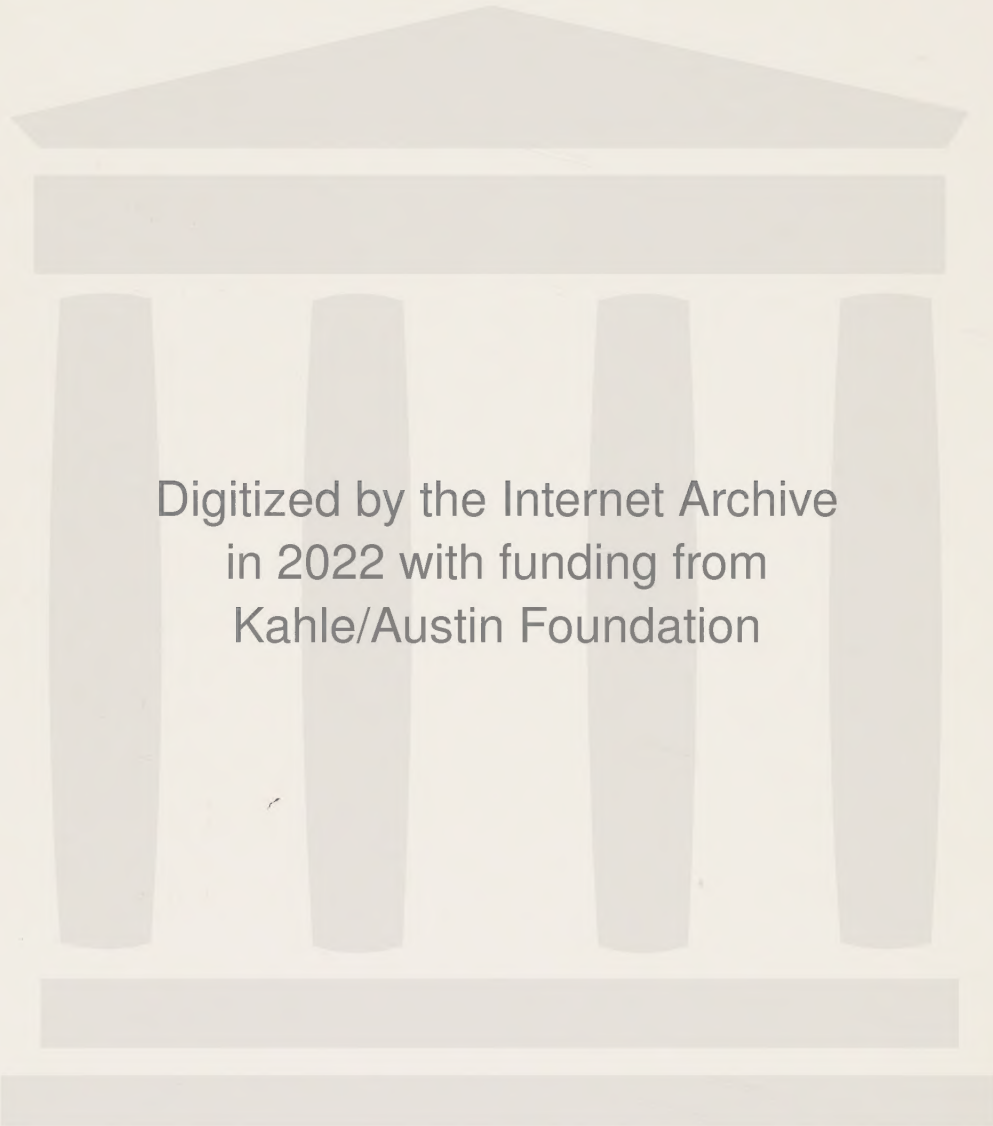




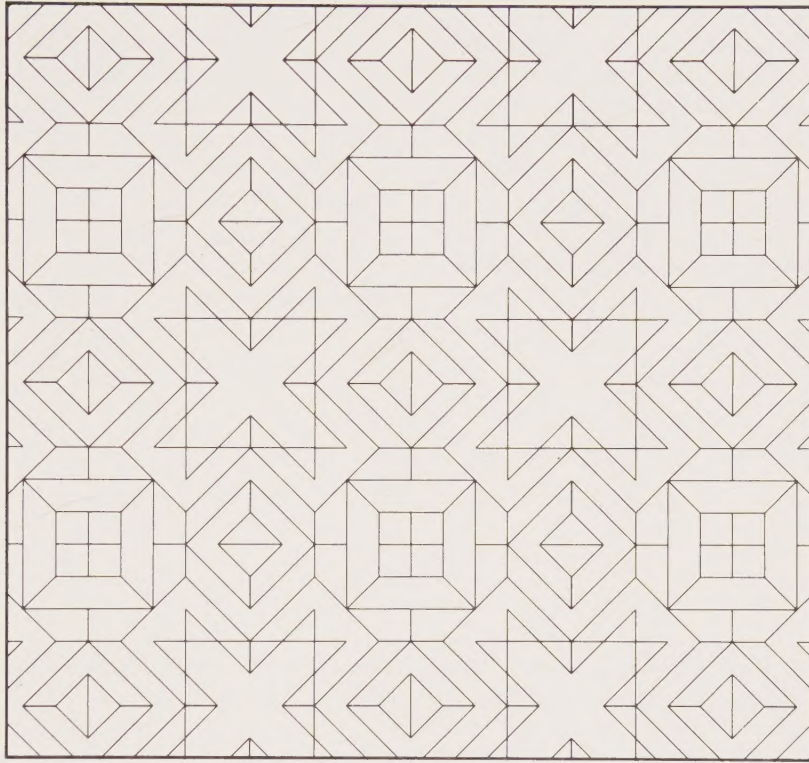
Ian D. Angell
**COMPUTER
GEOMETRIC
ART**



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COMPUTER GEOMETRIC ART



by Ian O. Angell

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INTRODUCTION

Dr. Angell is a senior lecturer in computer science at University College London, England. One of his many research interests is the study and mathematical analysis of geometrical patterns from ancient cultures. In order to illustrate lectures and articles on the art of the Graeco-Roman, Celtic and Islamic cultures, Dr. Angell has generated a series of computer programs, in the Fortran IV computer language, to draw idealized patterns.

The designs given in this book are an unusual by-product of his research. They were produced by the computer program that generates the so-called lattice patterns. These lattice patterns are highly structured and demonstrate various types of repetition and symmetry. The potentially infinite number of lattice patterns fall into 17 categories, each type corresponding to one of the 17 two-dimensional space groups. This fundamental mathematical structure has meant that this kind of geometrical design was developed independently at different times in many cultures throughout the world.

To draw a lattice pattern the computer has first to generate a "tile"; the computer takes an elementary set of line segments and arcs, and manipulates them using a space group (a sequence of reflections, rotations and translations on the original set) into a tile, which introduces some initial symmetry. These tiles are then stacked in a regular lattice in two-dimensional space, thus initiating further symmetries. Such a design is necessarily infinite so Clipping, a technique from computer graphics, is used to restrict the pattern to within a finite rectangle.

A surprising feature of this method of generating what Dr. Angell calls "serendipity patterns" is that even an apparently random, nonsymmetric basic set of lines and arcs can produce beautifully symmetric designs. In addition to the numerous possible artistic applications of the artwork, an interesting pastime might be to work out the tile for each pattern and then find which lines and arcs form that tile by combining reflections, rotations and translations.

