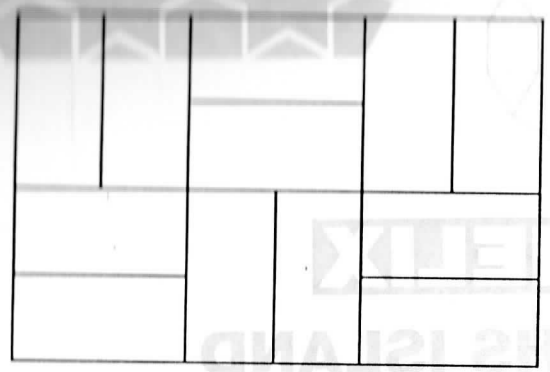
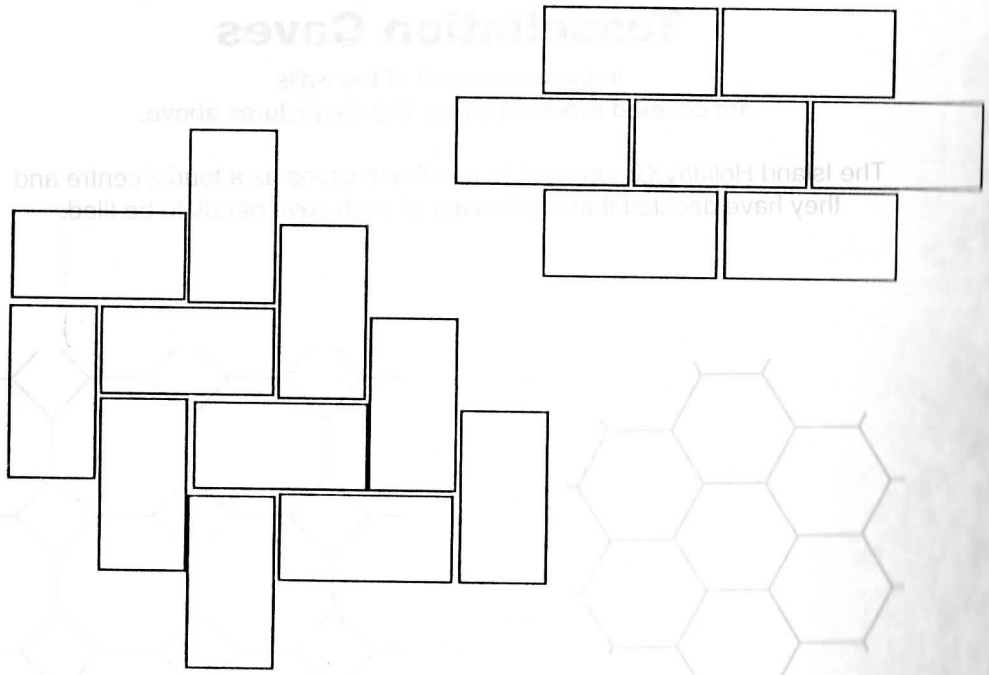
## TILING PROBLEMS

On Maths Island everything is to do with Maths and the tiles that they are going to use in the cave are going to tessellate.

The floor to the 'Rectangle' Cave has been started for you below (using rectangles of course). Can you complete this floor pattern on the special paper?

