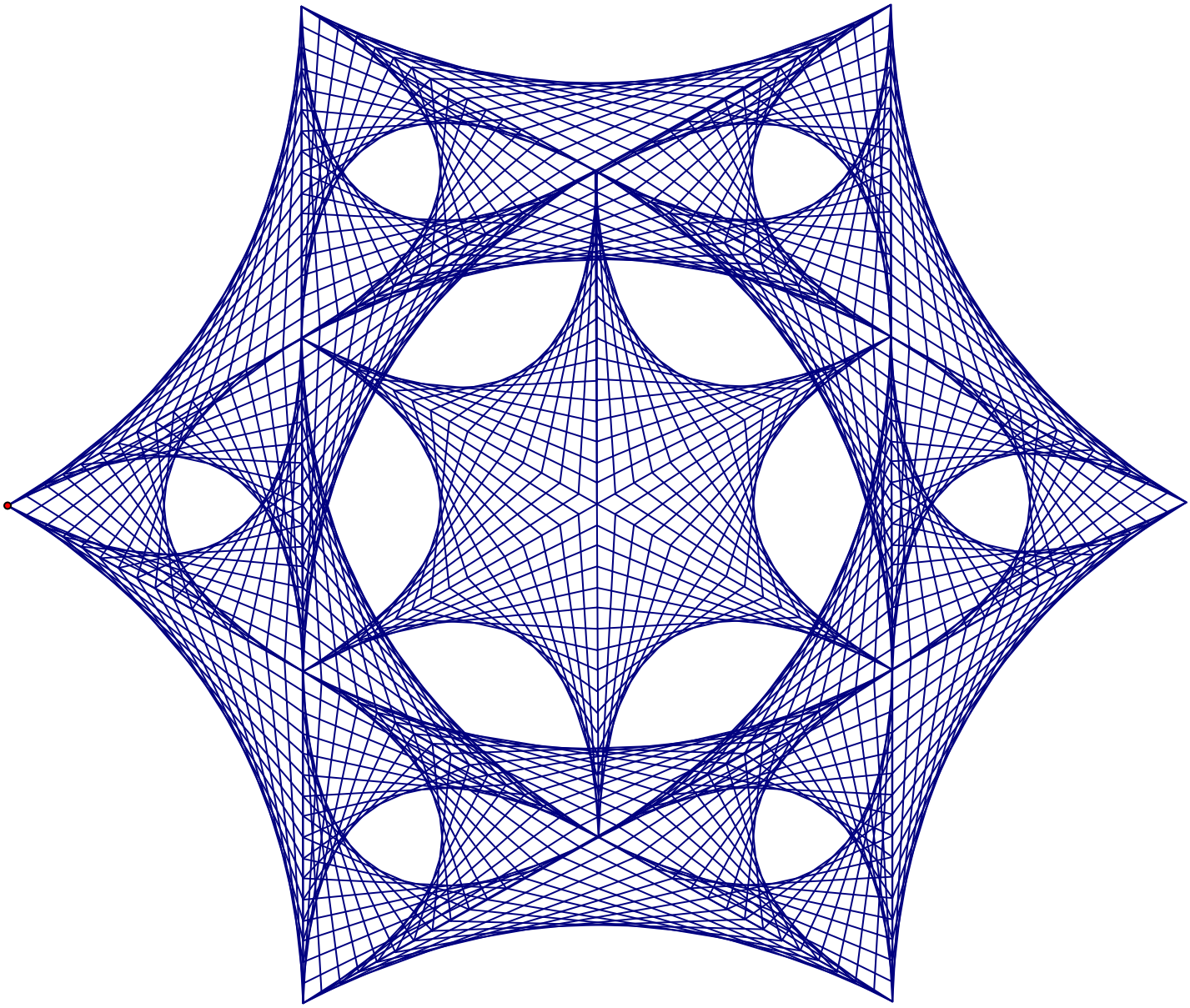
GEOMETRY



LINE DESIGN PROJECT

THE LINE DESIGN GEOMETRY PROJECT:

Steps to success:

1. Read the attached materials to get a sense of what you will be doing and how to do it. I also have a book with many Line Designs (to be used to help you come up with ideas). I will help you if you have questions or problems, but we will not be working in class on this project.
2. Practice creating a design on paper. Be creative and come up with something unique! Making a 3-Dimensional line design would certainly give you major kudos in the Creativity and Effort rubric categories!
3. Choose the paper*, colors, pens, marker, etc., and carefully construct your design using only straight lines. Mount your design on poster board (or some similar type of material) so that it can be hung in the room for all to see!
4. The design will be due on October 4th.

* If you wish, you may do the line design by stitching or by using pins or nails on tack board or plywood or foamcore. The choice of medium, color, and design are left to your creative impulses!

The grade:

The evaluation of this project will be done based on the following criteria:

- **Accuracy (10 pts):** Are the lines straight? Are the intervals even? Are the angles or circles or polygons correct when used?
- **Neatness (10 pts):** Are the erasures well made? Is coloring neat? Is the project presented well?
- **Creativity (20 pts):** Does the design have a personal and unique quality to it, either in the design or in the coloring/presentation?
- **Effort (10 pts):** is there an obvious effort involved in the completion of the project? Is it wonderful, amusing, interesting, exciting?
- **Meeting deadlines/following directions (10 pts):** Points will be deducted if the project is not handed in on time and/or if any parts of the directions are overlooked.

Accuracy:

8-10	• All line segments are straight. • All line segments end at the appropriate endpoints. • Intervals along axes for each angle are evenly distributed. • Angles, circles, polygons, etc. are correctly constructed when used.
5-7	• Most line segments are straight. • Most line segments end at the appropriate endpoints. • Intervals along axes for each angle are mostly evenly distributed. • Angles, circles, polygons, etc. are mostly correctly constructed when used.
3-4	• Some line segments are straight. • Some line segments end at the appropriate endpoints. • Intervals along axes for each angle are sometimes evenly distributed. • Angles, circles, polygons, etc. are sometimes correctly constructed when used.
0-2	• Most line segments are not straight. • Line segments rarely end at the appropriate endpoints. • Intervals along axes for each angle are rarely evenly distributed. • Angles, circles, polygons, etc. are rarely correctly constructed when used.