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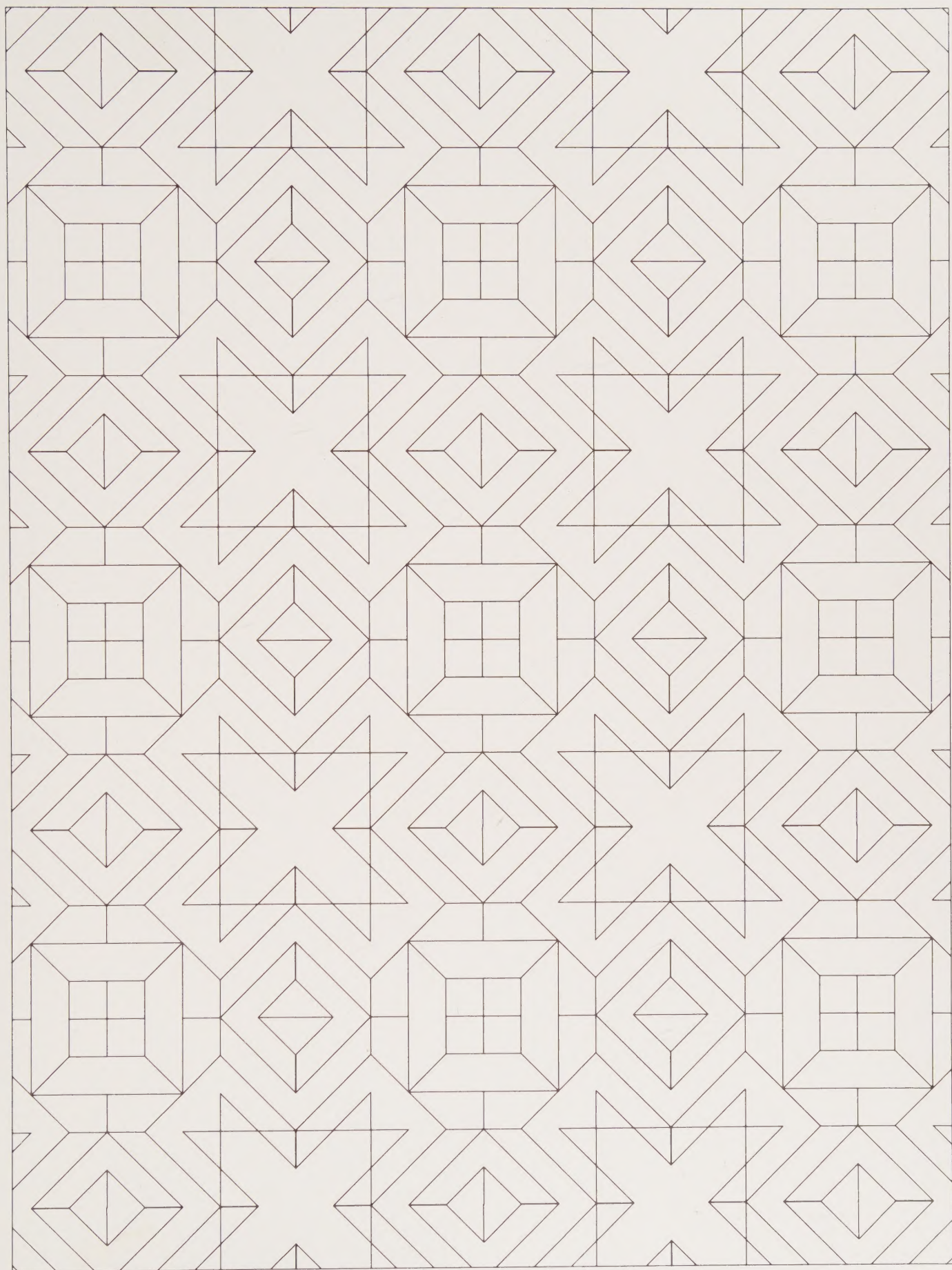
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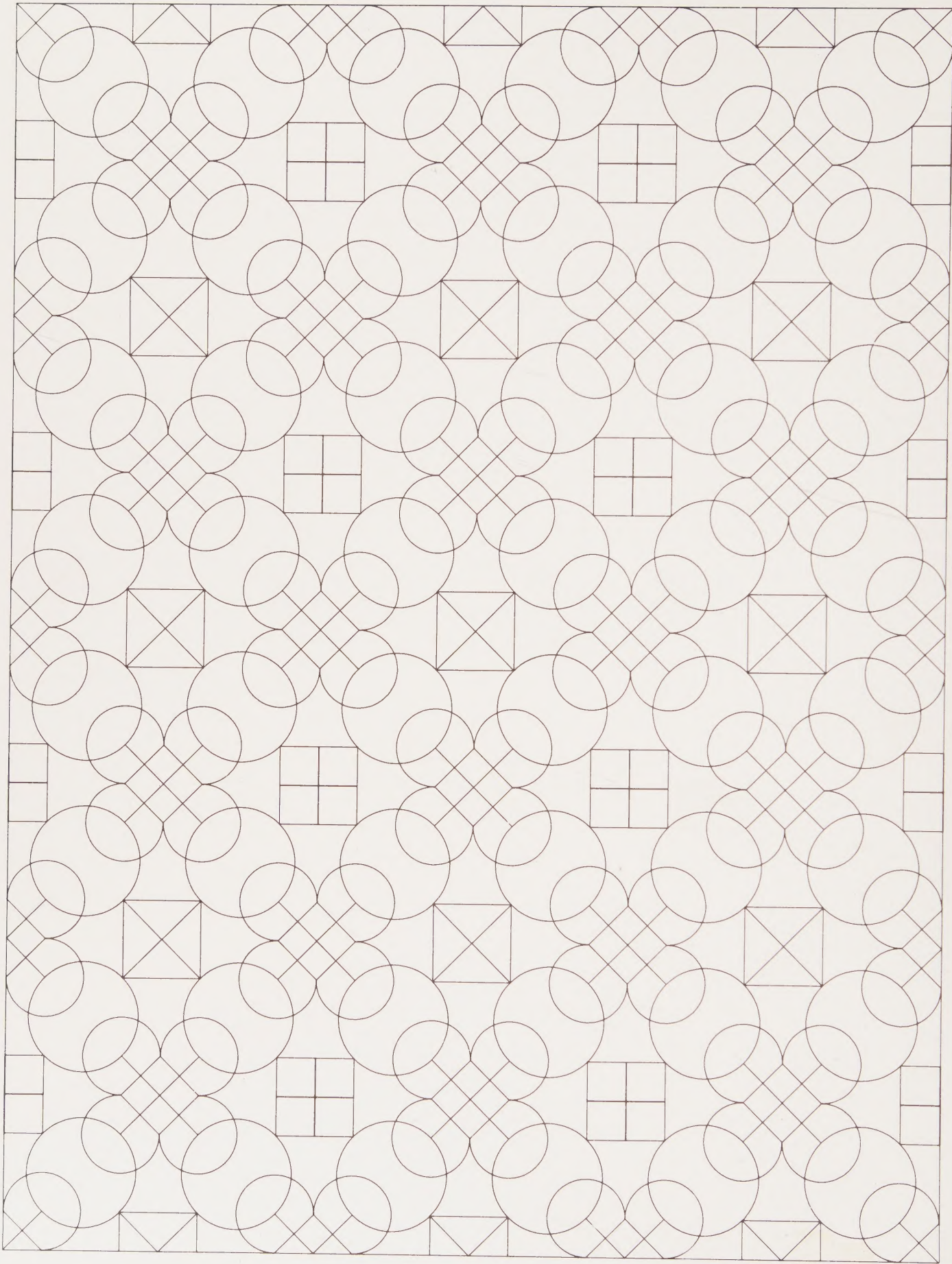
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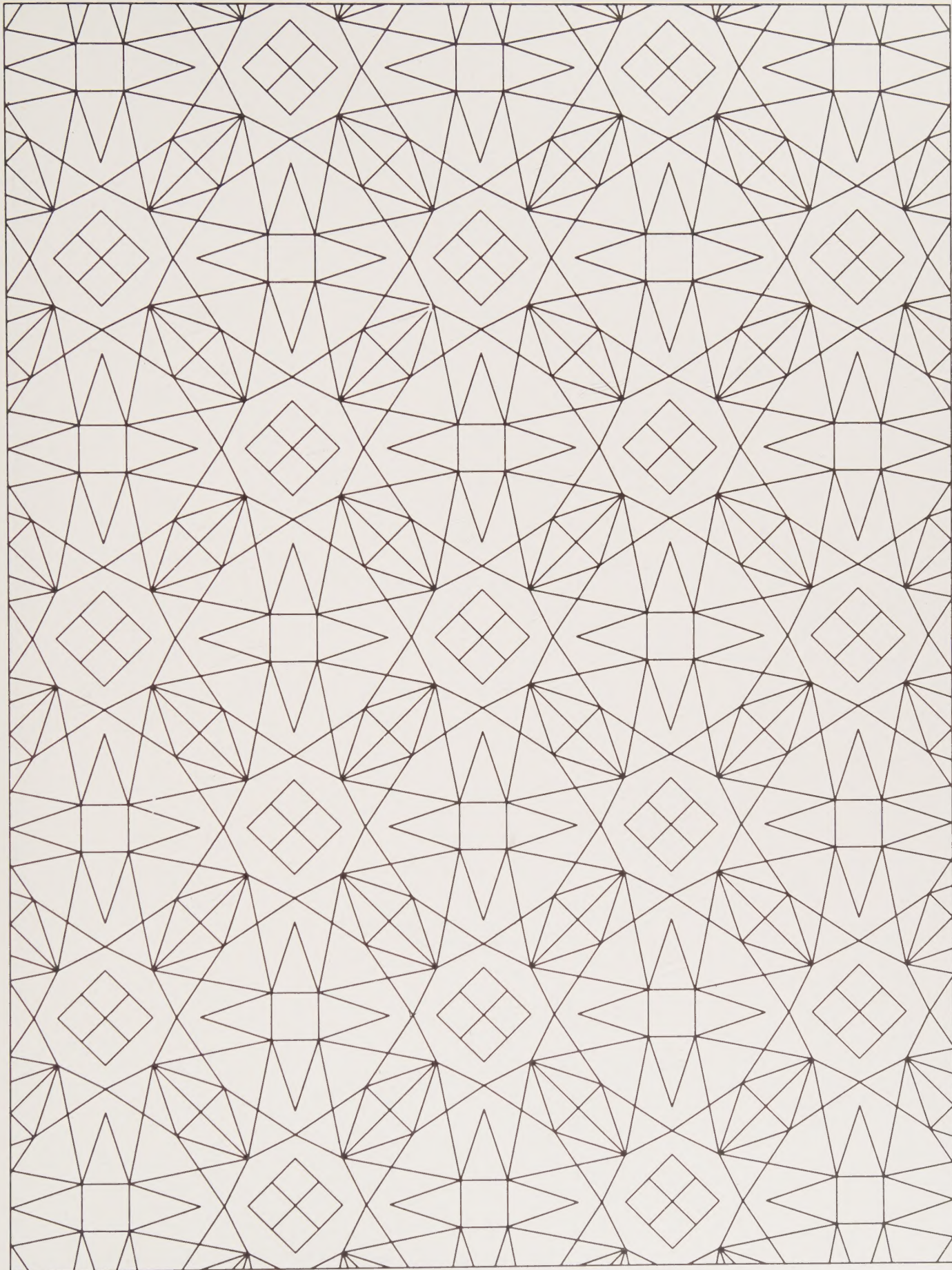
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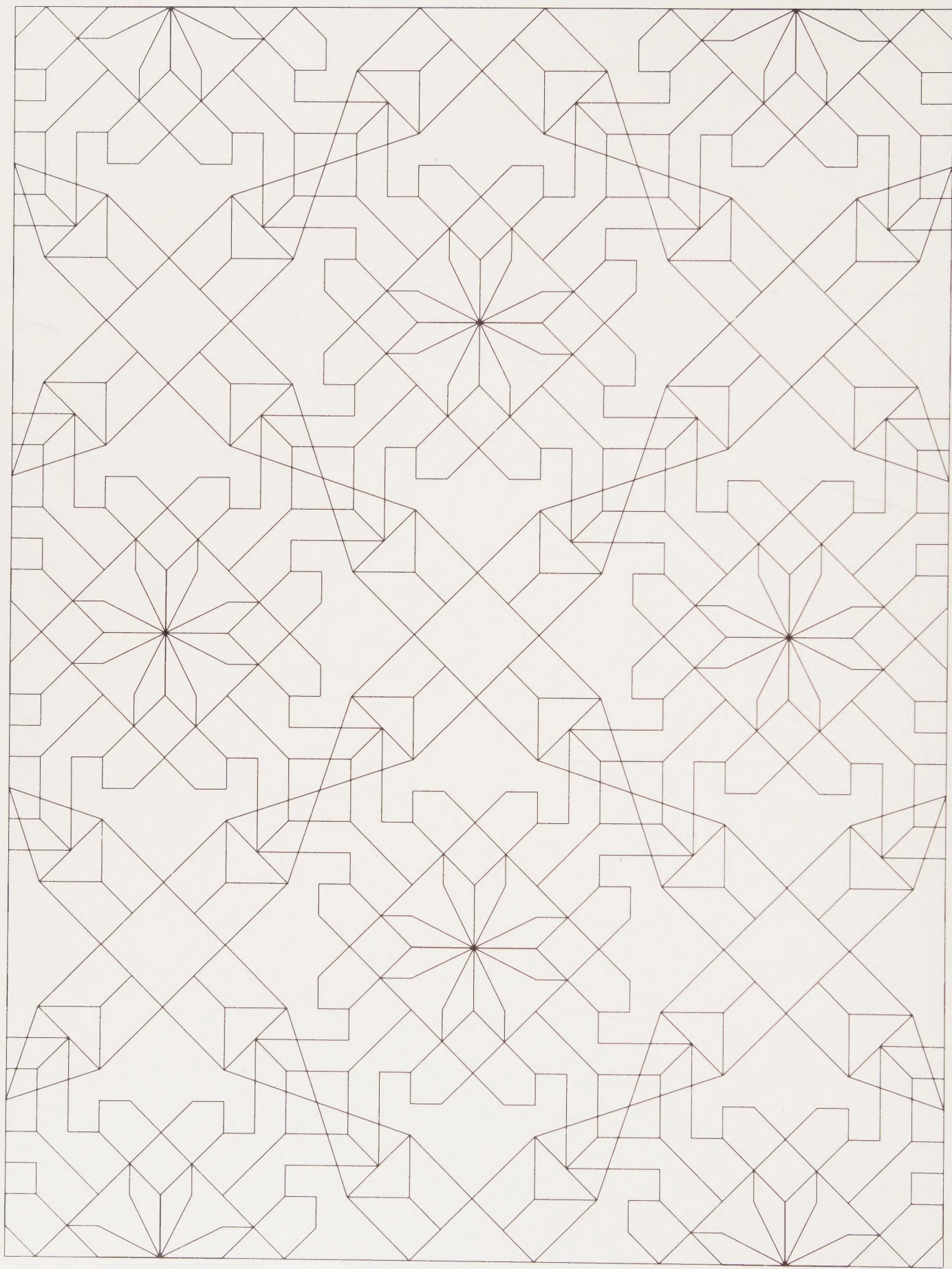
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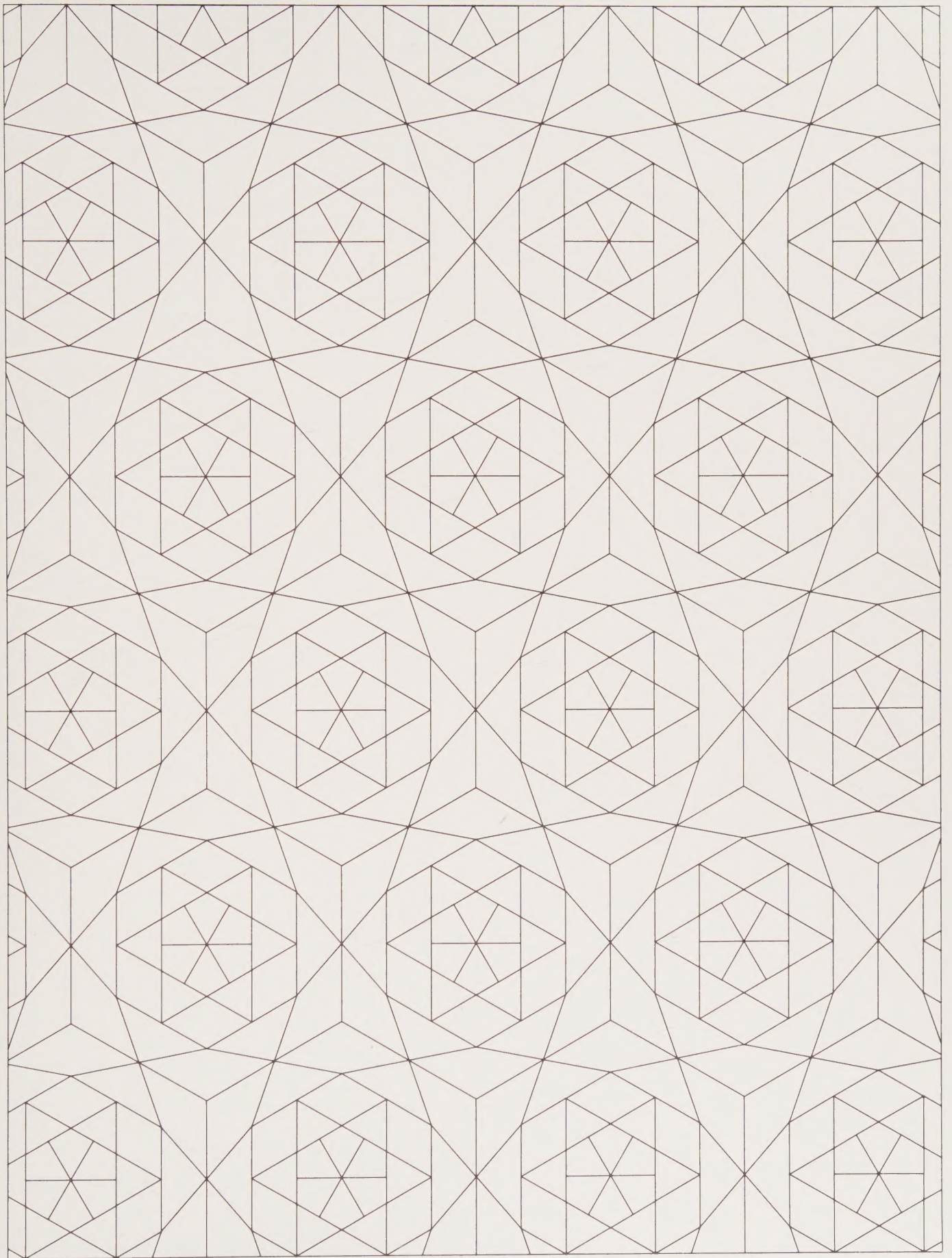
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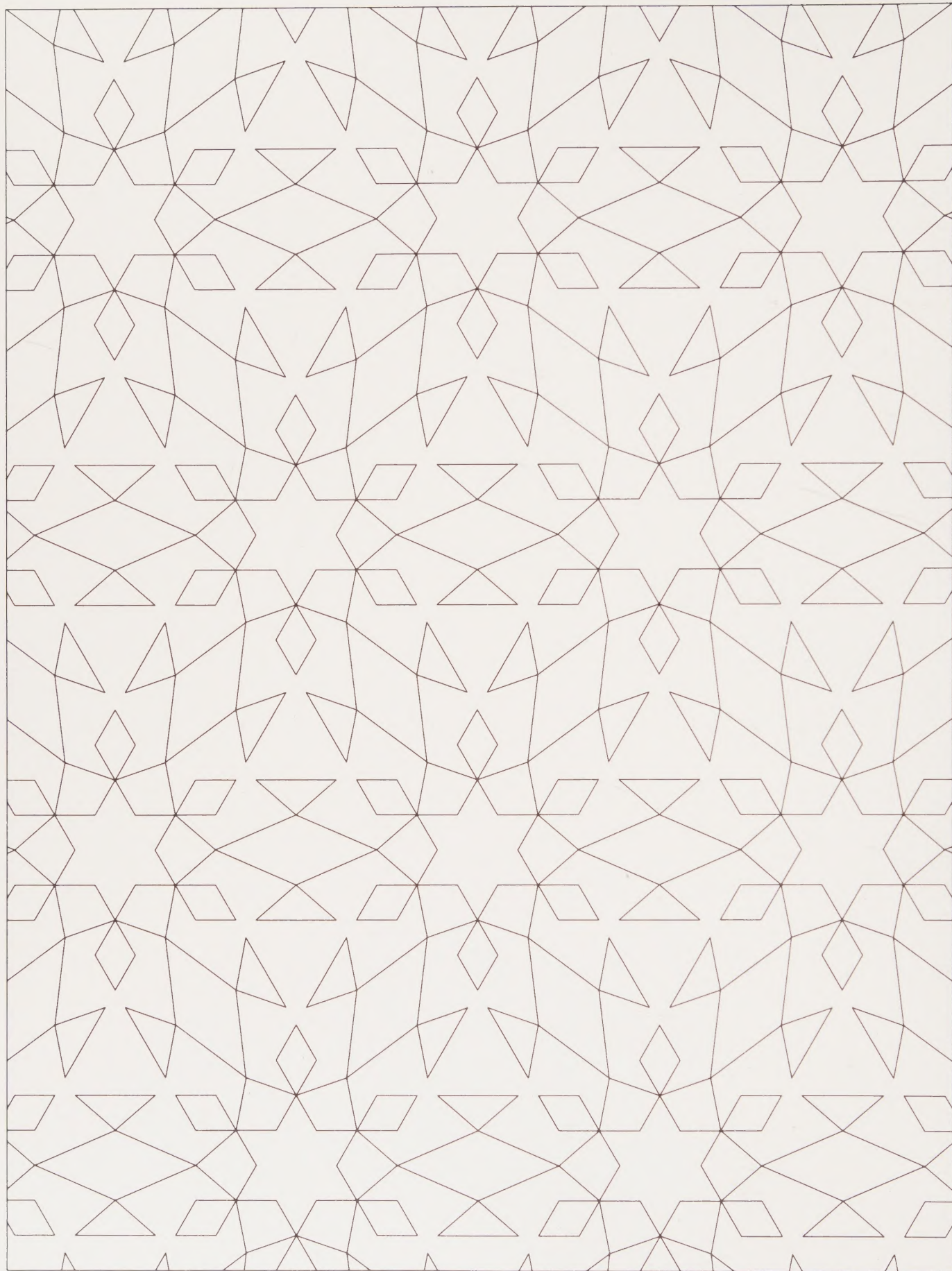