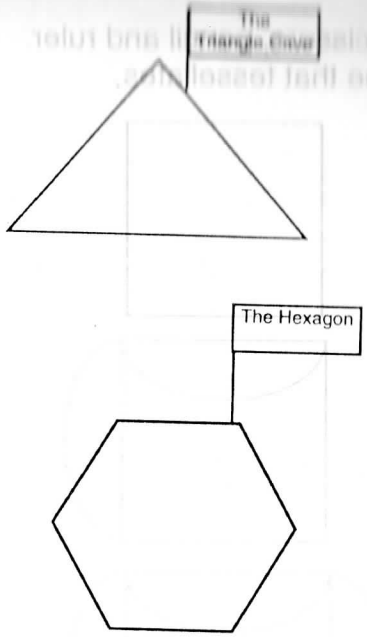


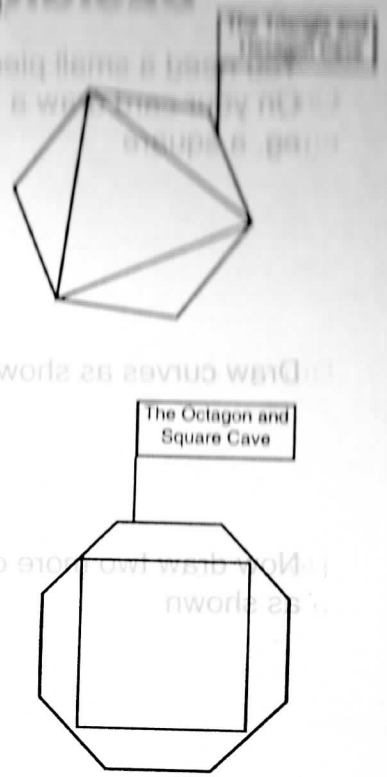
There are many more designs that you can make using rectangles. Design your own rectangle tessellation pattern on your special paper.



## TESSELLATING POLYGONS

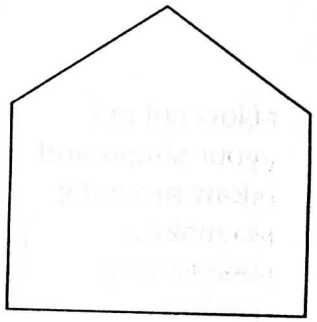
The other caves shown below need the tile that




Draw the tile pattern for one of the caves.
(Remember to use the correct polygon for your tessellations)

The most exciting designs are to be found in the PENTAGON Cave, but the designers have not been able to draw tessellations from a regular pentagon.



Use a regular pentagon, can you make a tessellation pattern?

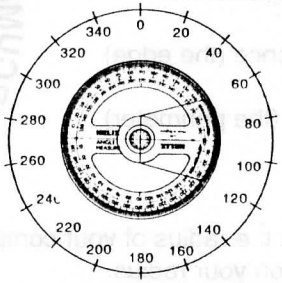
This pentagon will tessellate, copy it and cut out a template, of the design. Use this to draw round for your tessellation pattern.

Measure each of the angles that meet at a point in your pattern. What total do you get when you add them together?

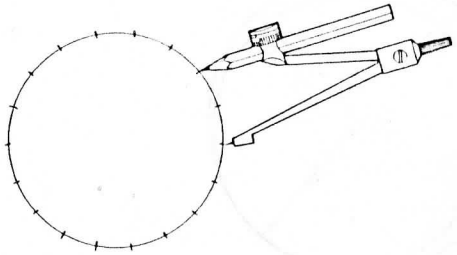
## ROUNDERS

For this activity you need an angle indicator and a pair of compasses and a sharp pencil.
1. Draw around your angle indicator and mark off every 20°.

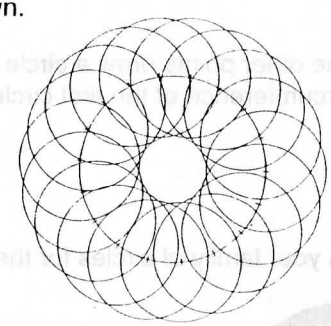
You should have 18 marks.
(360°÷ 20 = 18).



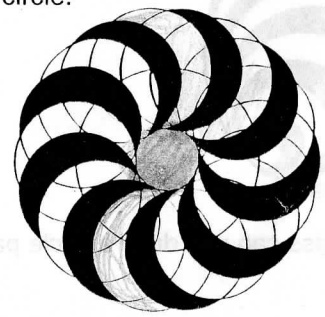

2. Open out your compasses so that they have a radius equal to the gap between 2 marks on the circumference of the circle.



3. Draw circles from each point as shown.



4. Now shade in the diagram carefully
Start as before, this time open your compass so that it has a radius equal to the gap between three marks on the edge of the circle.