Neatness:

8-10	• Erasures are well made..there is little to no evidence of original construction marks. • There are no smudges. • Coloring is neatly done and is pleasing to the eye. • Care is taken in terms of the presentation of the design (e.g., it is centered; backgrounds are used; name, title, date, etc. are displayed; design is of a large size and takes up most of the poster board)
5-7	• Erasures are mostly well made..there is little evidence of original construction marks. • There are few smudges (1-3, but no more). • Coloring is neatly done in most instances and is mostly pleasing to the eye. • A good degree of care is taken in terms of the presentation of the design (e.g., it is centered; name, title, date, etc. are displayed, design is of a large size, but there is a little too much whitespace around the design)
3-4	• Erasures are sometimes well made..there is some evidence of original construction marks. • There are smudges (4-5, but no more). • Coloring is neatly done in some instances but only partially pleasing to the eye. • Some care is taken in terms of the presentation of the design (e.g., name, title, date, etc. are displayed, design is of a medium size and there is a little too much whitespace around the design).
0-2	• Erasures are not well made..there is much evidence of original construction marks. • There are many smudges (more than 5). • Coloring is not neatly done and/or is not pleasing to the eye. No coloring is done. • Little care is taken in terms of the presentation of the design (e.g., design is not centered; name, title, date, etc. are not displayed, design is of a small size and there is too much whitespace around the design).

Creativity:

16-20	• Very clever; creatively designed • Original in nature (e.g., uses completely original design or combines non-original designs in an original way). • *"WOW!" in spades…remember that the projects are being compared relative to each other!*
10-15	• Displays creative thinking • Design is mostly original in nature (some portion of the design is copied from another source, but most is original) • *A decent amount of "WOW!"…remember that the projects are being compared relative to each other!*
5-9	• Shows some creative thinking • Design is somewhat original in nature (most of the design is copied from another source, but some portions are original in nature) • *Not much "WOW!"…remember that the projects are being compared relative to each other!*
0-4	• Lacks creativity • Design is fully copied from another source. • *No "WOW!"…remember that the projects are being compared relative to each other!*

Effort:

8-10	• The project clearly shows that much effort was put into producing an excellent design. • The project looks complete – nothing was left undone. • Risks were taken in terms of design (design is complex, materials used are unique, etc.) • Intervals along axes are very small. • Design is 3D in nature.
5-7	• The project shows that good effort was put into producing the design. • The project looks mostly complete – some touch up is still required. • Some risks were taken in terms of design (design is relatively complex, materials used are mostly unique, etc.) • Intervals along axes are small.
3-4	• The project looks like parts of it were thrown together at the last minute. • The project does not look complete – a lot of work is still required. • Few risks were taken in terms of design (design is relatively simple, materials used are predictable, etc.) • Intervals along axes are medium-sized.
0-2	• The project looks as if it were put together in a hurry. • The project is not complete. • No risks were taken in terms of design (design is very simple) • Intervals along axes are large.

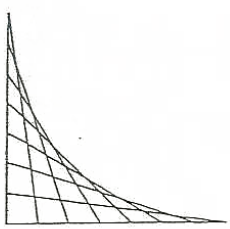
Meeting Deadlines/Following Directions:

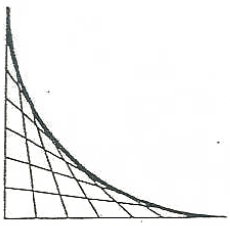
8-10	• The project is handed in on time. • The project goes beyond the requirements as presented.
5-7	• The project is handed in on time. • The project meets all the requirements as presented.
3-4	• The project is handed in no more than one day late. • The project meets some of the requirements as presented.
0-2	• The project is handed in more than one day late. • The project meets few of the requirements as presented.

BASIC INSTRUCTIONS

WHAT ARE LINE DESIGNS?

Line designs are geometric patterns formed entirely by the use of straight line segments that produce the illusion of a curve. When first seeing one of these designs you will have to look closely to convince yourself that no curved lines are used. This interesting property produces fascinating results yet line designs are relatively simple to do.

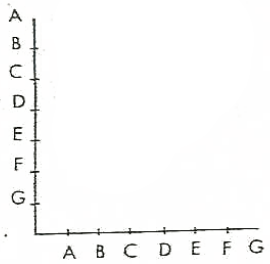




HOW ARE THEY MADE?

These line designs are formed by connecting certain sequences of points with line segments Different designs are formed by selecting points in various ways. The most common way is to connect equally-spaced points along the two sides of an angle as shown and described below.

(1) Draw an angle with two sides of the same length.
(2) Divide each side into an equal number of segments and mark them as shown in figure 1.
(3) Connect point A with point A, point B with point B, and so on as shown in figure 2 until all of the points are connected.



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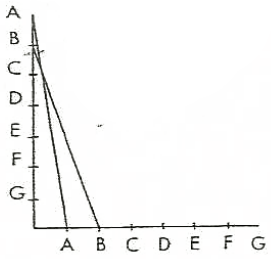

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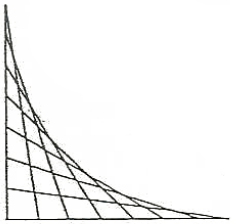
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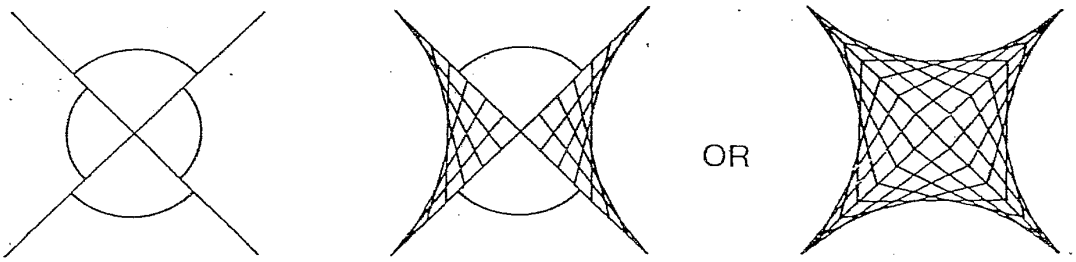
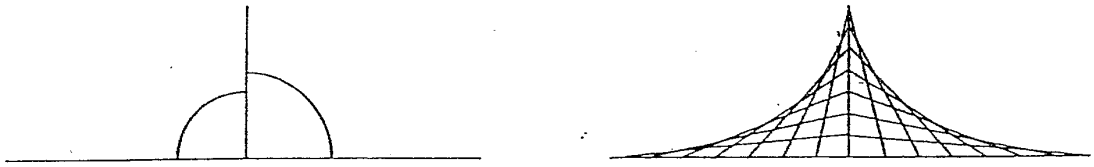
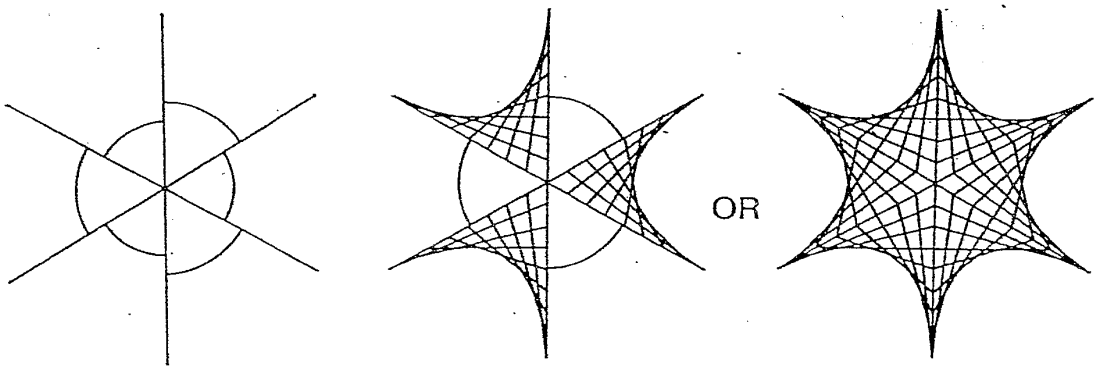
MAKING DESIGNS BY COMBINING ANGLES

By combining two or more angles a variety of designs can be produced. Complete each angle using the basic line design technique.