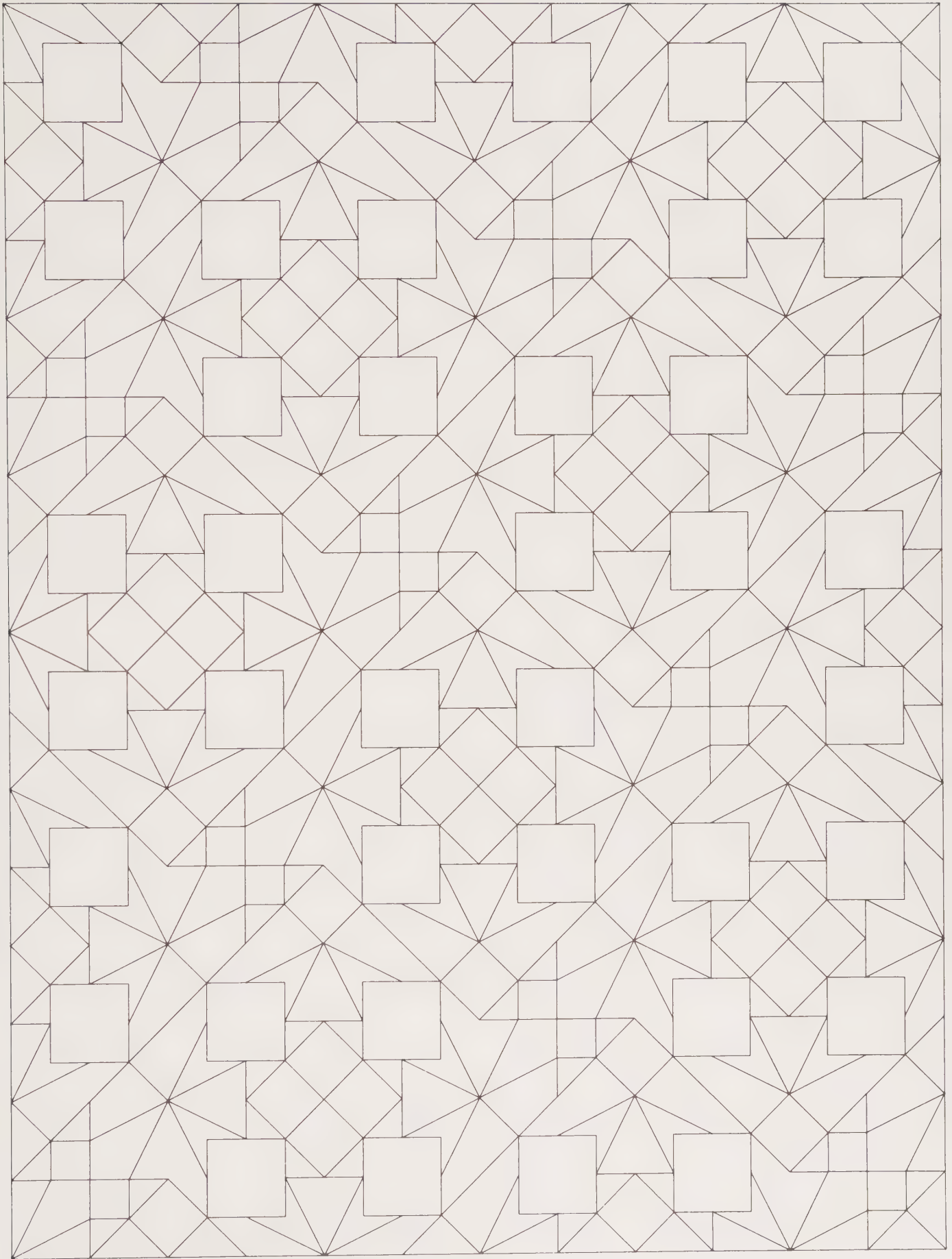


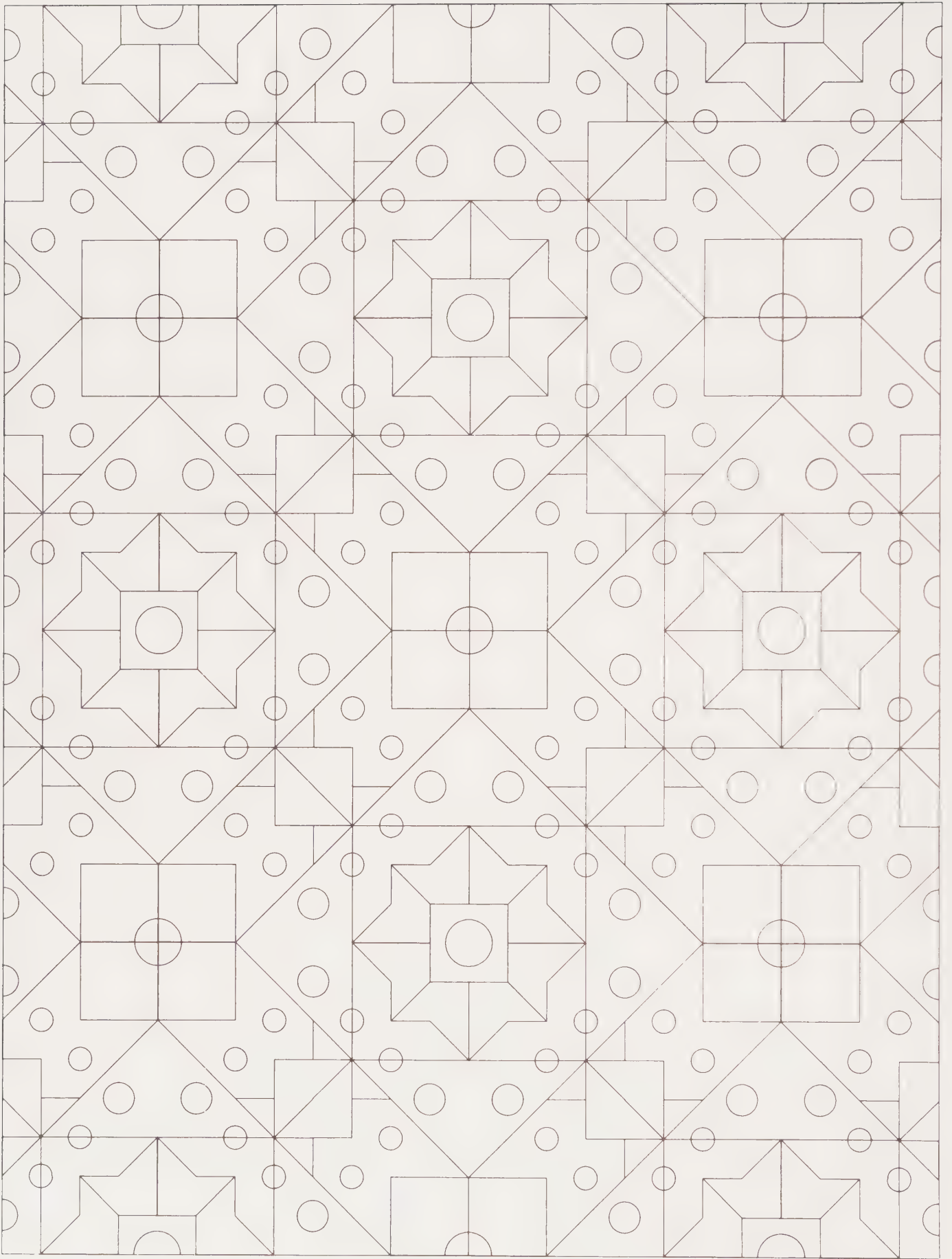


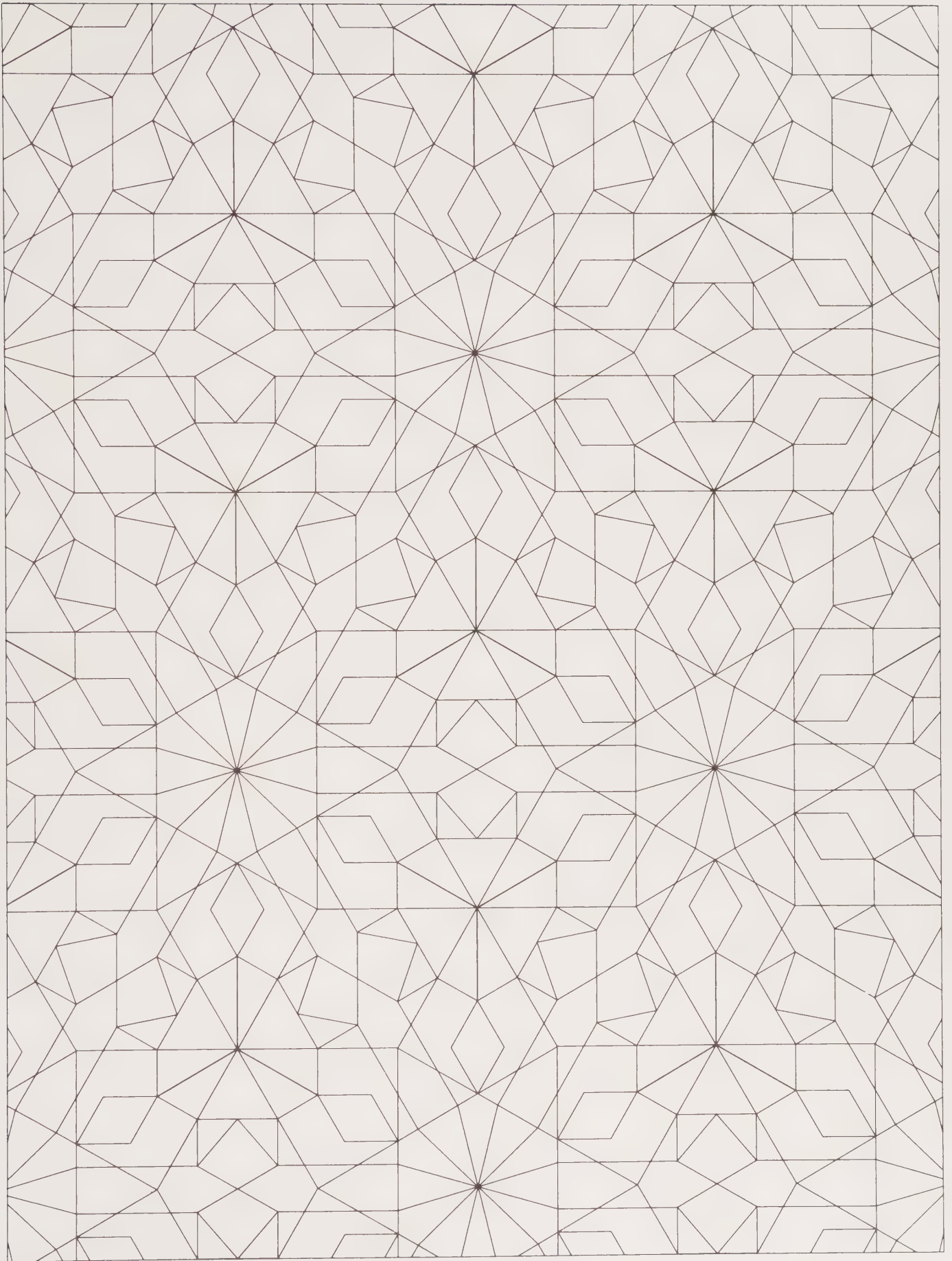


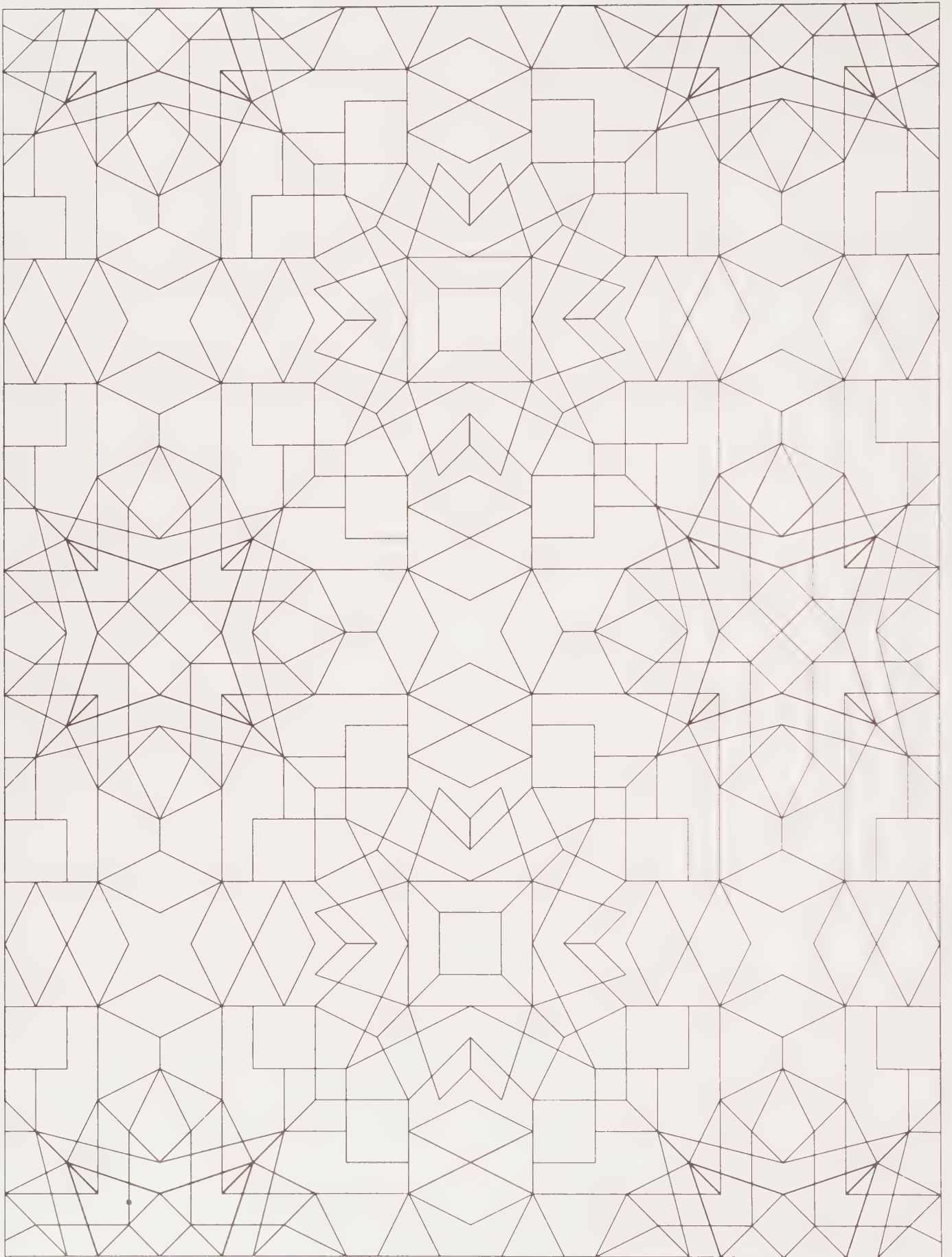


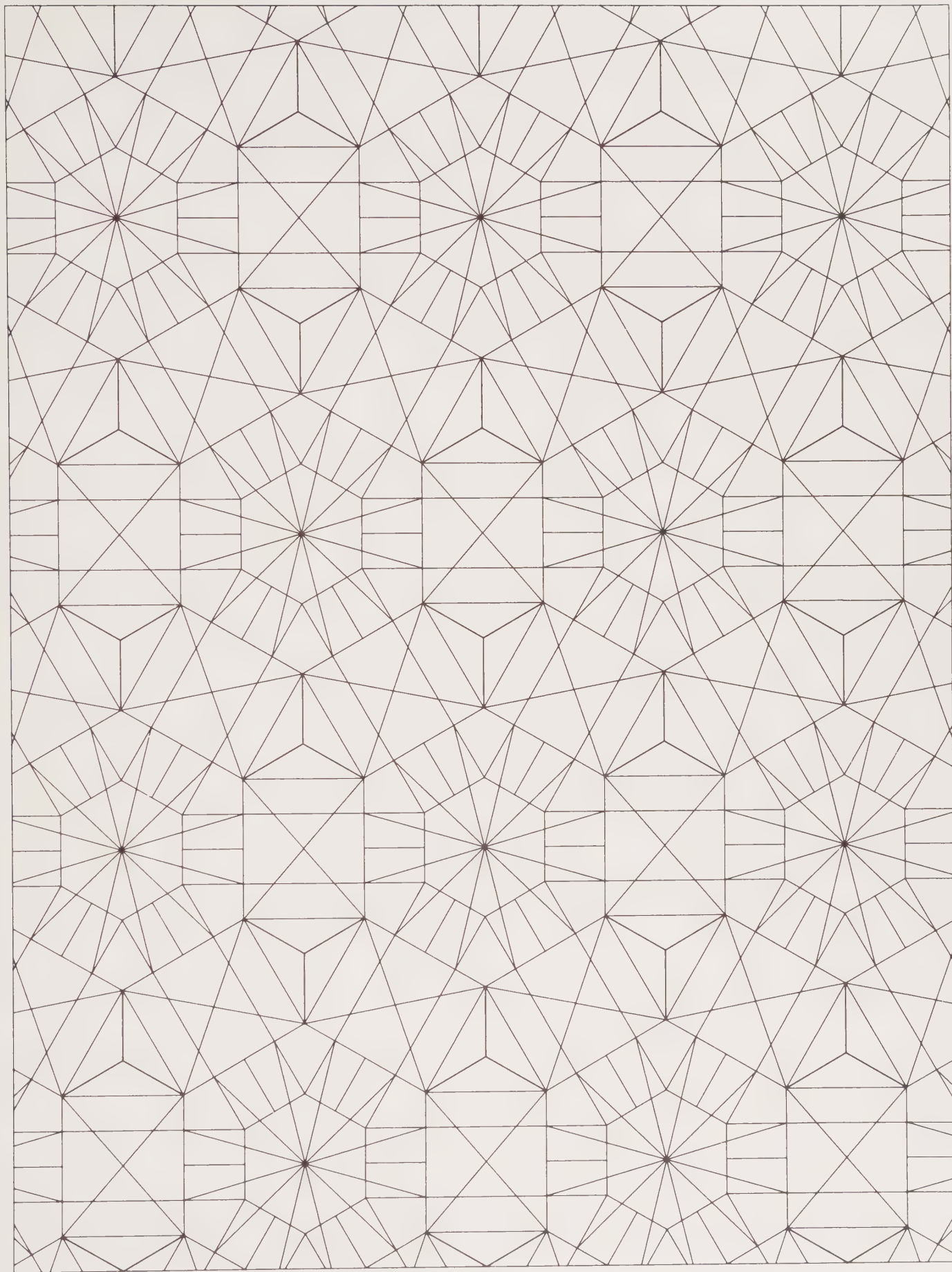


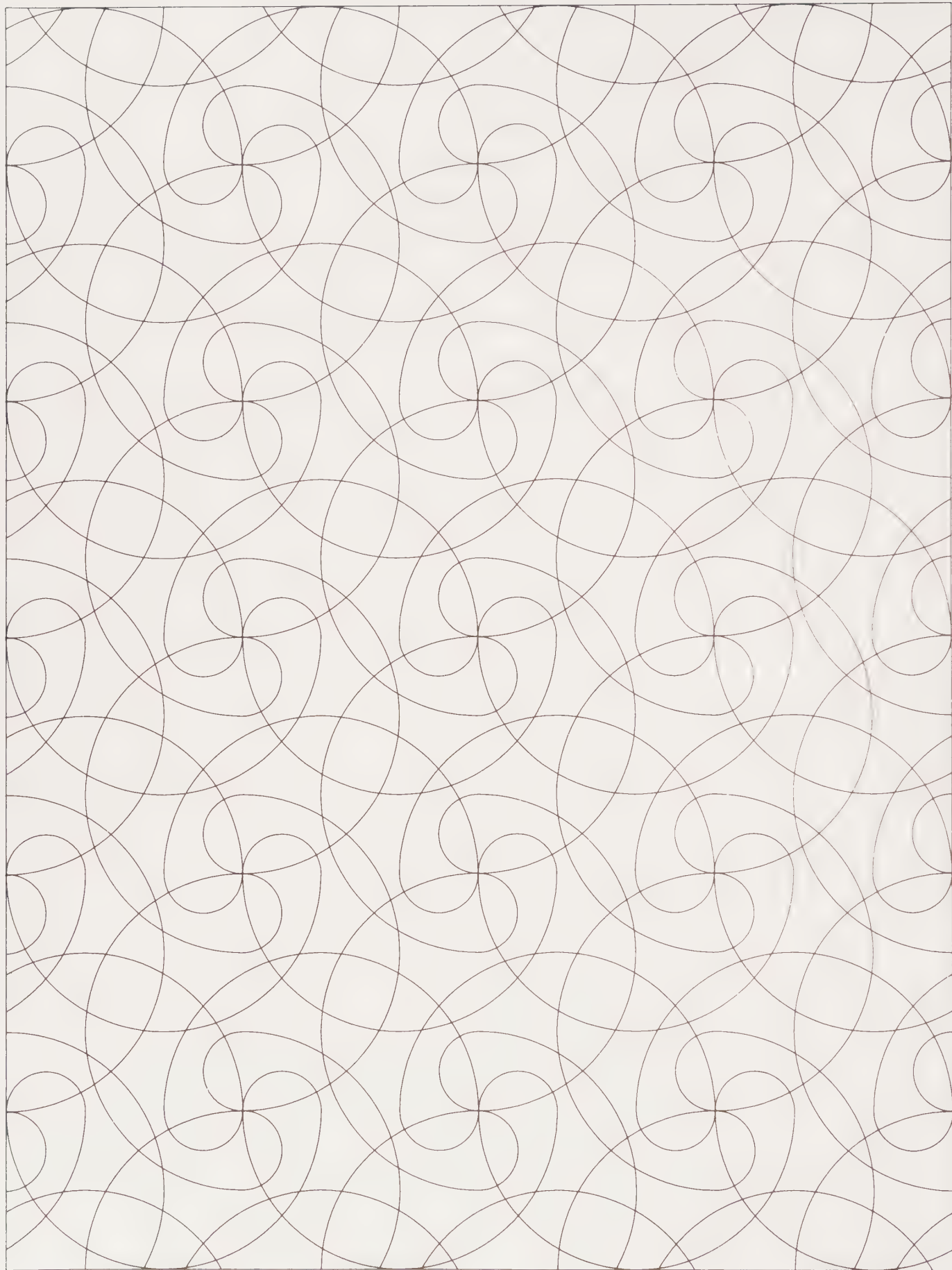


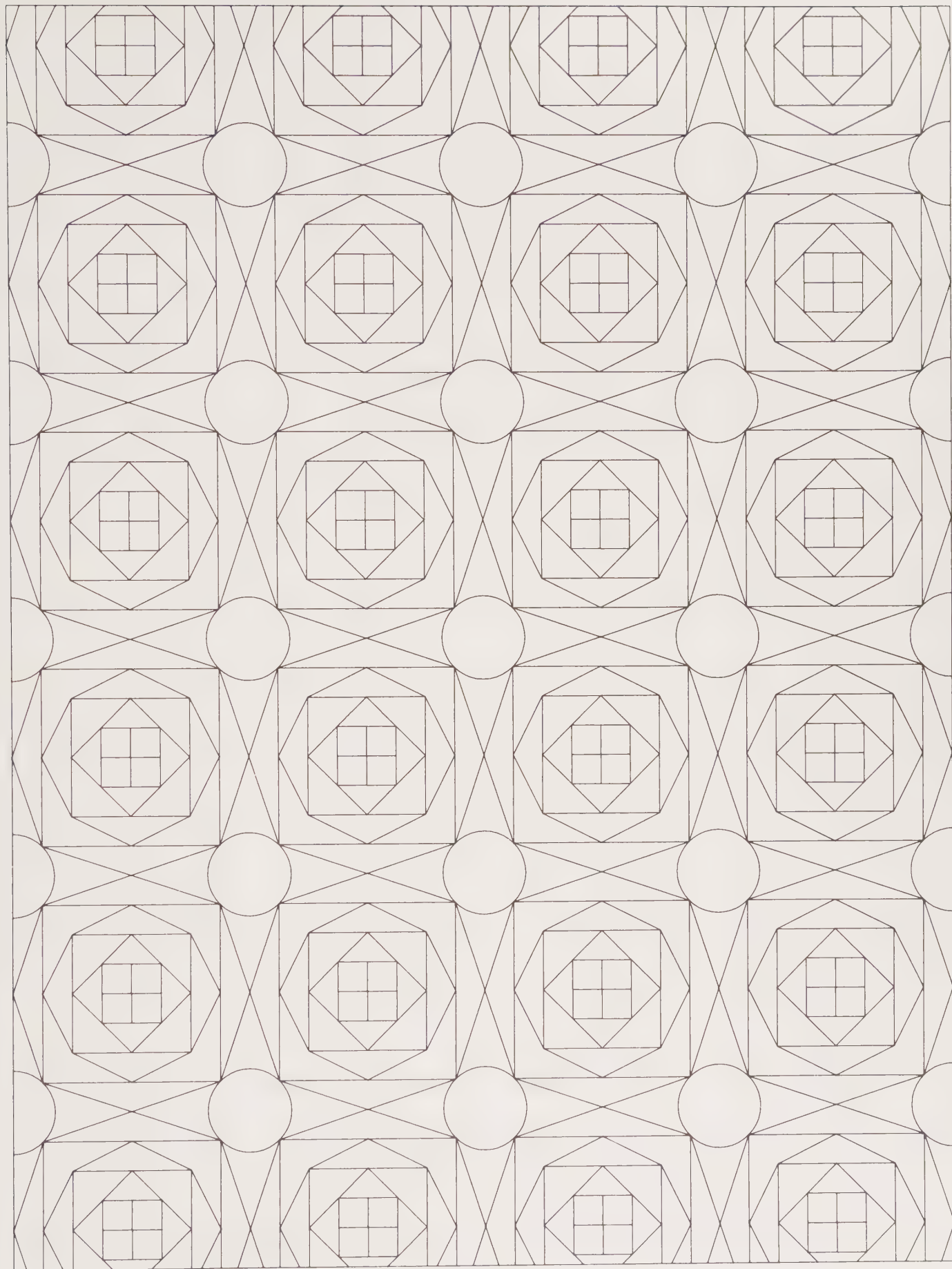




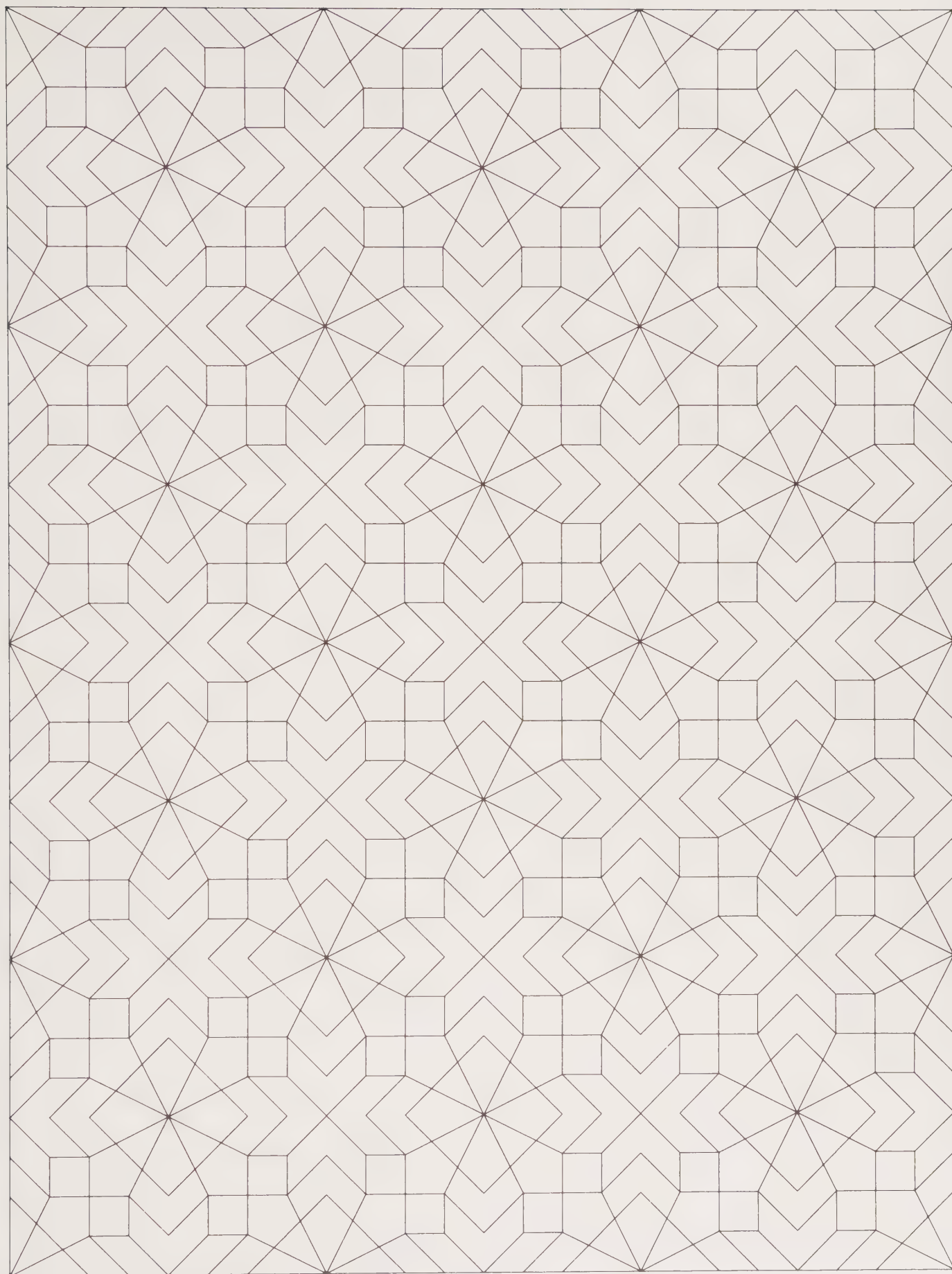


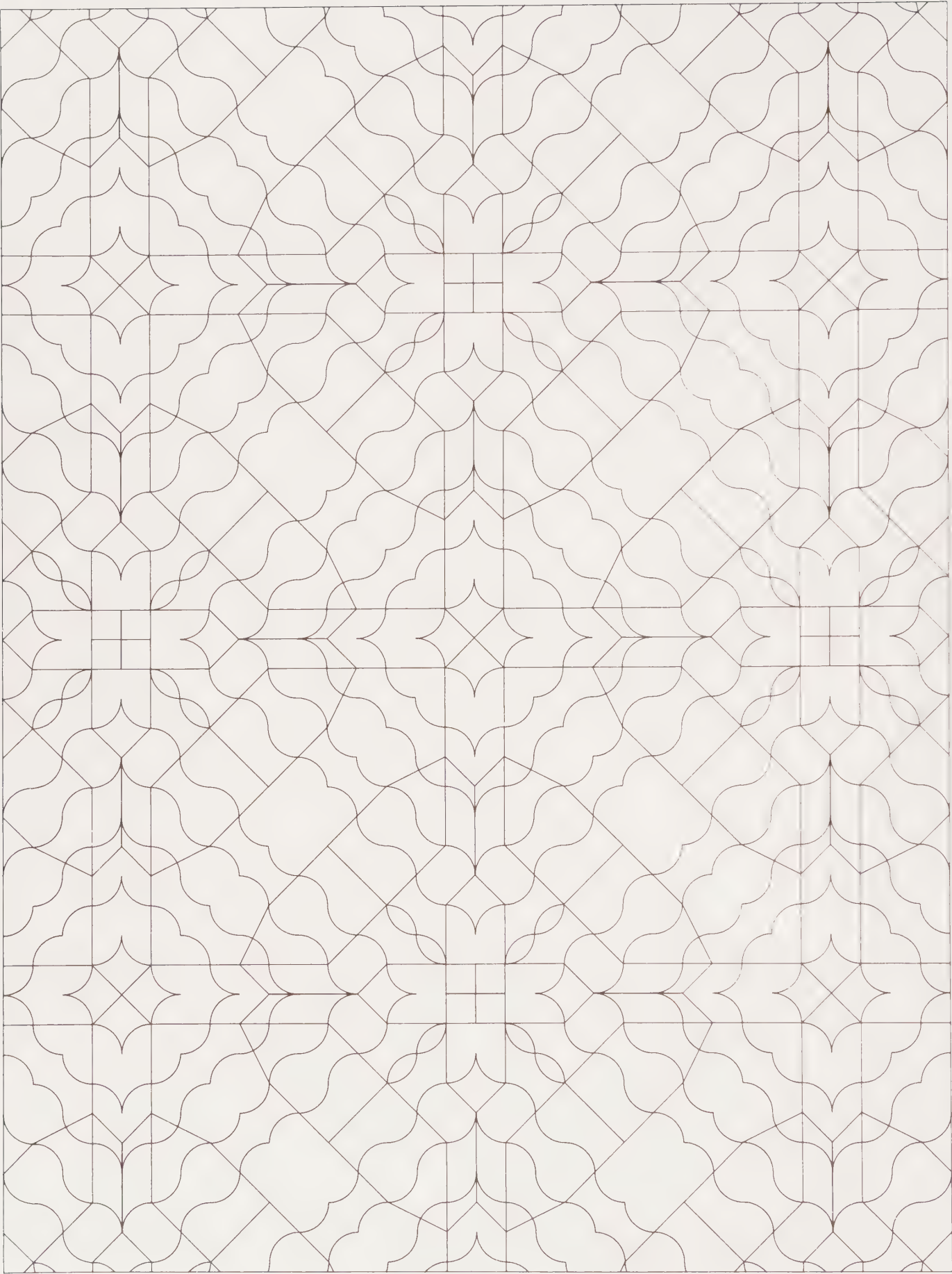


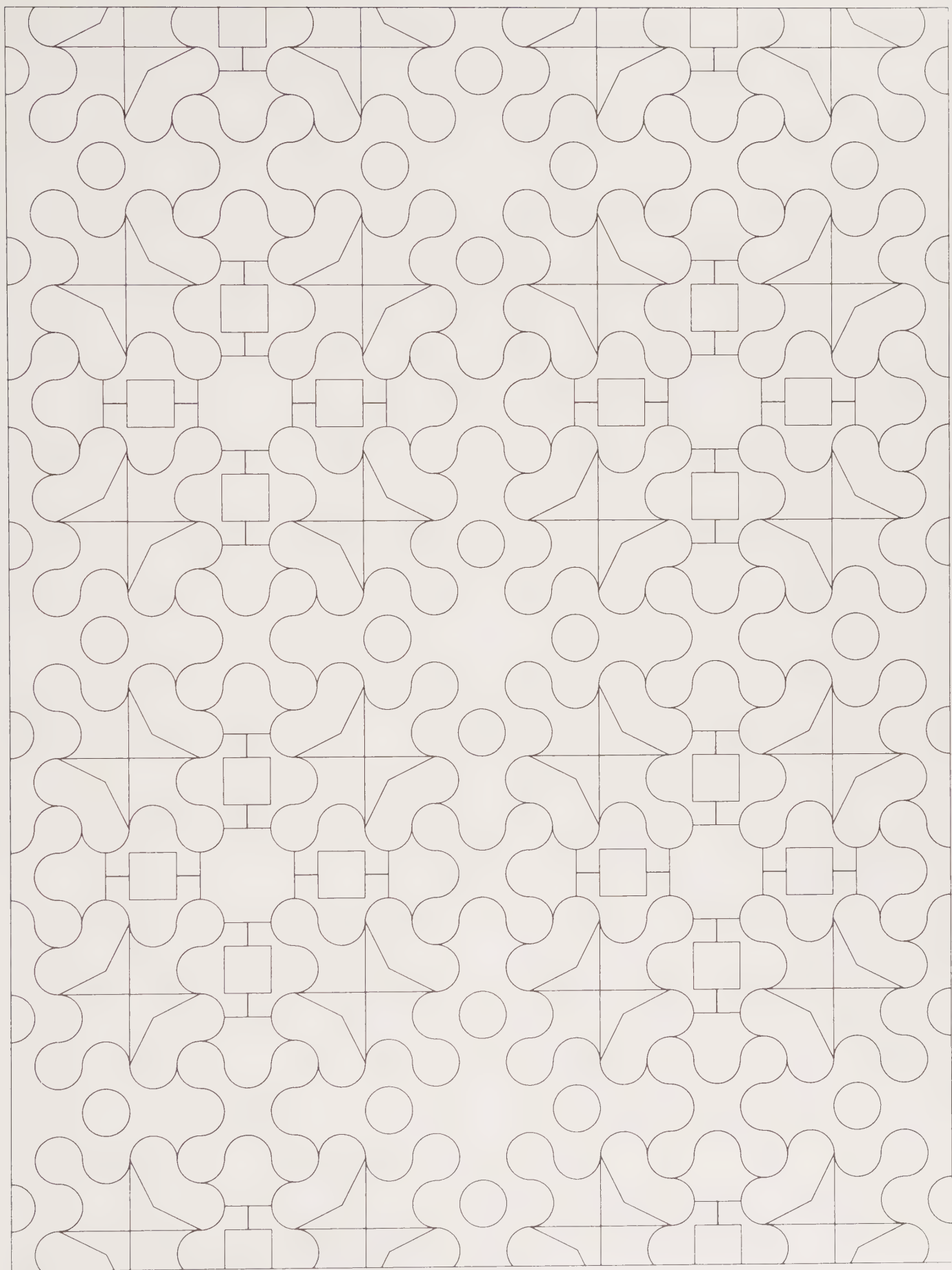