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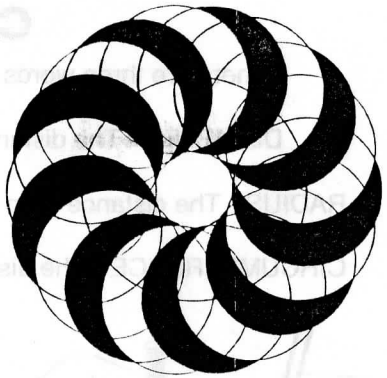
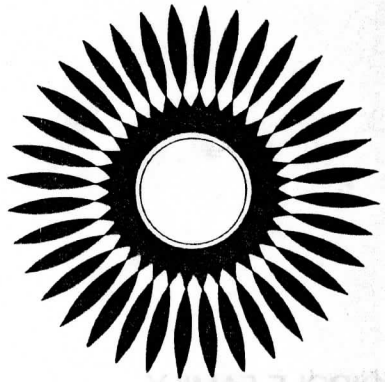
**Telephone (0384) 424441 Fax (0384) 892617**





**HELIX**

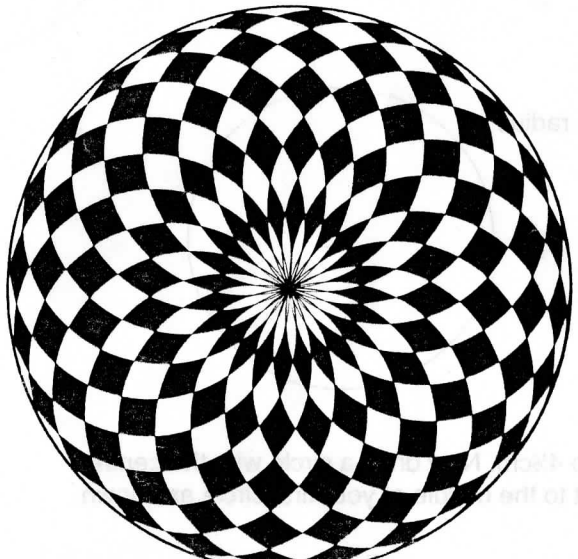
# MATHS ISLAND

On maths island everything is to do with mathematics.

## Stone Circles

In this area of the island there are many large and small stones.
All of these stones are shaped as cylinders, like round cake tins.
On the top of each stone which is a circle, there is a pattern which is different for each stone.

A few of the patterns are shown here.



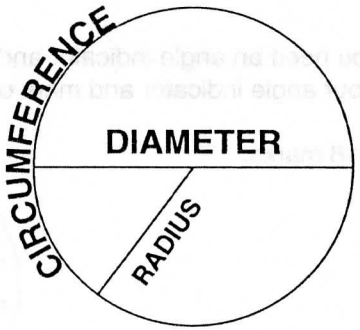
# CIRCLES

There are three words that you should know about circles-

DIAMETER - The distance across a circle through the centre

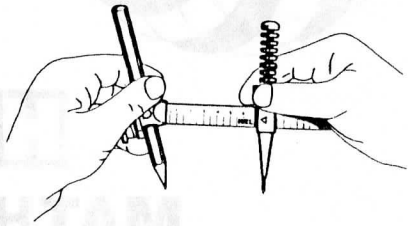
RADIUS - The distance from the centre to the circumference (the edge)

CIRCUMFERENCE - The distance right round the circle (the perimeter)

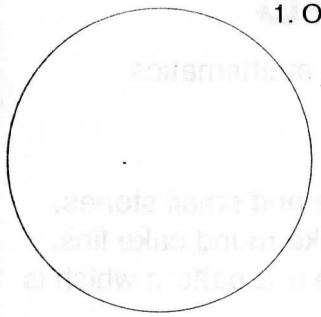



## A CIRCLE FAMILY

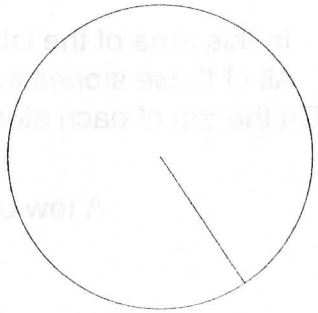
Follow these instructions to draw a circle family



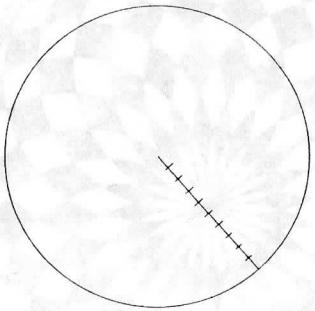
1. Open out your compass with radius 5cm.
2. Draw a circle carefully



3. In pencil draw in a radius.

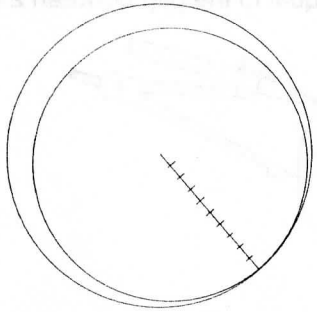


4. Put marks on the radius every ½cm.

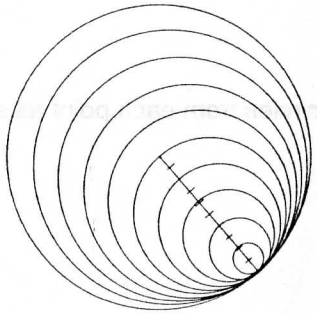


5. Open compass to 4½cm. Now draw a circle with the centre on the nearest point to the middle of your first circle as shown.