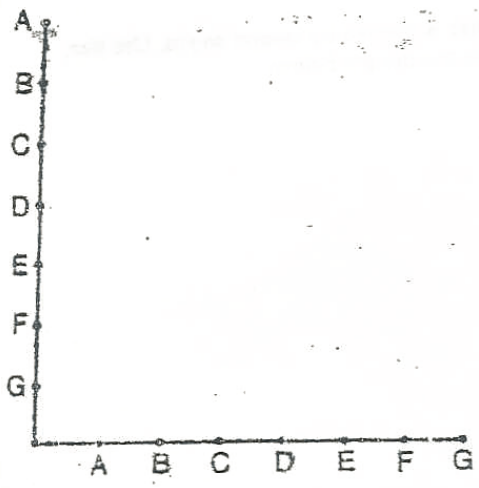




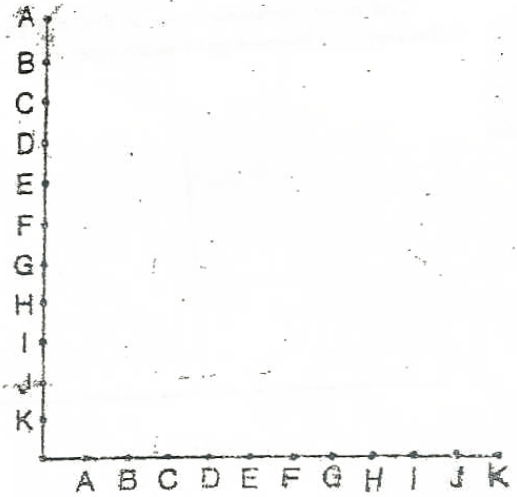


LINE DESIGNS WORKSHEET ONE

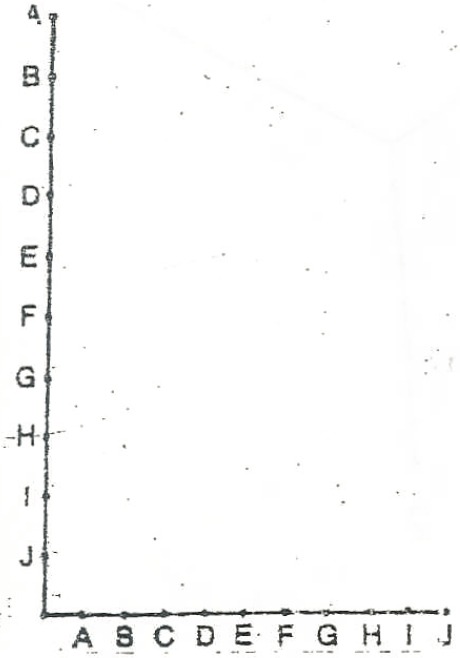
This worksheet will show you how to make beautiful geometric curves, called line designs, by drawing a series of straight line segments.



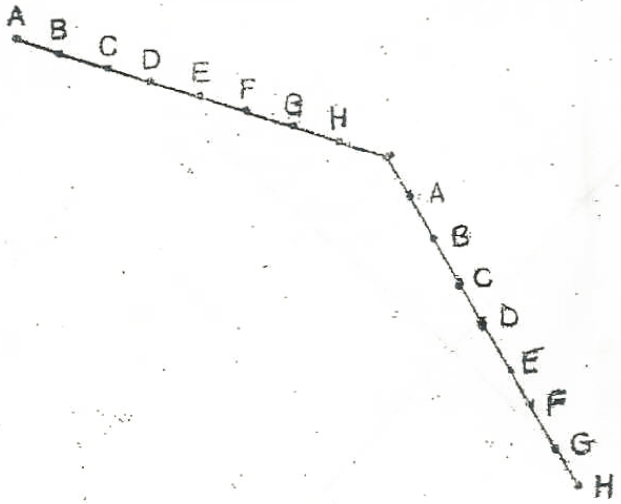
1. In the figure above, connect like letters (A to A, B to B, etc.) with a straight edge.



2. Notice the "curve" that was formed by the series of straight segments. The two sides of the angle are divided into an equal number of equal parts.
Connect the like letters above, and notice the difference in the design when the equal parts are closer together.



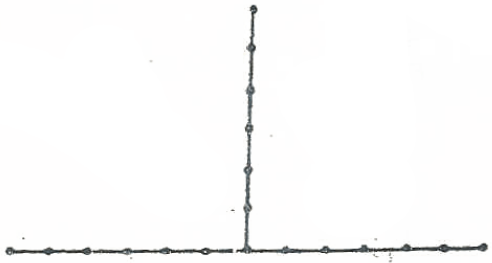
3. The two sides of the angle do not need to be equal in length. However, they do need to be divided into the same number of parts. Connect the like letters above to see the effect.



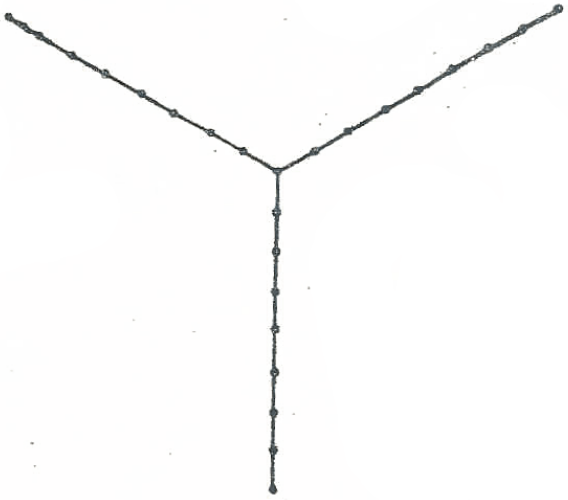
4. The angle which is the basis for the line design does not need to be a right angle. Connect the like letters of the obtuse angle above to see the effect.

LINE DESIGNS WORKSHEET TWO

The most common type of line design is one that is formed by several angles. Use the technique you learned with worksheet one to complete the designs below.