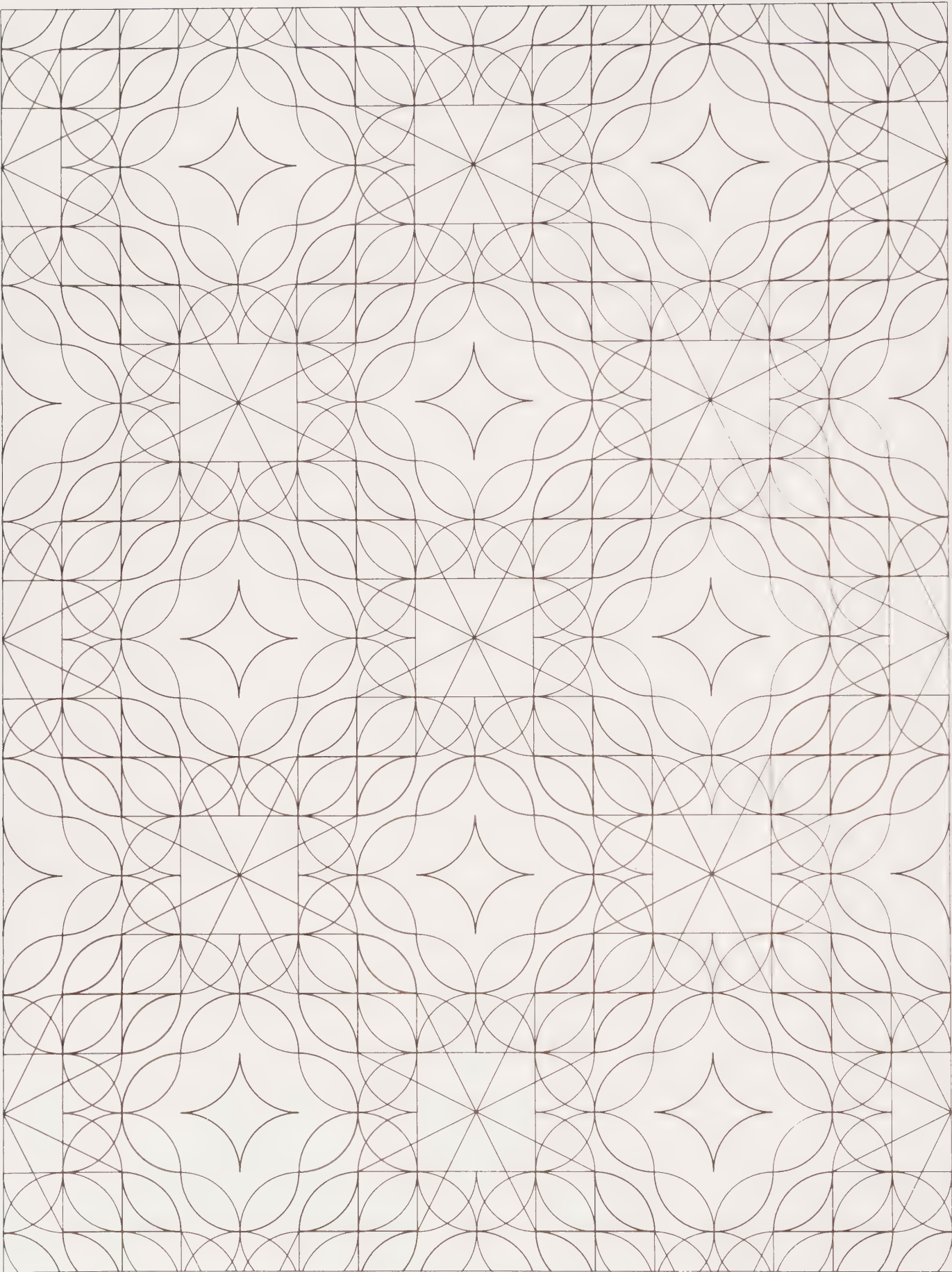




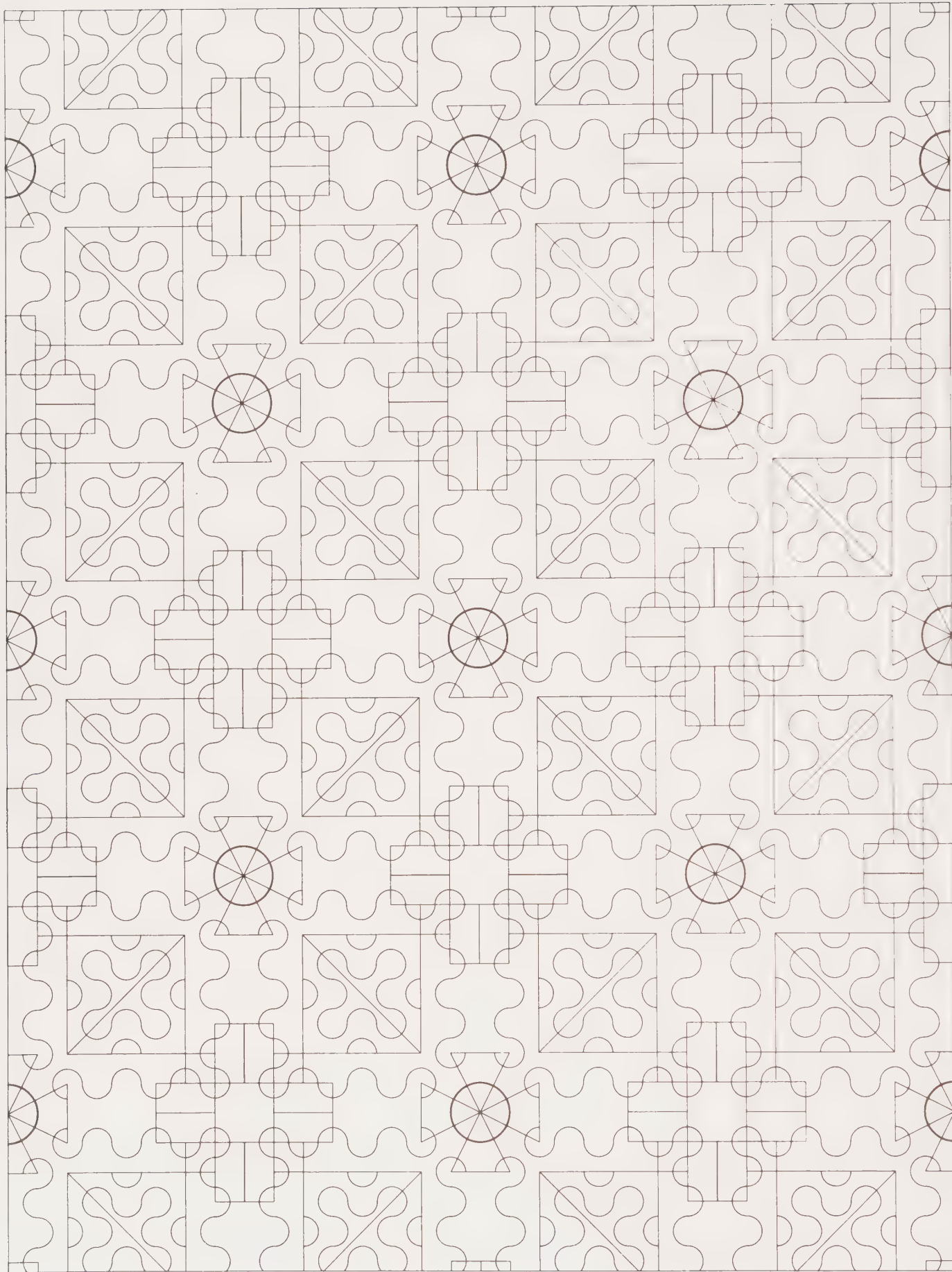




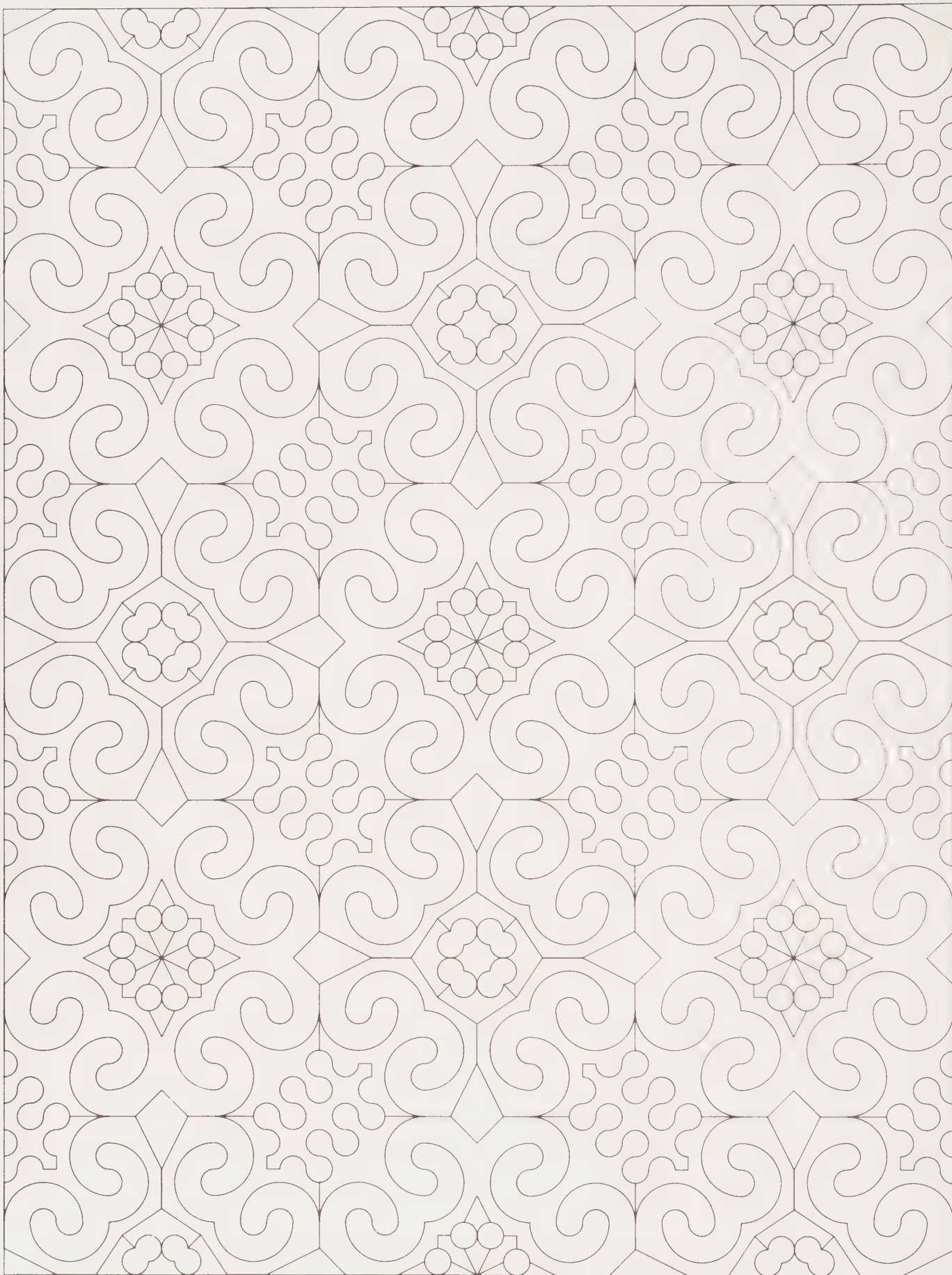


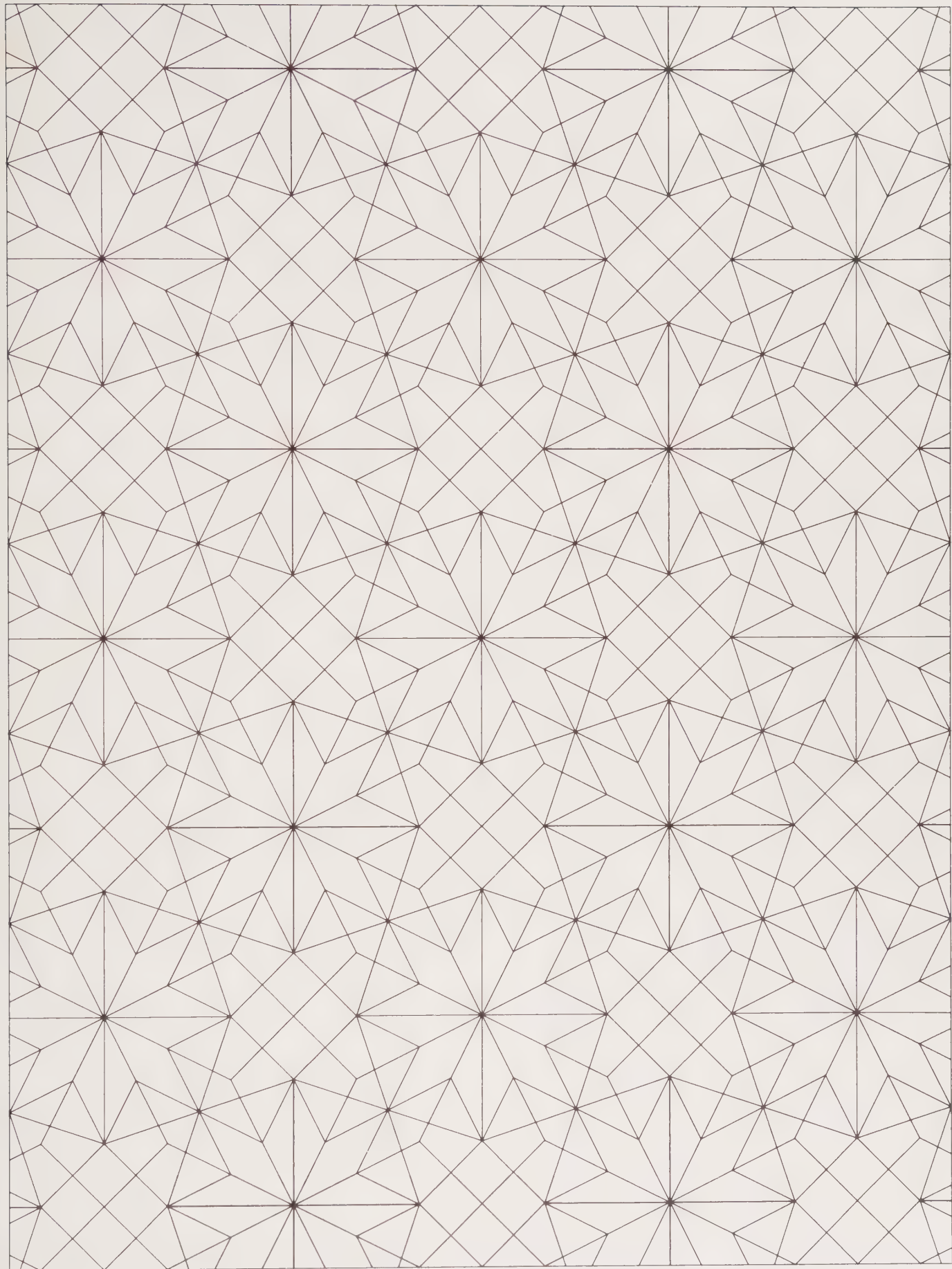




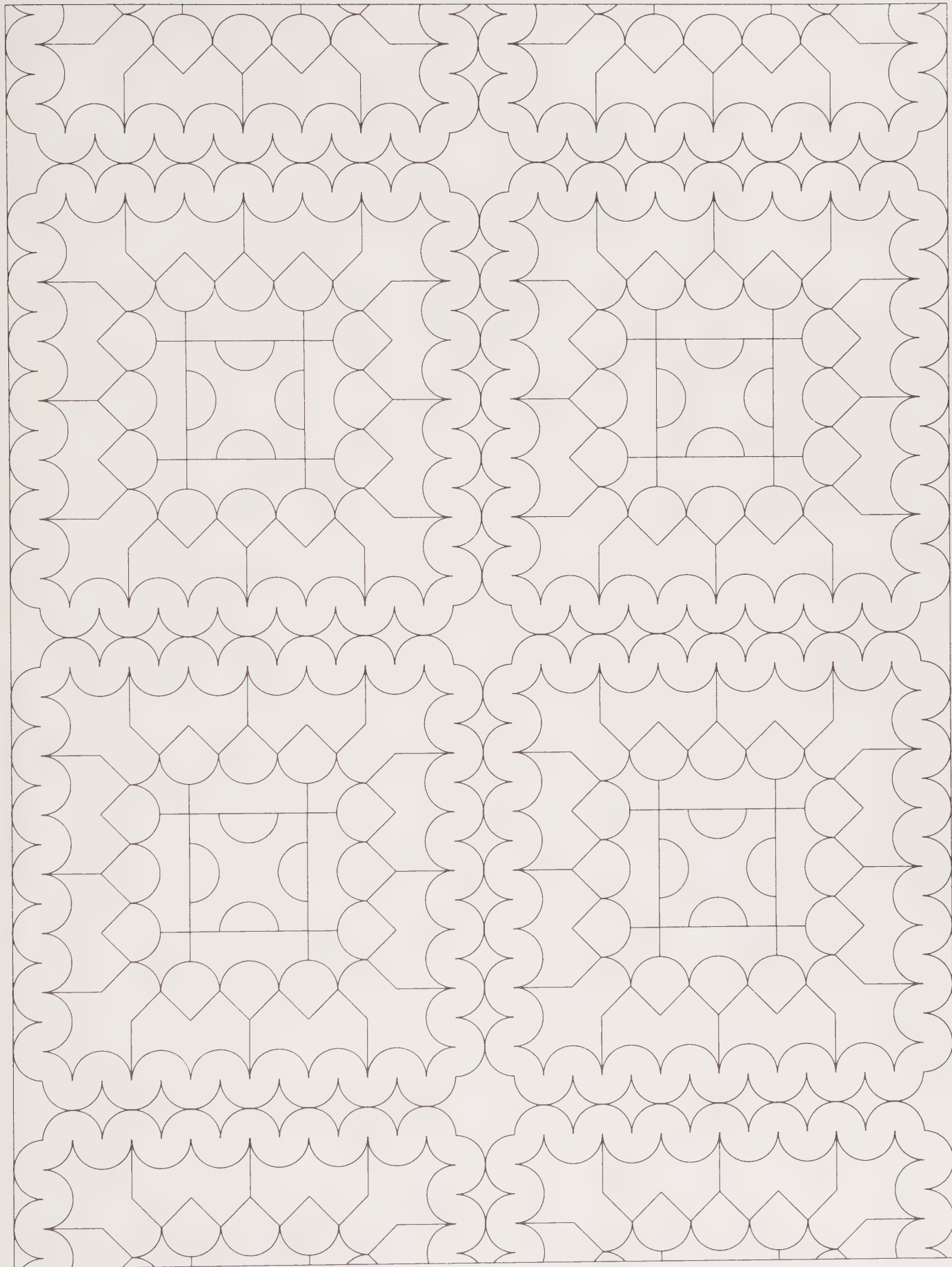


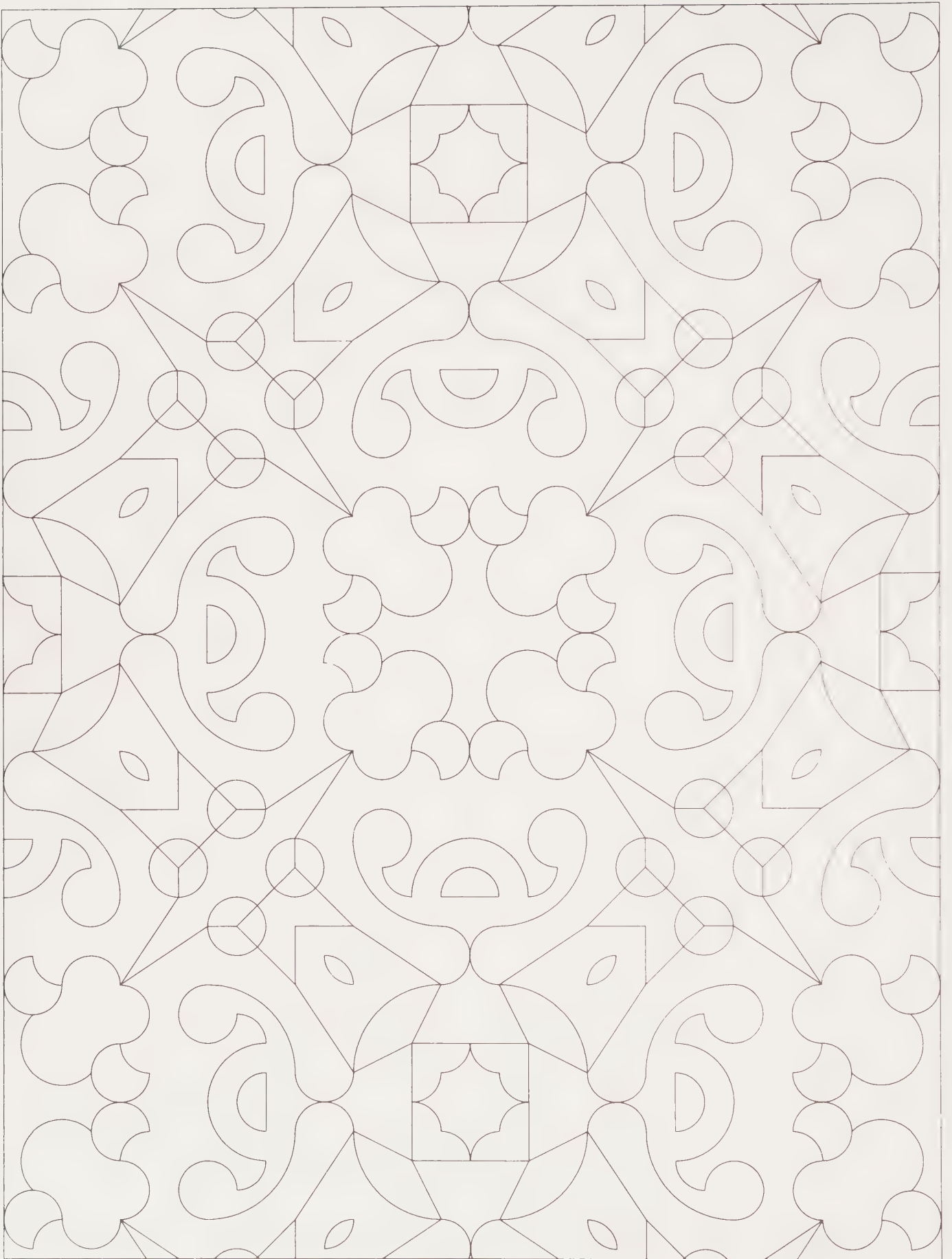










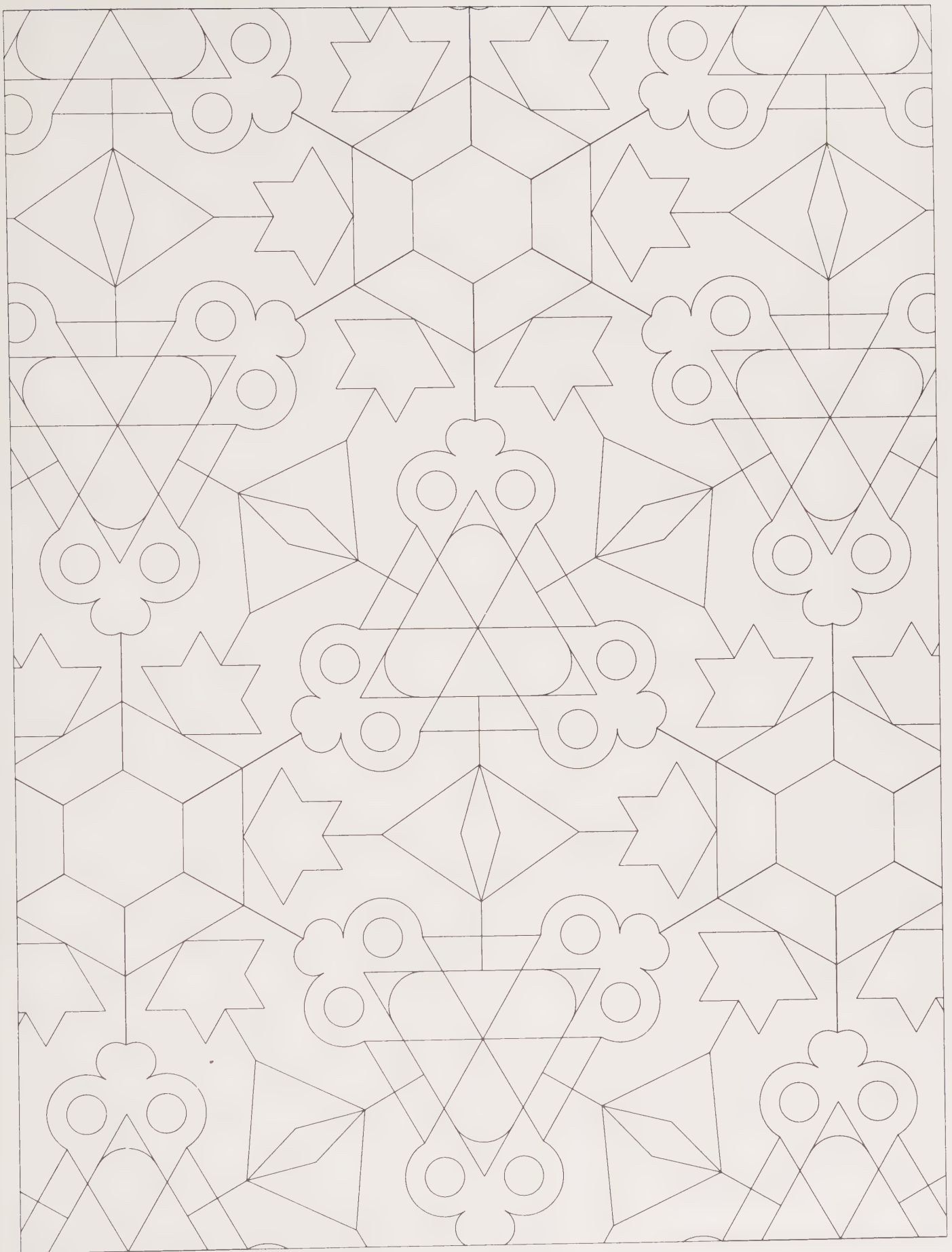


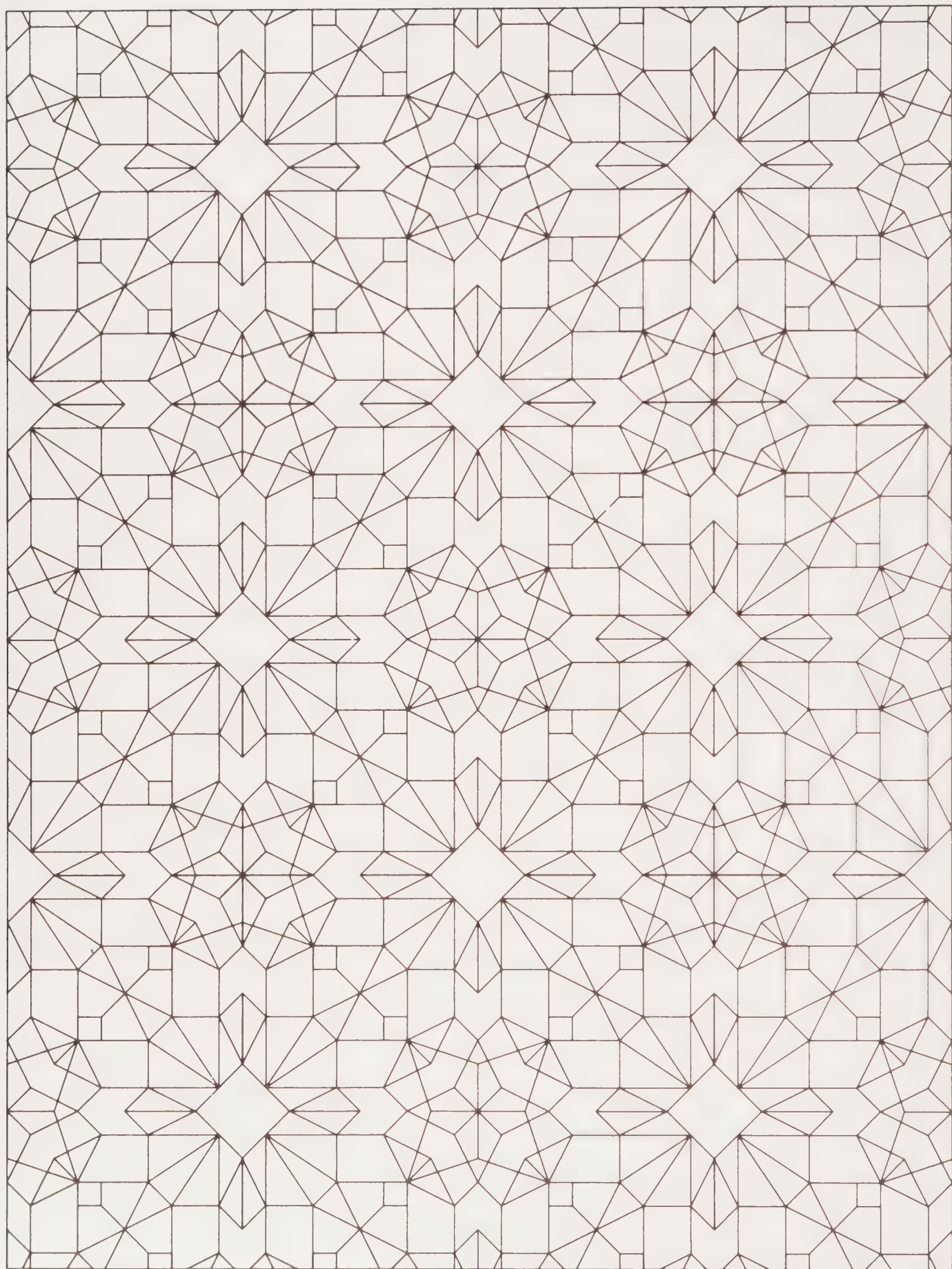




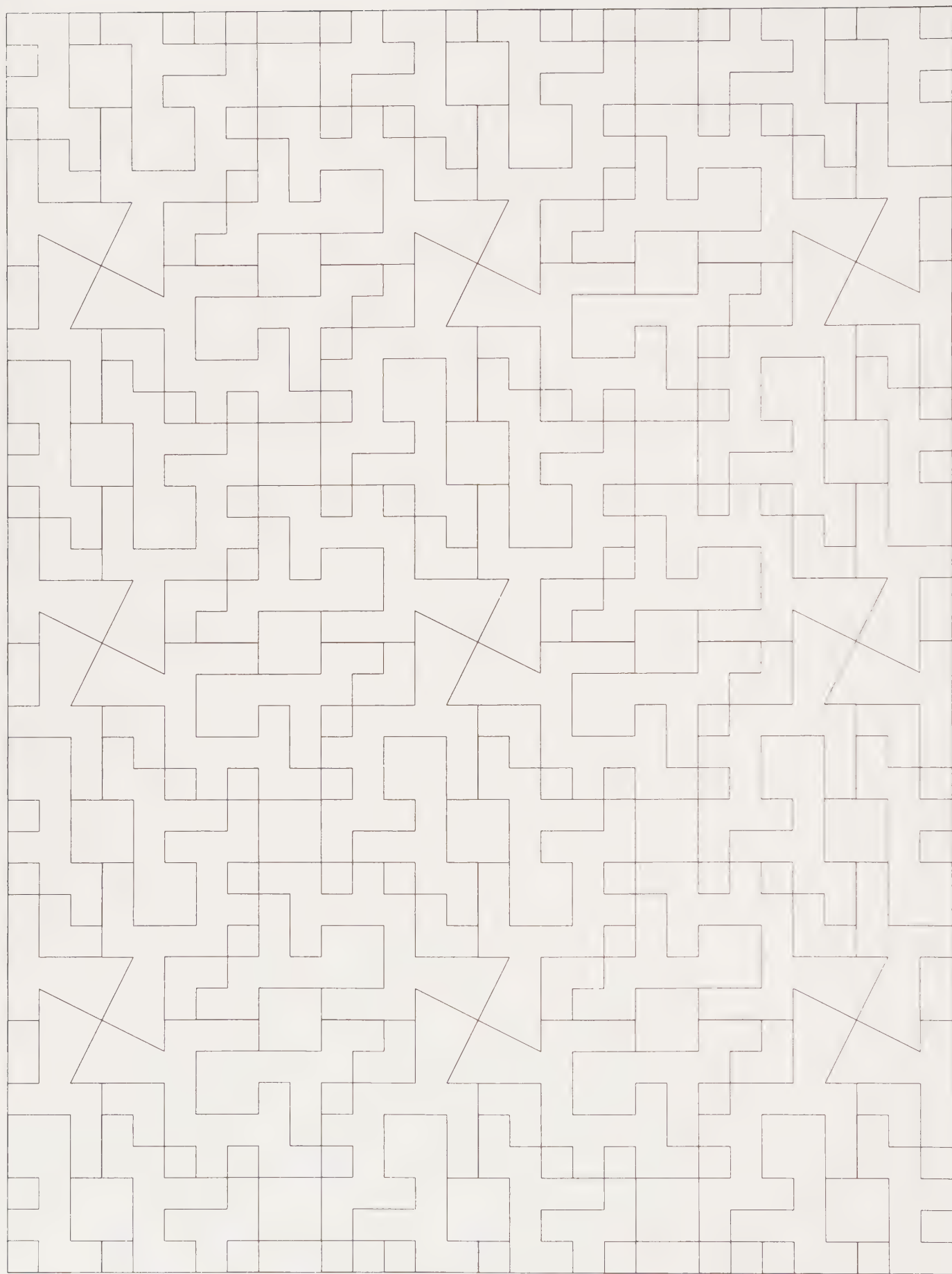


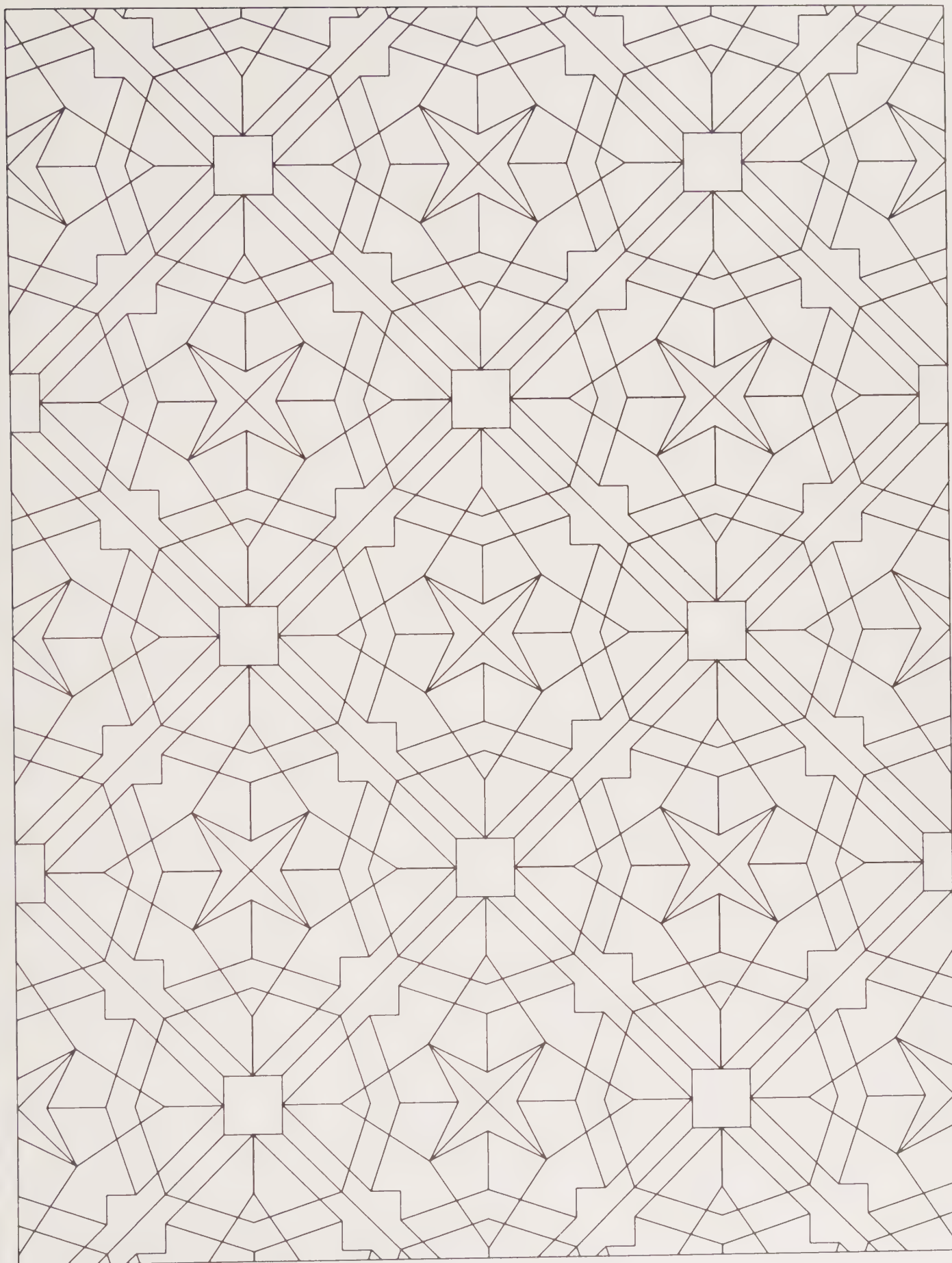