6. Now reduce the radius of your compass to 4cm and draw another circle from the next point on your radius.



7. For each of the other points draw a circle to just touch the circumference of the first circle.



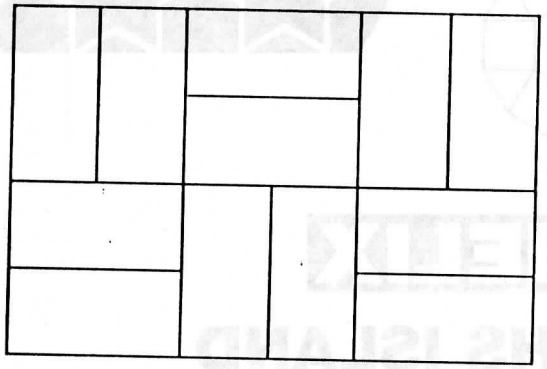
8. Now shade in your family of circles for the best effect.

Using the compass can you draw a circle pattern with a flower design?

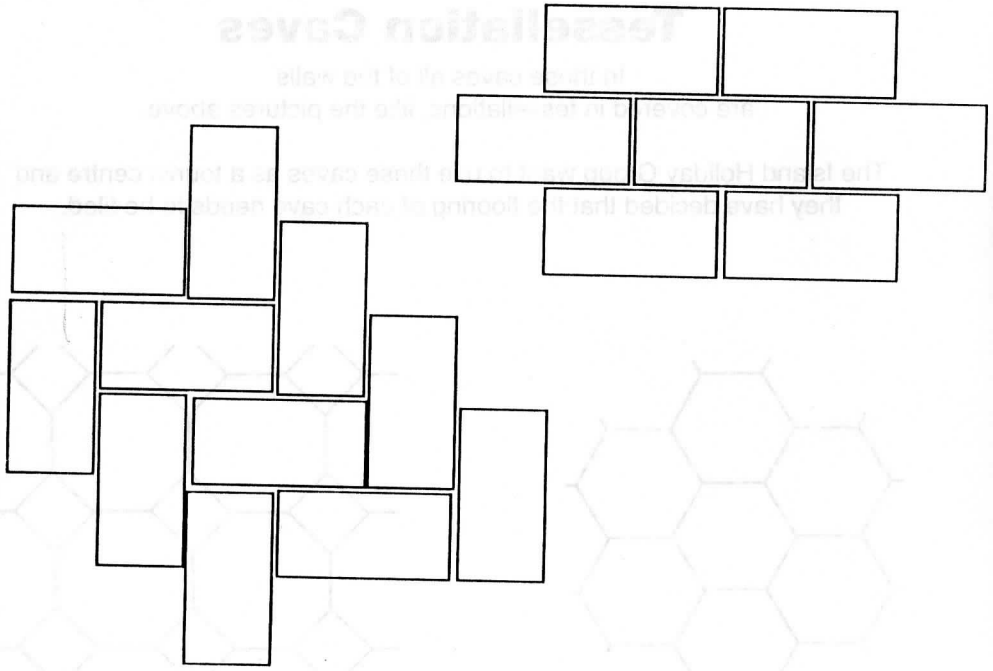
# TILING PROBLEMS

On Maths Island everything is to do with Maths and the tiles that they are going to use in the cave are going to tessellate.

The floor to the 'Rectangle' Cave has been started for you below (using rectangles of course). Can you complete this floor pattern on the special paper?