1



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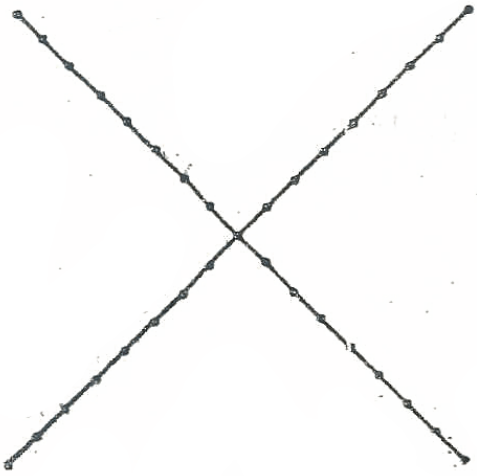

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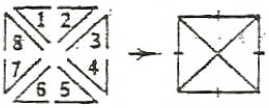
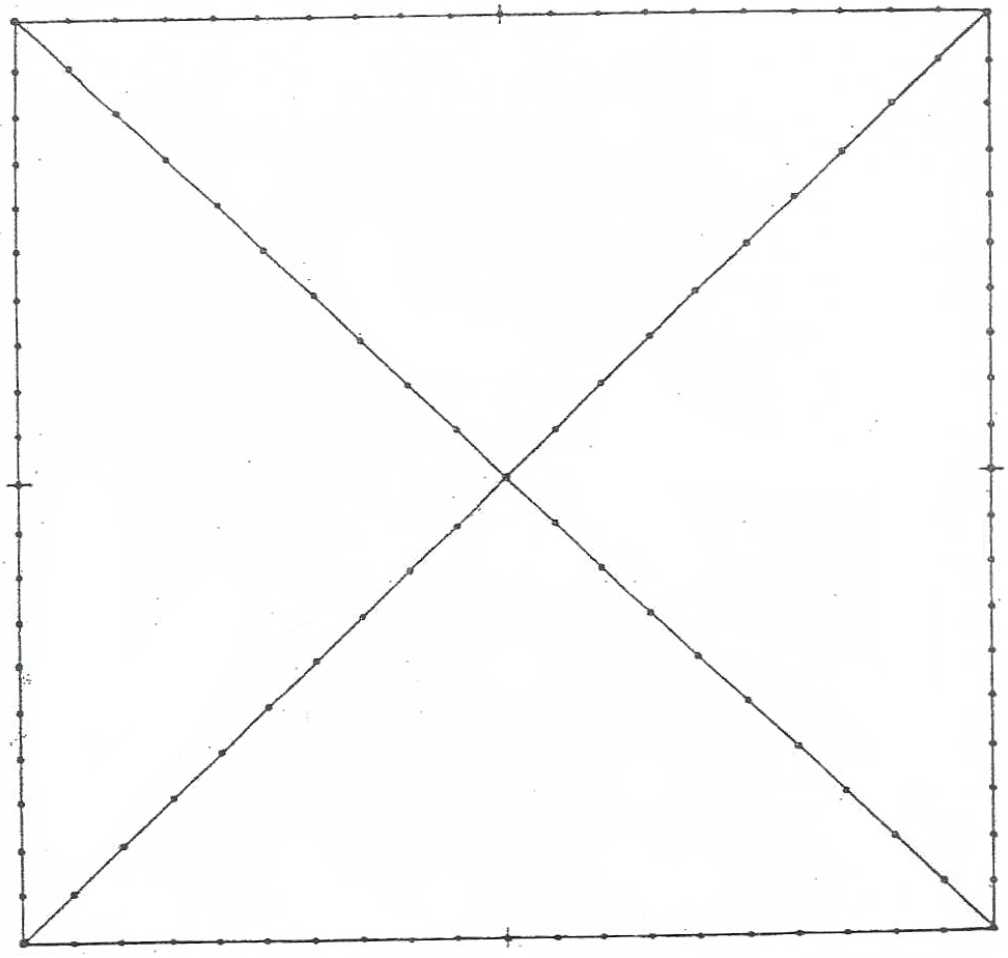
LINE DESIGNS WORKSHEET THREE

The square below can be thought of as eight angles.