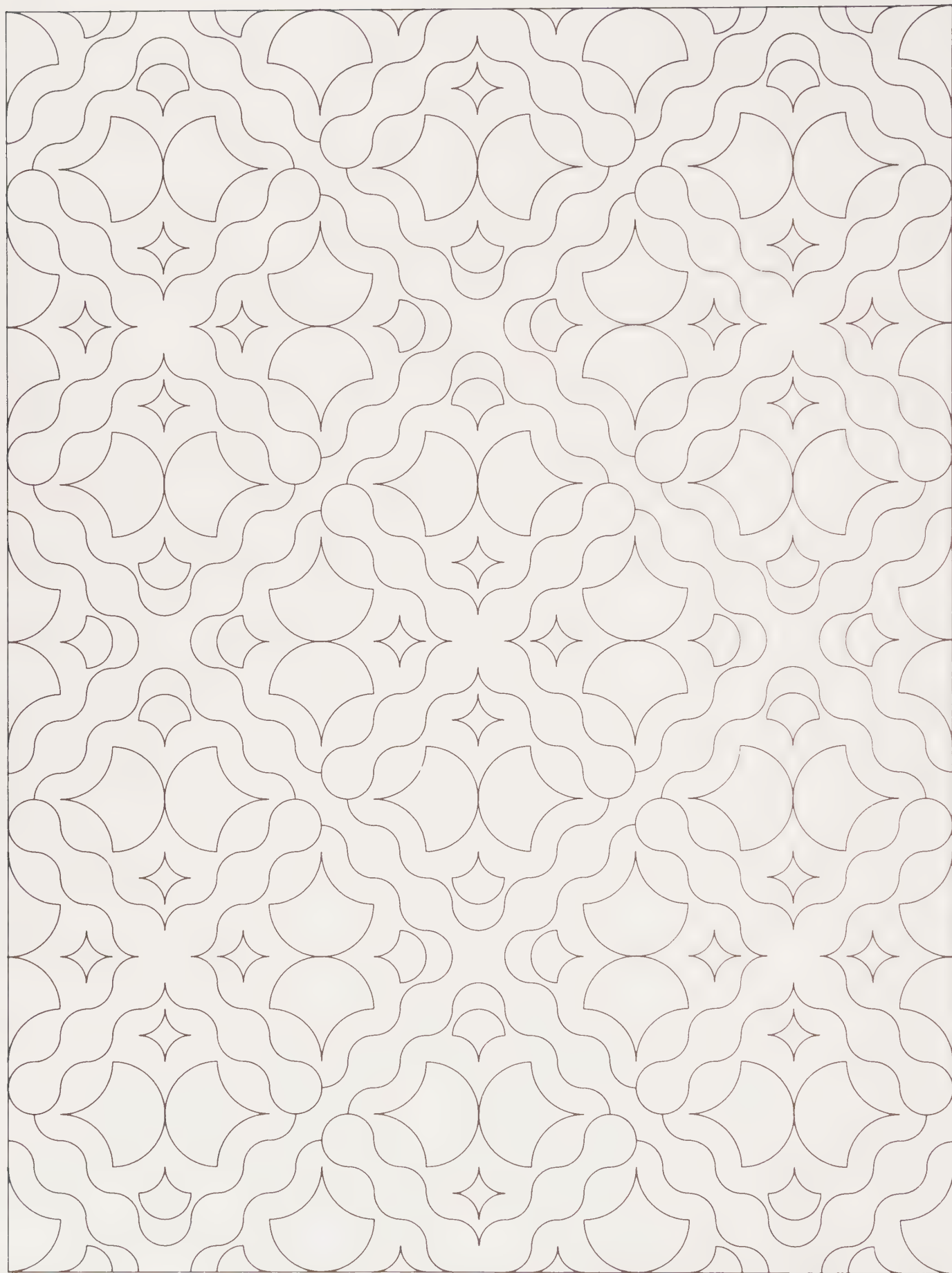






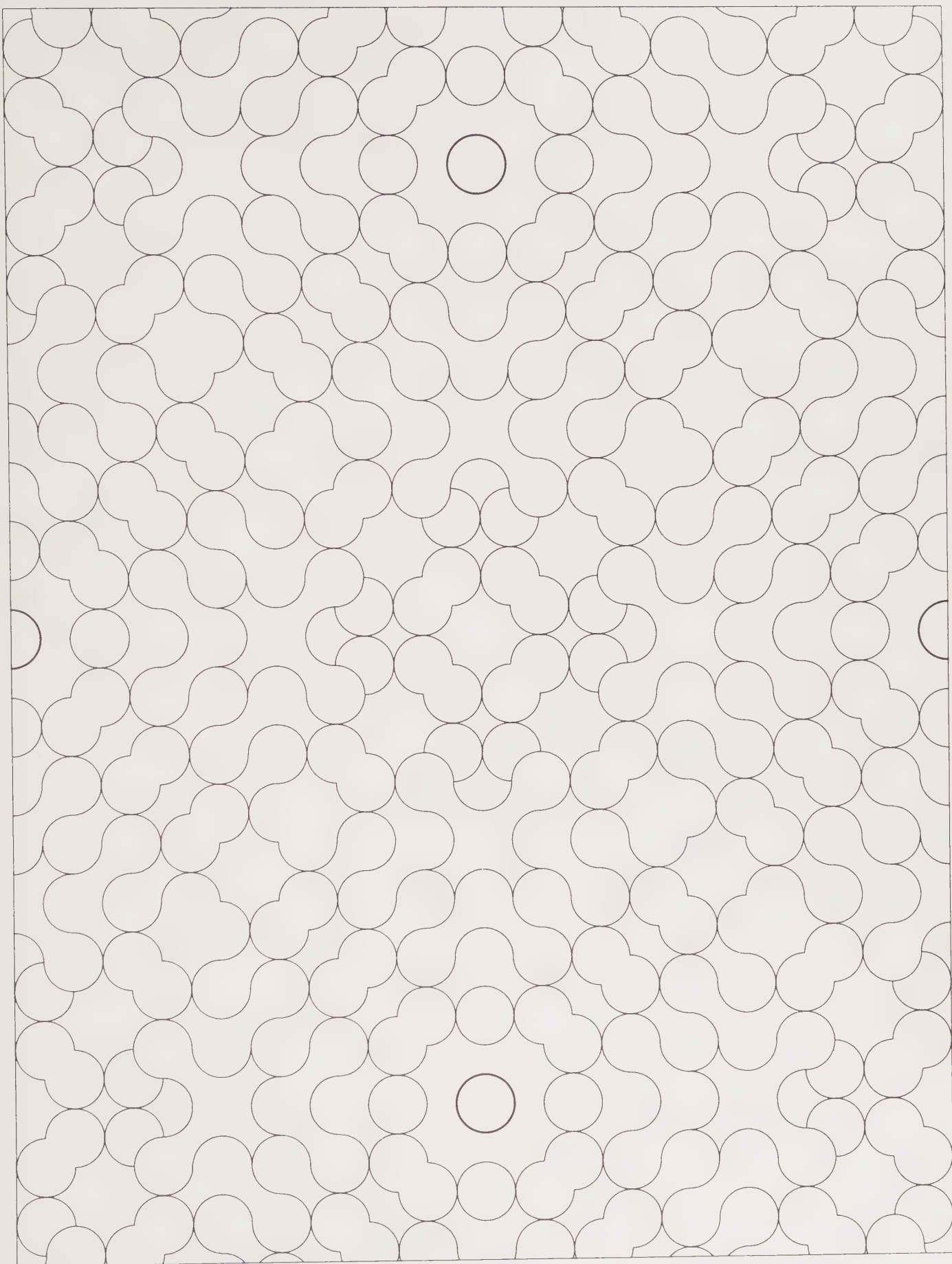


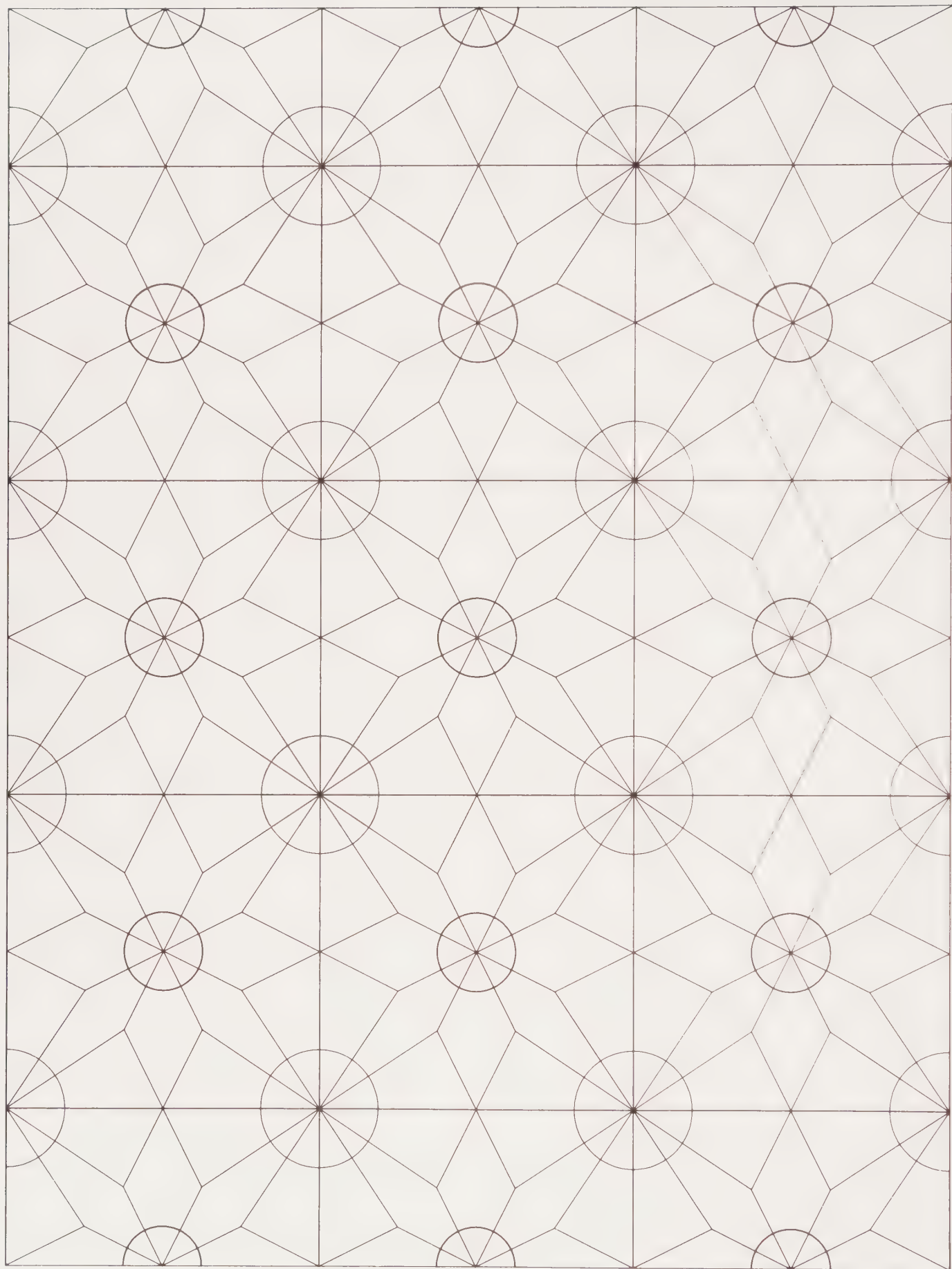


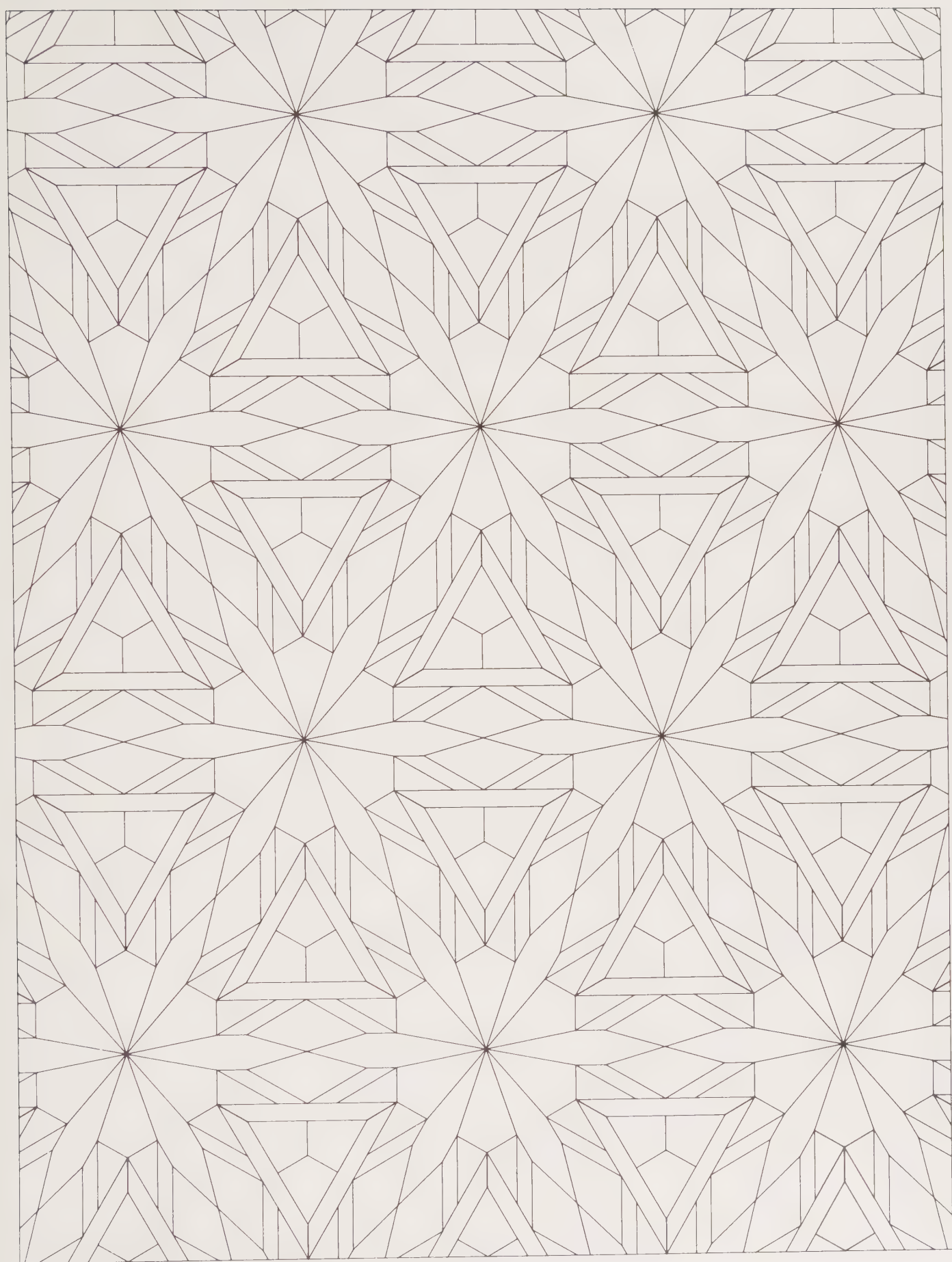


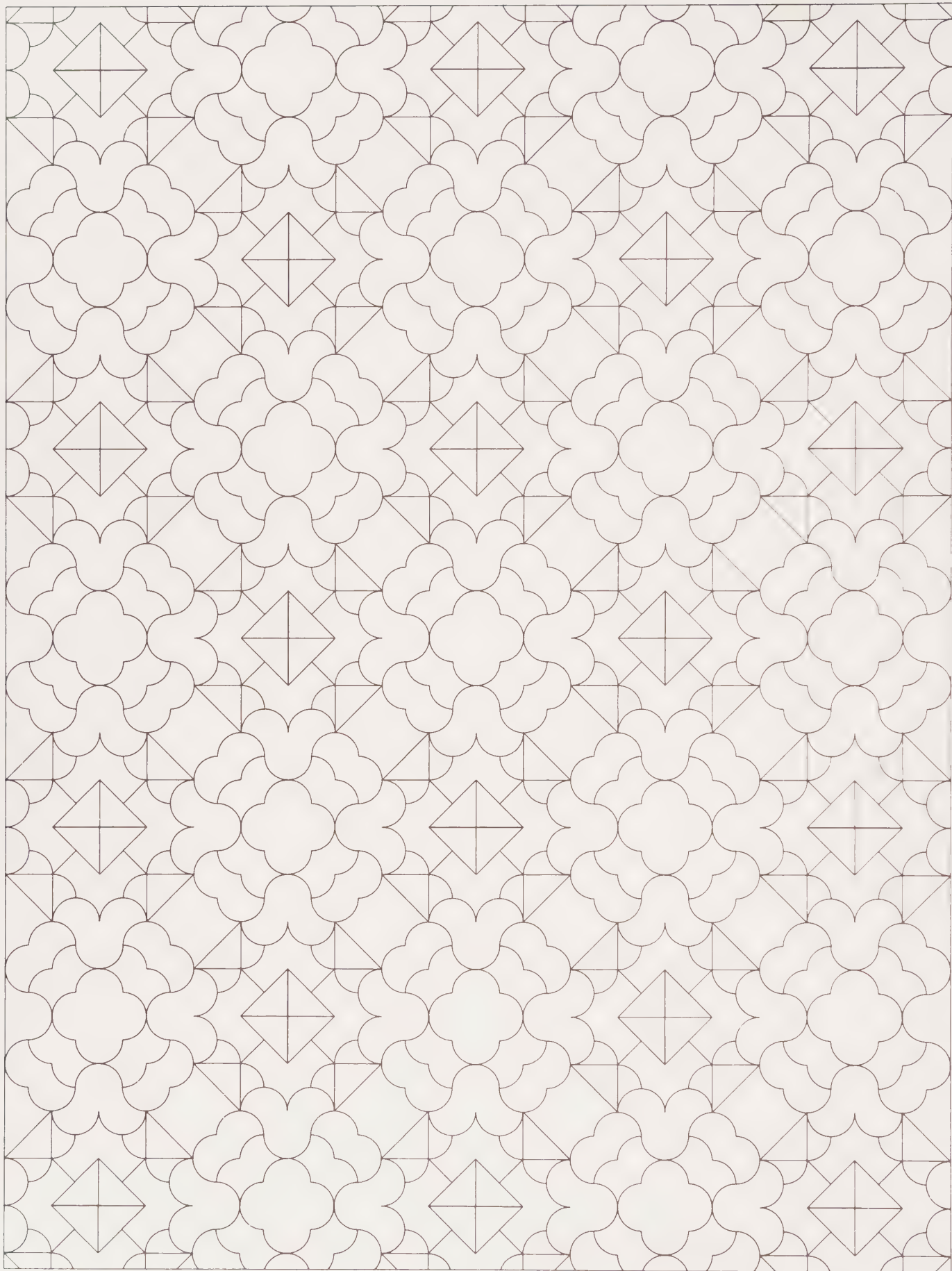


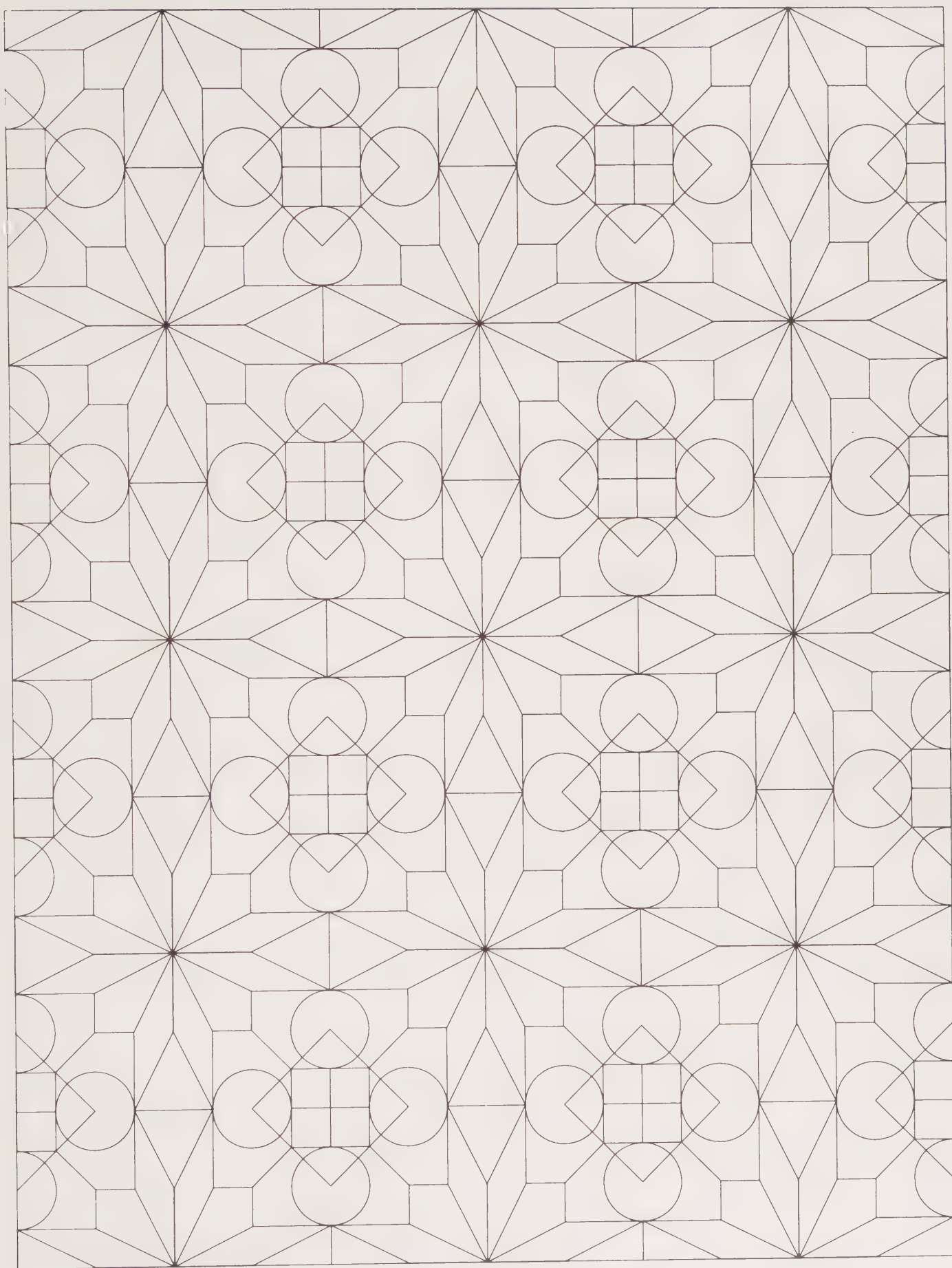


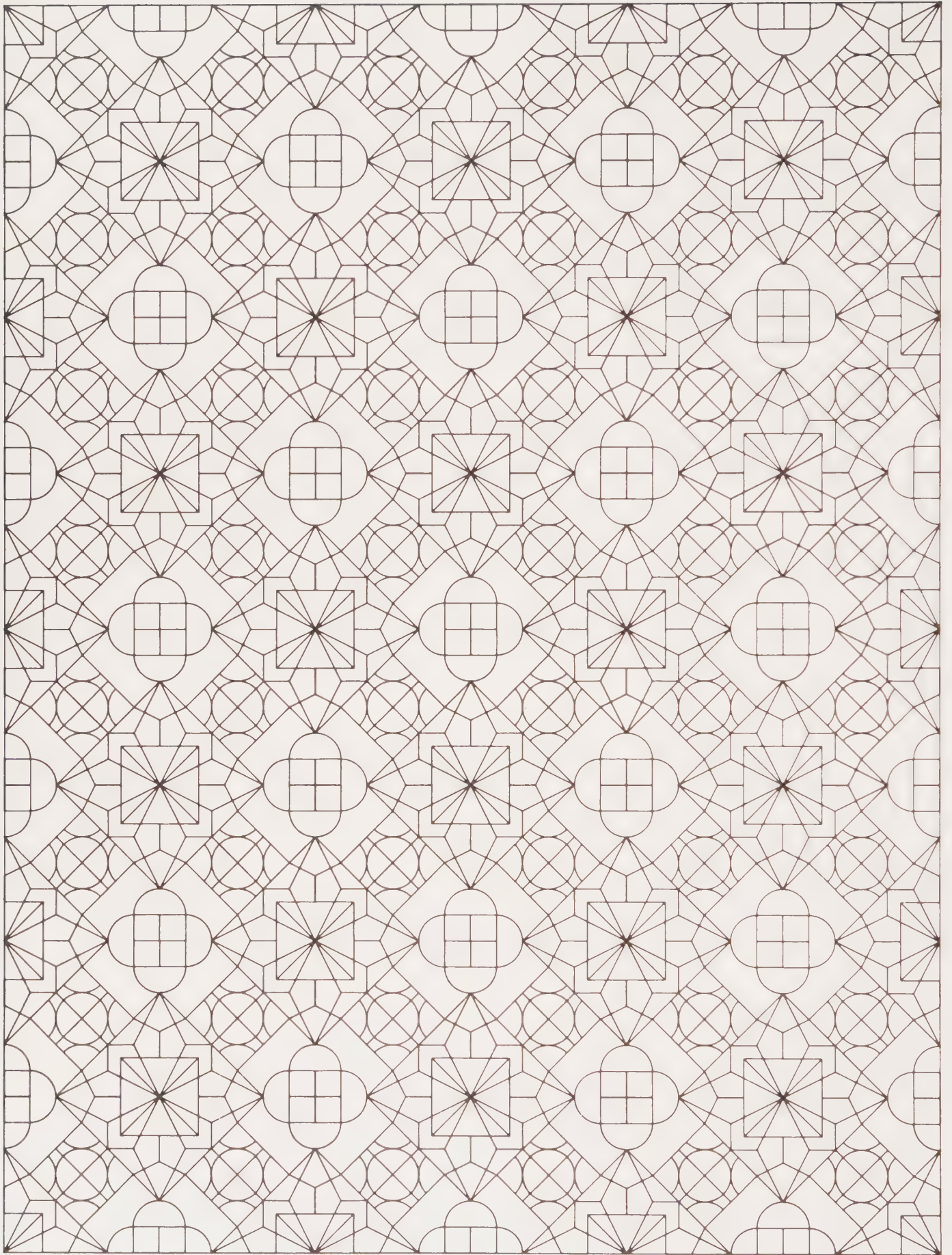


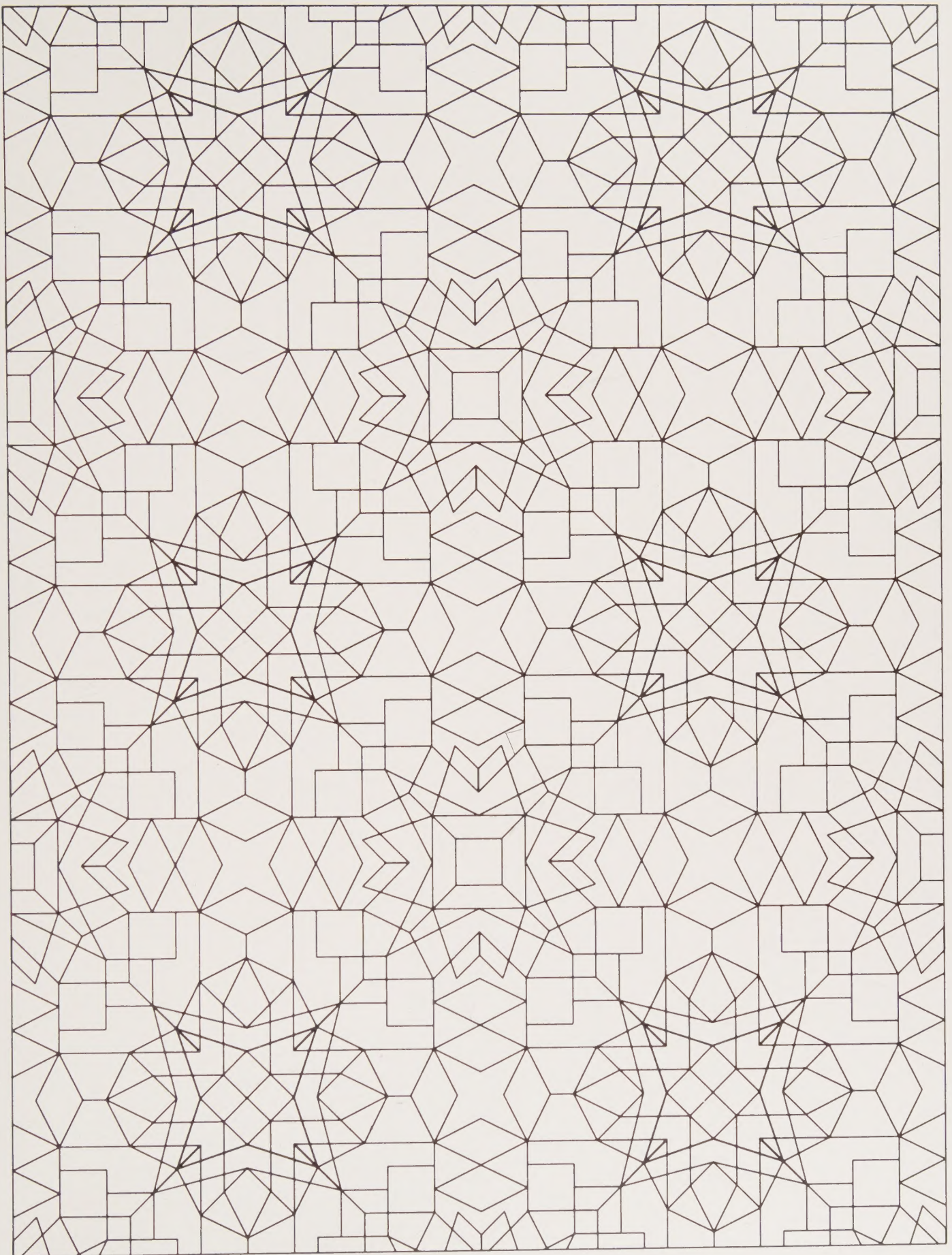


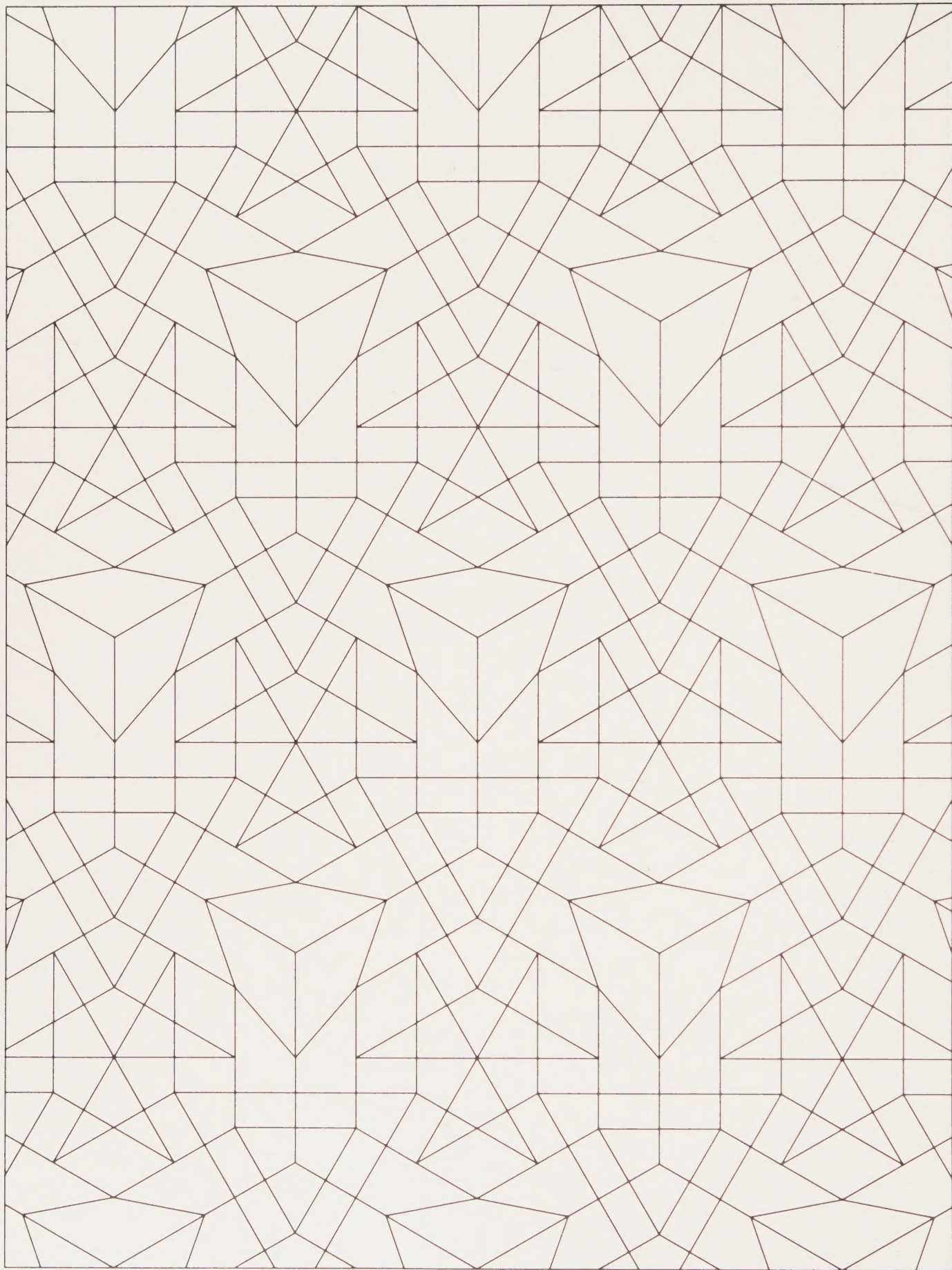












Ian O. Angell

COMPUTER GEOMETRIC ART

Geometric forms have intrigued man for centuries in many cultures throughout the world. The popularity of abstract designs is greater than ever today, finding expression in textiles, wallpapers, stationery, floor coverings and more.

Computer Geometric Art offers a fascinating collection of 45 striking lattice designs drawn by a computer and based on mathematical analysis of age-old geometrical compositions. The designs are a by-product of computer-science lecturer Ian O. Angell's research of beautiful ancient patterns and development of a computer program to generate new decorative motifs.

Using random, nonsymmetric sets of lines and arcs, the computer produced dynamic symmetric lattices called "serendipity patterns." The bold geometrics fall into 17 categories, each type corresponding to one of 17 two-dimensional space groups.

Use the crisp black-and-white illustrations alone or in any combination to create your own eye-catching compositions or color them in vivid hues to achieve dazzling new effects. Artists, designers and craft enthusiasts will find *Computer Geometric Art* a practical, inexpensive source of copyright-free ideas for a host of arts-and-crafts projects.

Original Dover (1985) publication. 45 black-and-white illustrations. Introduction. 48pp. 8¼ x 11. Paperbound.

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