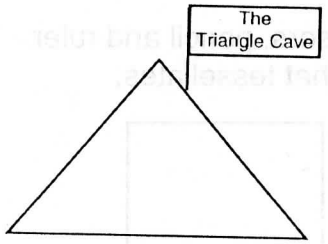


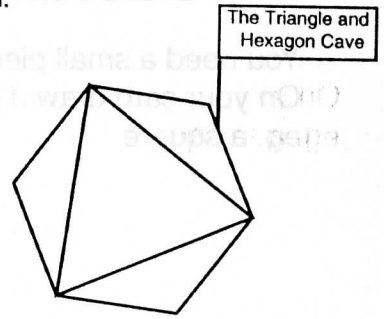
There are many more designs that you can make using rectangles. Design your own rectangle tessellation pattern on your special paper.

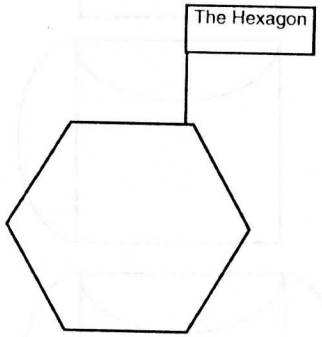


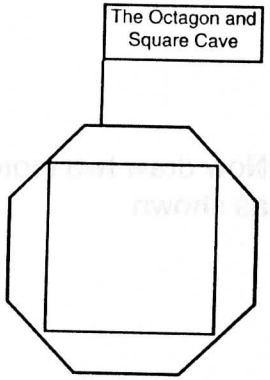
# TESSELLATING POLYGONS

The other caves shown below need the floor tiled.




Draw the tile pattern for one of the caves.
(Remember to use the correct polygon for your tessellations)

The most exciting designs are to be found in the PENTAGON Cave, but the designers have not been able to draw tessellations from a regular pentagon.

Use a regular pentagon, can you make a tessellation pattern?

This pentagon will tessellate, copy it and cut out a template, of the design. Use this to draw round for your tessellation pattern.

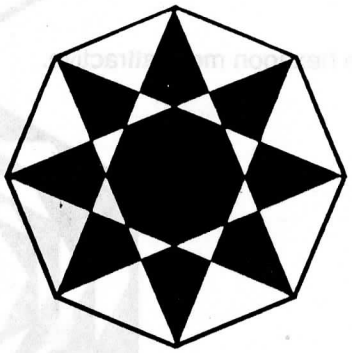
Measure each of the angles that meet at a point in your pattern. What total do you get when you add them together?

# The Octanut Tree

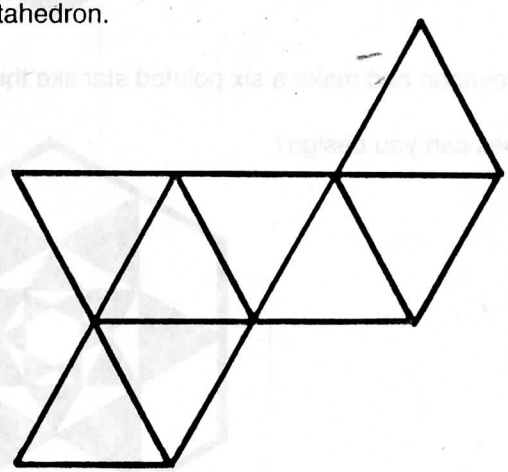
The Octanut tree has leaves with 8 sides (octagons) and octanuts, which have 8 faces (octahedrons).

Use your angle indicator to mark accurately the 8 corners of a regular octagon.

Now join the corners to make an 8 pointed star.



The octanut grown on this tree has 8 triangular faces and is the mathematical shape known as an octahedron.



Using either the polygon stencil or triangular dotty paper copy out this shape and try to fold it over to make an octahedron.

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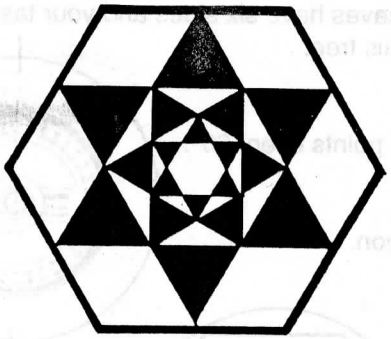
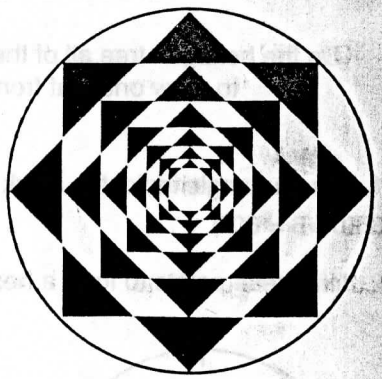