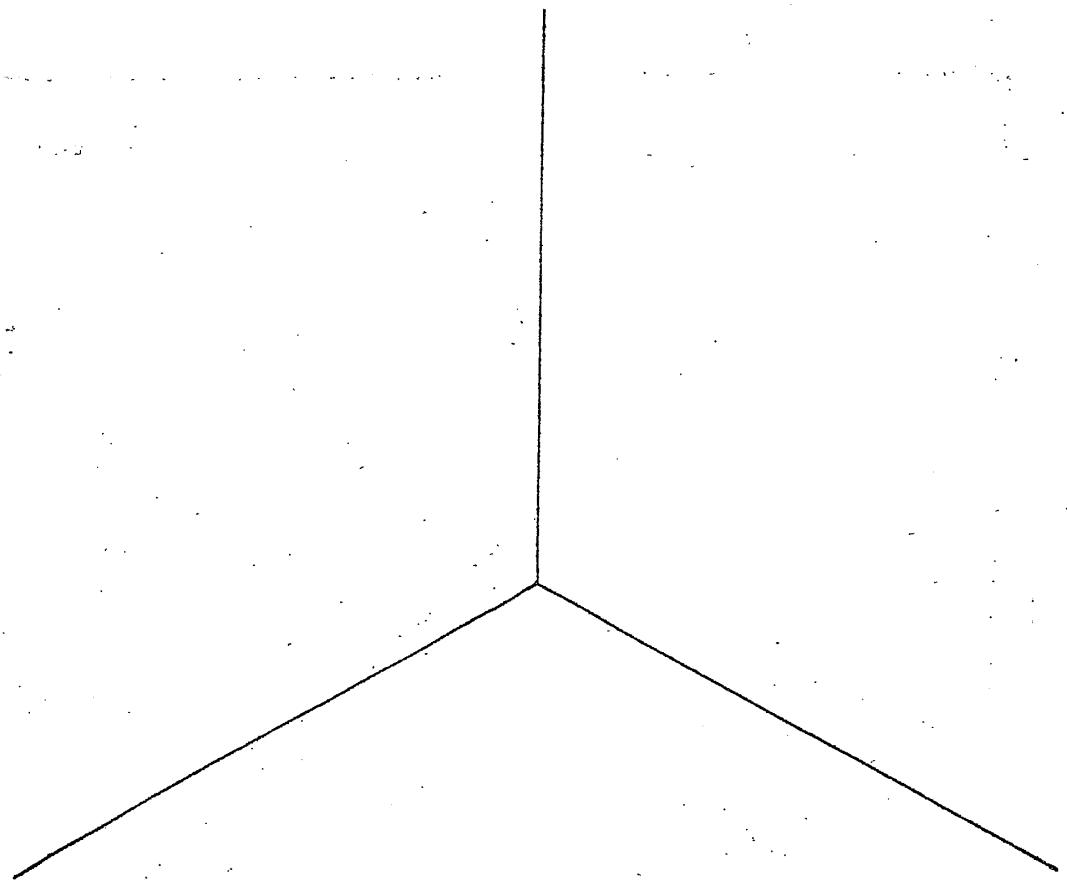


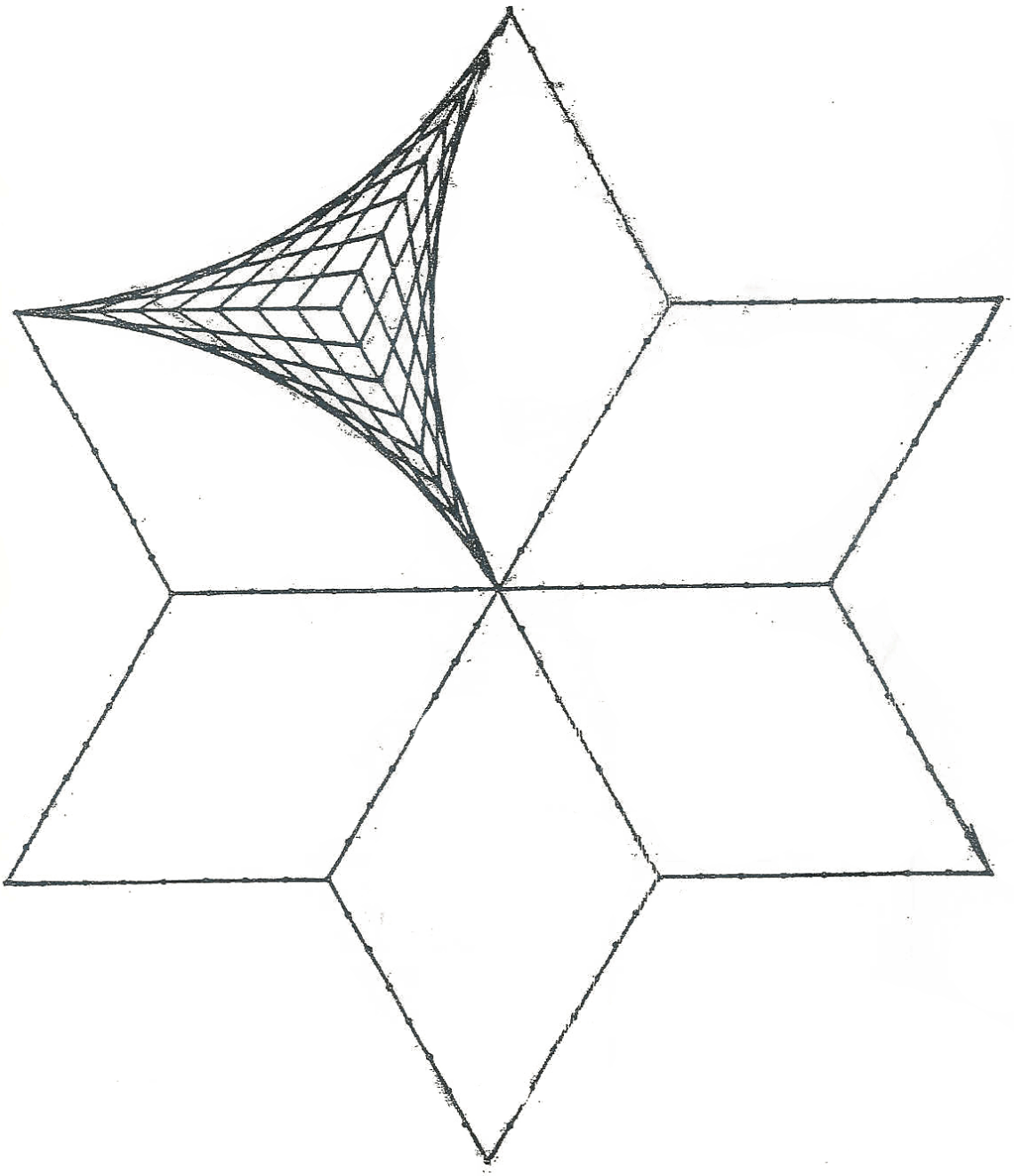
"Fill-in" the eight angles below to form a line design. Your final result should look similar to the design on page 34.