**HELIX**

# MATHS ISLAND

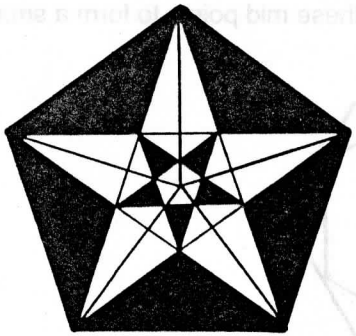
On maths island everything is to do with mathematics

## Polygon Rain Forest

There are many large and many small trees in the Polygon Rain Forest, but the leaves of every tree are the shape of regular polygons.

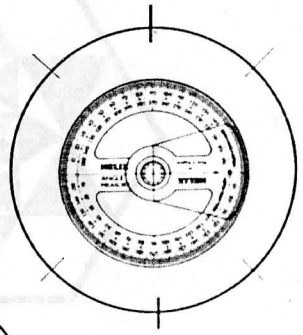
Even though each leaf on each tree has the same number of sides, they are all different because of the many colourful designs on the polygons.

Leaves from the pentagon, the hexagon and the octagon trees are shown here.



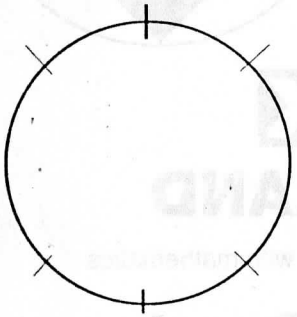
# The Hexagon Tree

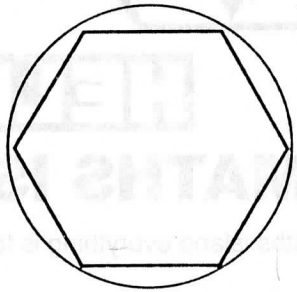
On the hexagon tree all of the leaves have six sides and your task is to draw one leaf from this tree.



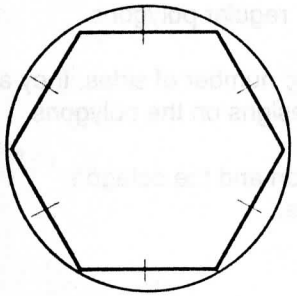
1. Take an angle indicator, mark off points every 60°.
(360°÷6 = 60°)

2. Join these points to form a hexagon.

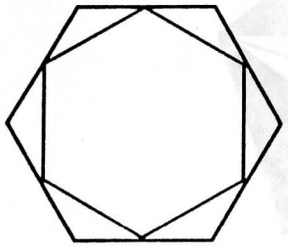




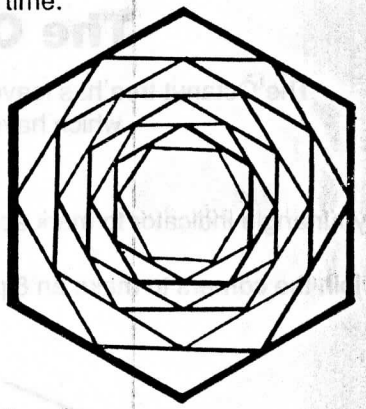
3. Mark the mid points of each side of the hexagon.



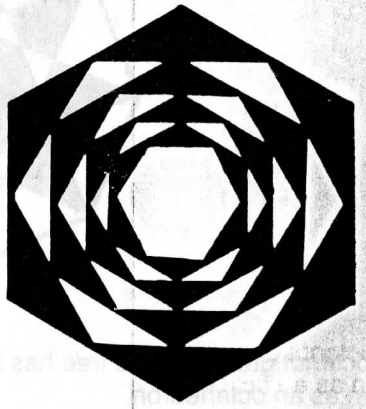
4. Now join up all of these mid points to form a smaller hexagon.