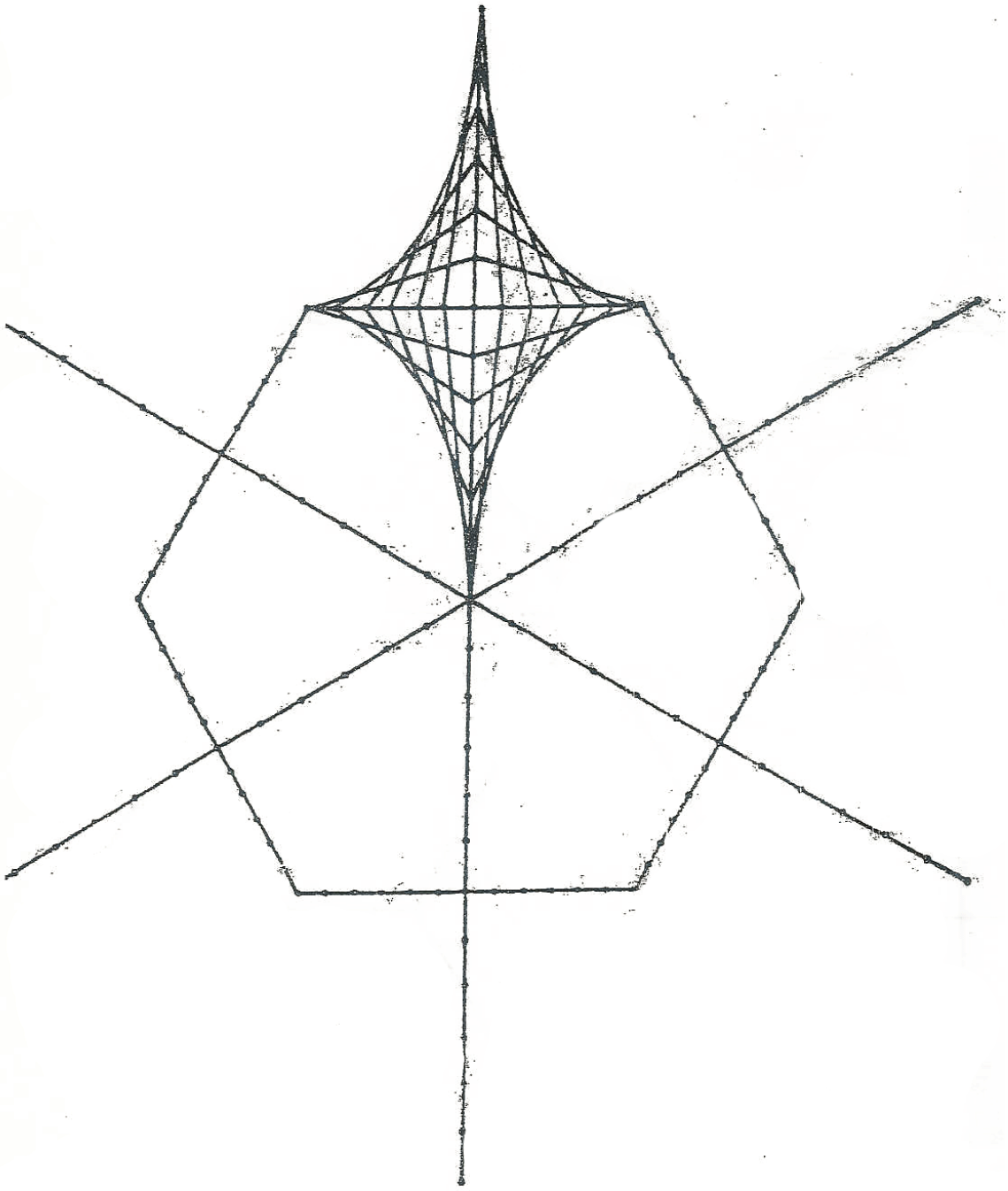


LINE DESIGN WORKSHEET FIVE

Divide the three line segments below into an equal number of equal parts. "Fill-in" the three angles using the line design technique.

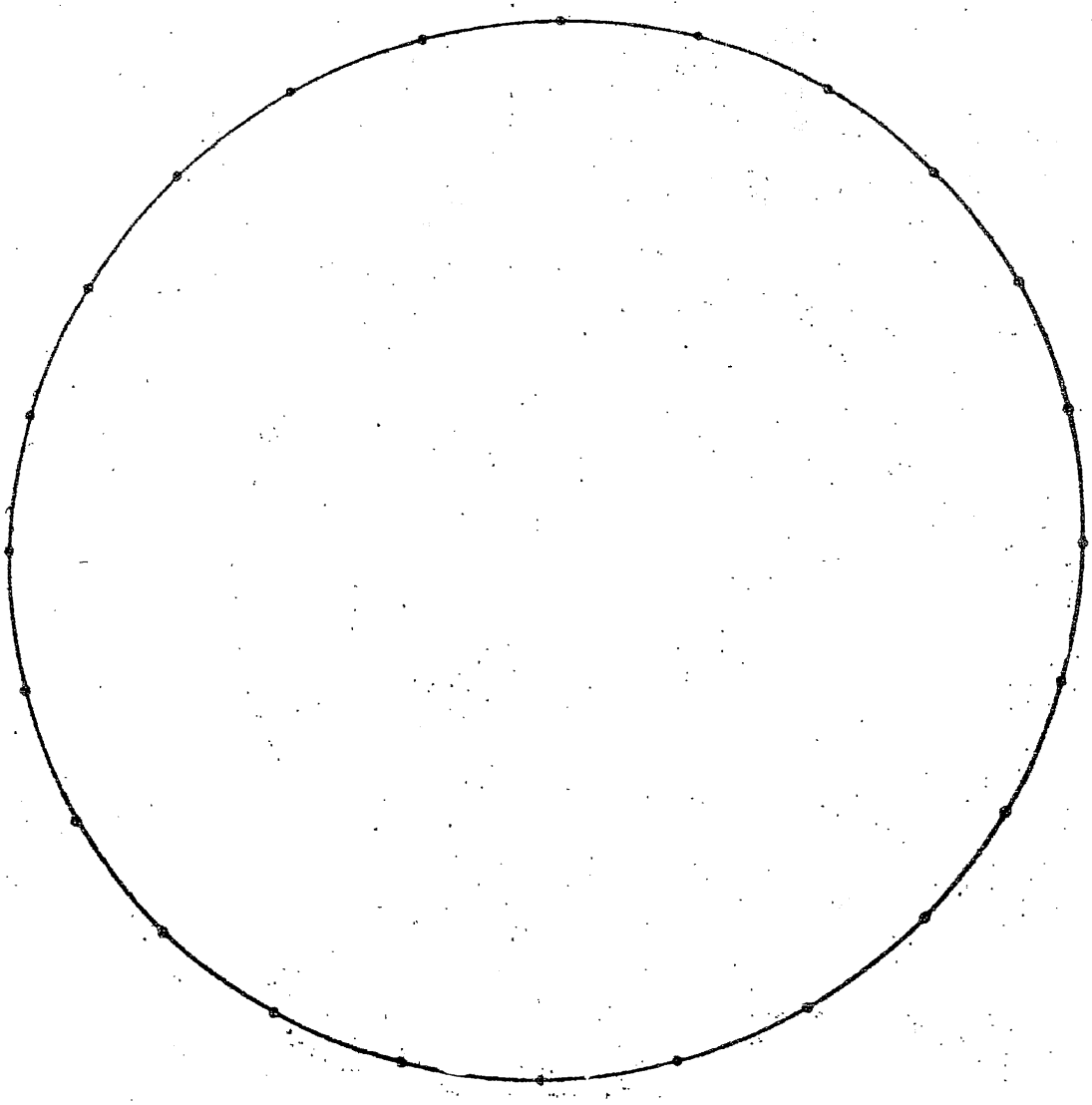


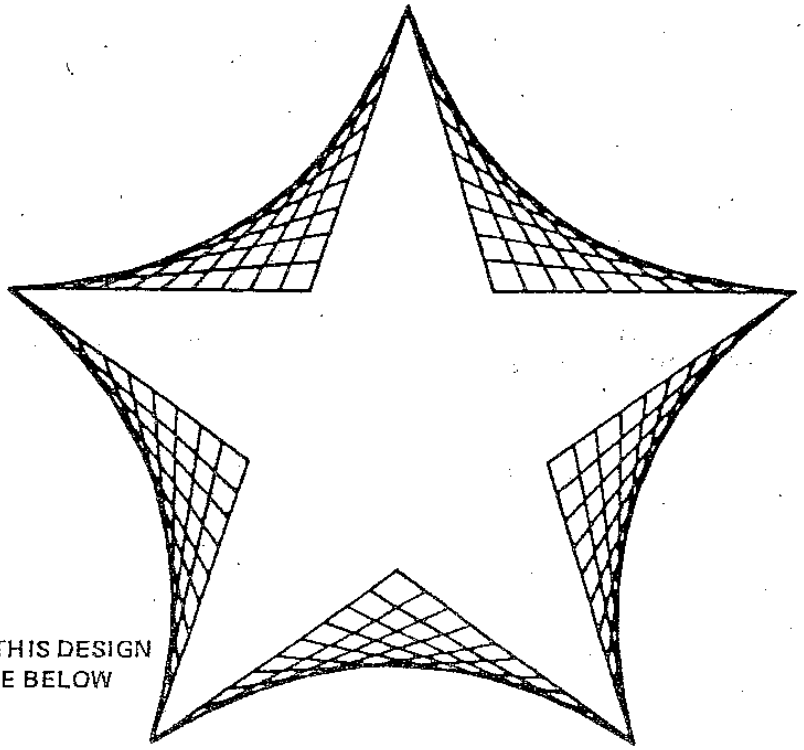




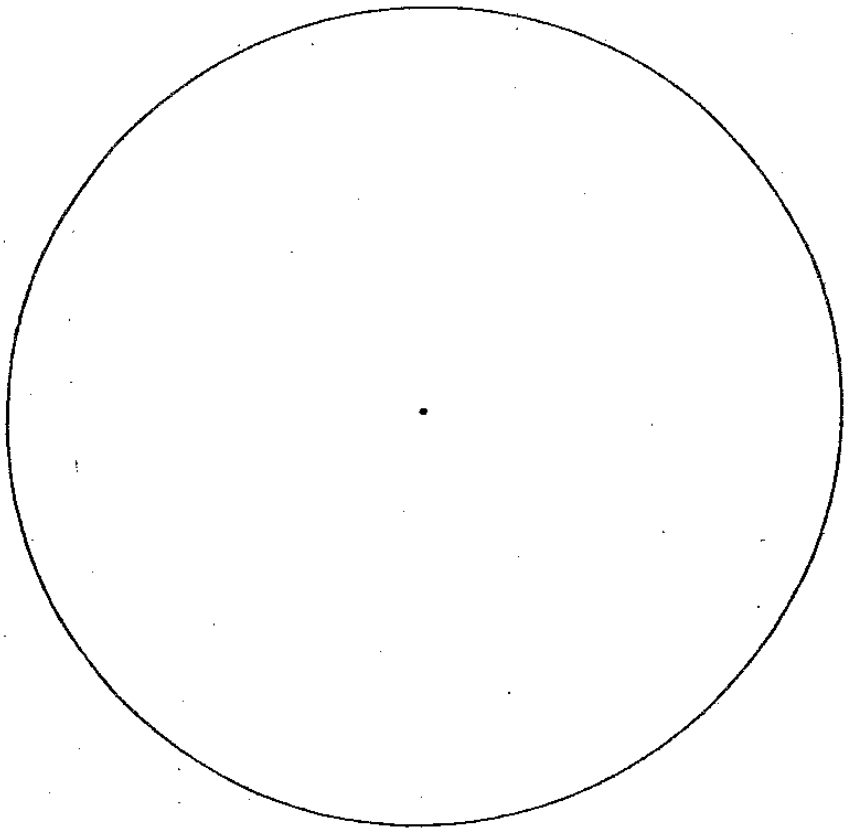
LINE DESIGN WORKSHEET SIX

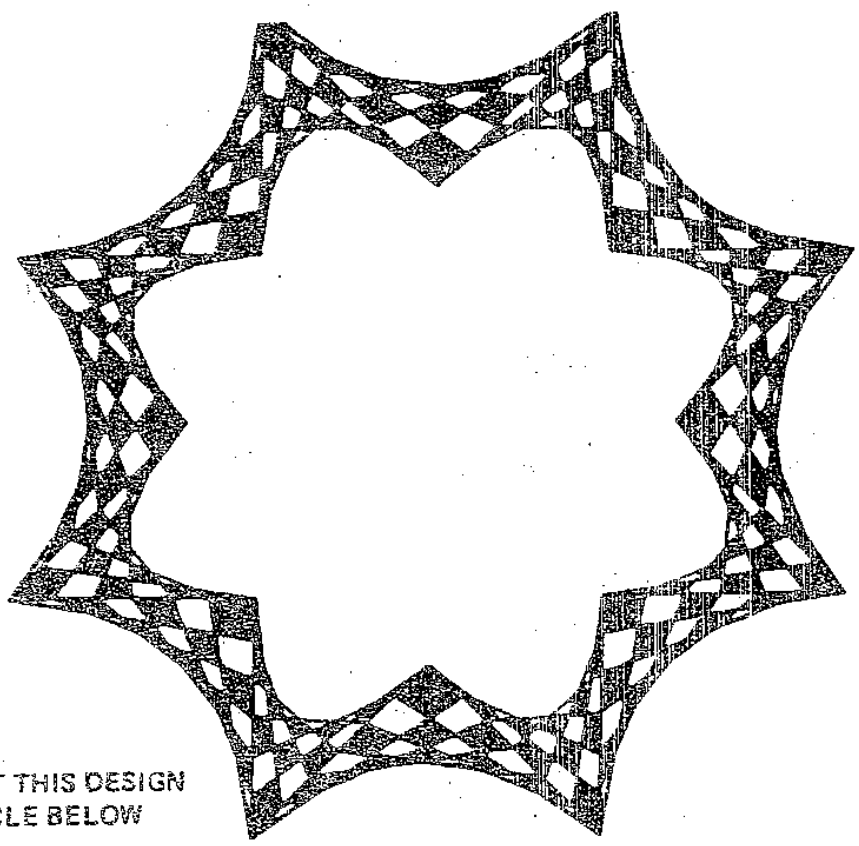
The circle below is divided into twenty-four equal arcs. Connect each point with every one of the other 23 points by a line segment. Be accurate and you will be pleased with the resulting design.





CONSTRUCT THIS DESIGN
IN THE CIRCLE BELOW





CONSTRUCT THIS DESIGN
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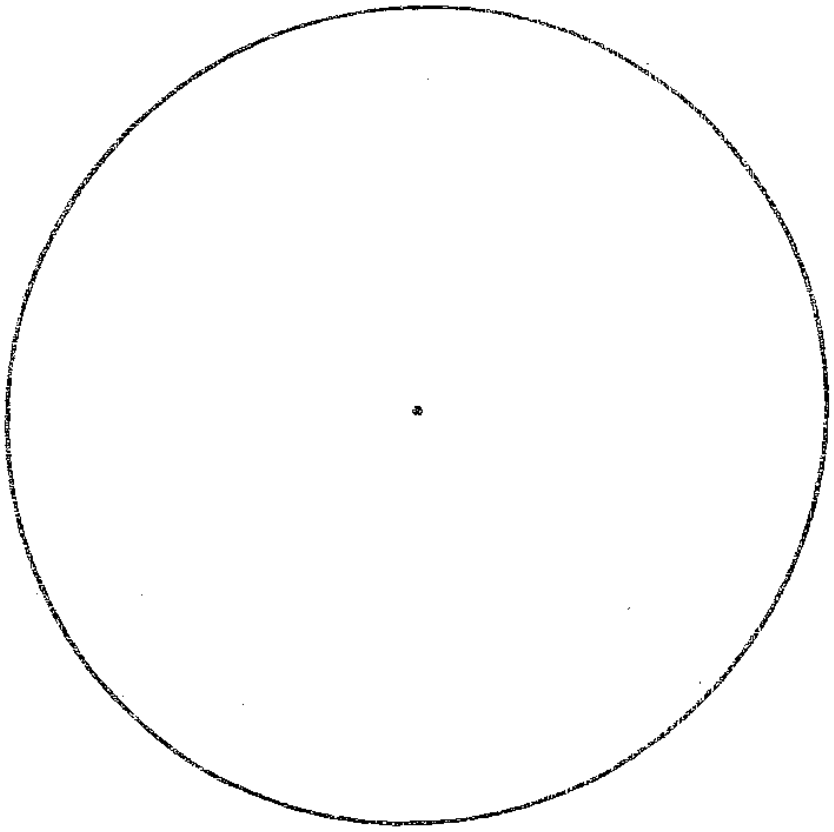