5. Repeat this, drawing smaller hexagons each time.

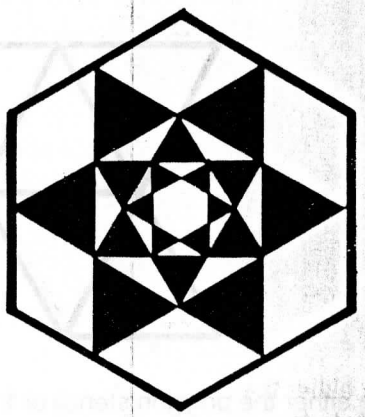


6. Now shade in and make the hexagon more attractive.

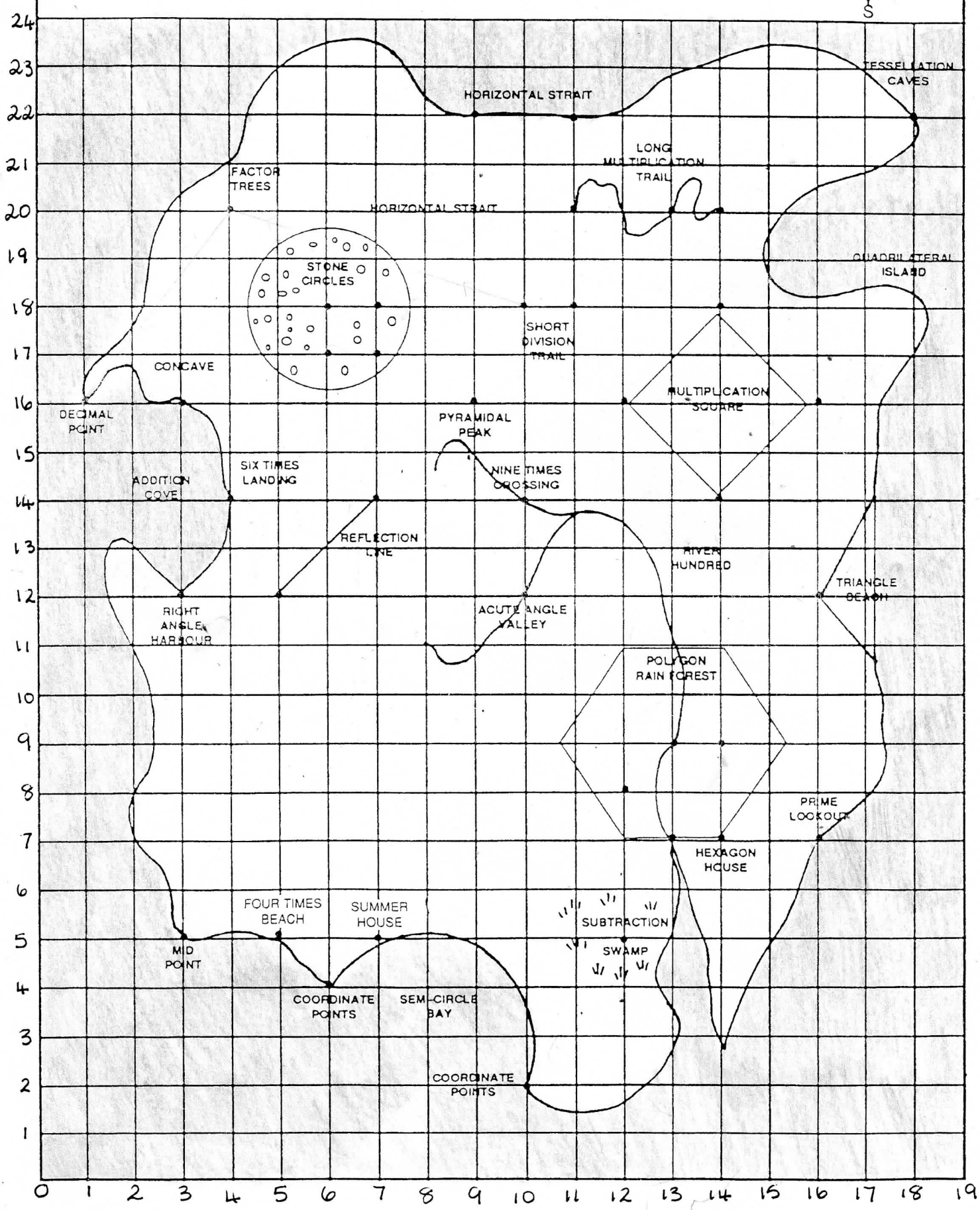


Can you draw another hexagon and make a six pointed star like this.

What other polygon leaves can you design?