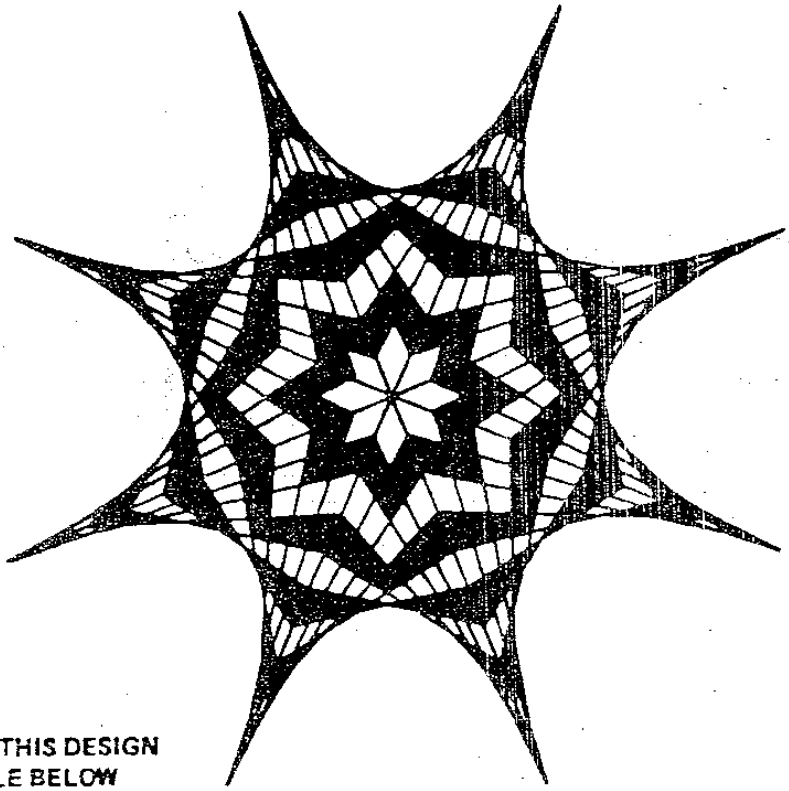

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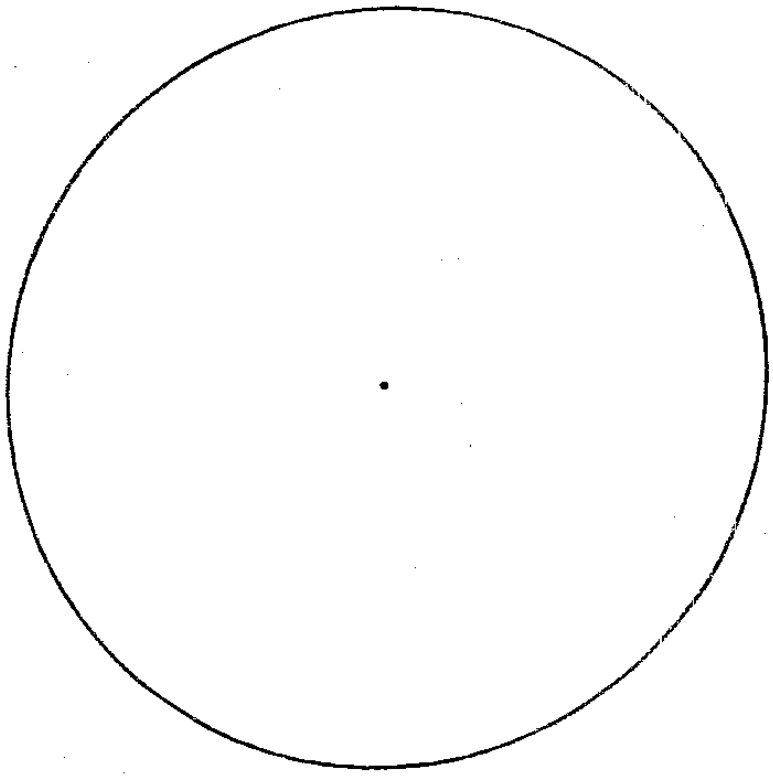

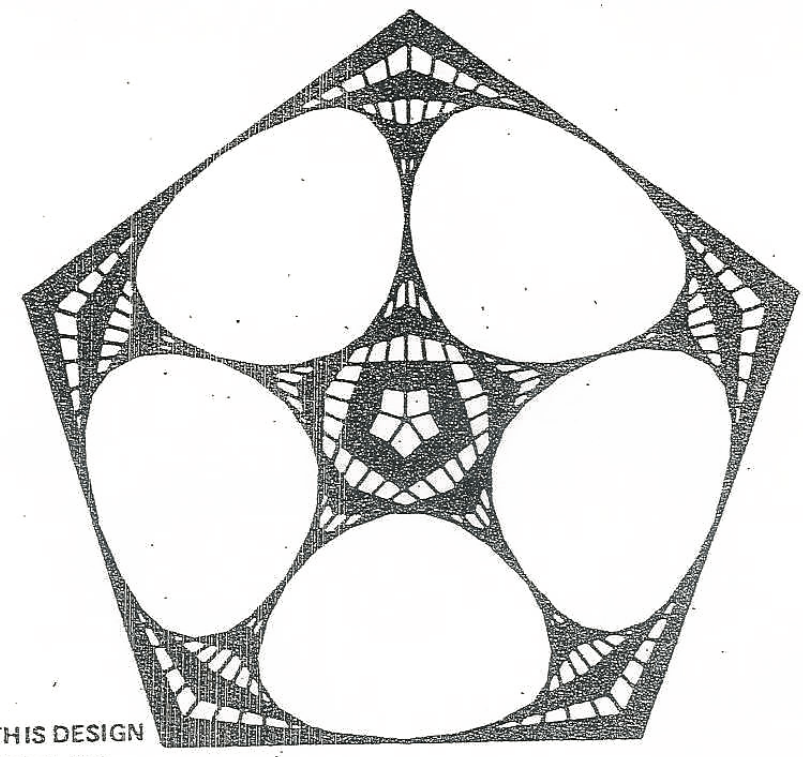

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