# MATHS ISLAND



**T1. MATHS ISLAND**
Folow these directions
Start at the Summer House

NORTH 9km
EAST 7km
NORTH 6km
WEST 3km
NORTH 2km
EAST 7km

**T2. MATHS ISLAND**
Folow these directions
Start ar Right Angle Harbour

EAST 7km
NORTH 2km
EAST 4km
NORTH 2km
NORTH 6km
EAST 9km

**T3. MATHS ISLAND**
Folow these directions
Start at Triangle Beach

SOUTH 5km
WEST 2km
NORTH 13km
WEST 3km
NORTH 2km
EAST 7km

**T4. MATHS ISLAND**
Follow these directions
Start at the Summer House

EAST 5km
NORTH EAST 2.8km
NORTH WEST 9.9km
SOUTH WEST 2.8km
EAST 5km
NORTH 2km
NORTH EAST 11.3km

**T5. MATHS ISLAND**
Follow these directions
Start at Right Angle Harbour

SOUTH 7km
NORTH EAST 9.9km
SOUTH EAST 4.2km
NORTH EAST 4.2km
NORTH WEST 8.5km
EAST 4km
NORTH EAST 5.7km

**T6. MATHS ISLAND**
Follow these directions
Start at Triangle Beach

SOUTH WEST 5.7km
SOUTH 3km
NORTH WEST 15.6km
EAST 8km
NORTH EAST 5.7km
NORTH WEST 2.8km
EAST 7km

**T7. MATHS ISLAND**
Follow these directions
Start at the Summer House

Bearing 056°, 7.2km
Bearing 315°, 4.2km
Bearing 045°, 5.7km
Bearing 323°, 5km
Bearing 074°, 7.3km

**T8. MATHS ISLAND**
Follow these directions
Start at Right Angle Harbour

Bearing 164°, 7.3km
Bearing 090°, 7km
Bearing 063°, 4.5km
Bearing 319°, 9.2km
Bearing 045°, 11.3km

**T9. MATHS ISLAND**
Follow these directions
Start at Triangle Beach

Bearing 270°, 6km
Bearing 0°, 6km
Bearing 288°, 6.3km
Beariang 217°, 5km
Bearing 081°, 13.2km
Bearing 045°, 5.7km

**S1. MATHS ISLAND**
Follow these directions
Start at the Summer House

NORTH 9km
WEST 3km
NORTH 6km
EAST 7km
SOUTH 2km
WEST 5km

**S2. MATHS ISLAND**
Follow these directions
Start at Right Angle Harbour

EAST 13km
SOUTH 5km
WEST 2km
NORTH 7km
WEST 4km
NORTH 4km
WEST 4km

**S3. MATHS ISLAND**
Follow these directions
Start at TriangleBeach

NORTH 4km
WEST 13km
SOUTH 11km
EAST 4km
NORTH 9km
EAST 3km
NORTH 4km
WEST 4km

**S4. MATHS ISLAND**
Follow these directions
Start at the Summer House

WEST 4KM
NORTH EAST 9.9KM
WEST 5KM
NORTH WEST 5.7KM
EAST 2KM
NORTH EAST 8.5KM
SOUTH WEST 2.8KM
SOUTH 2KM
WEST 5KM

**S5. MATHS ISLAND**
Follow these directions
Start at Right Angle Harbour

EAST 2KM
SOUTH 7KM
NORTH EAST 12.7KM
NORTH 6KM
WEST 10KM
SOUTH WEST 2.8KM

**S6. MATHS ISLAND**
Follow these directions
Start at Triangle Beach

SOUTH 5KM
WEST 2KM
SOUTH WEST 2.8KM
NORTH WEST 15.6KM
EAST 13KM
SOUTH WEST 5.7KM
NORTH 2KM
NORTH WEST 5.7KM

**S7. MATHS ISLAND**
Follow these directions
Start at the Summer House

BEARING 074°, 7.3KM
BEARING 321°, 6.4KM
BEARING 288°, 6.3KM
BEARING 0°, 6KM
BEARING 068°, 5.4KM
BEARING 135°, 2.8KM
BEARING 248°, 5.4KM

**S8. MATHS ISLAND**
Follow these directions
Start at Right Angle Harbour

BEARING 027°, 2.2KM
BEARING 098°, 6.3KM
BEARING 164°, 7.3KM
BEARNG 030°, 8.1KM
BEARING 339°, 8.5KM
BEARING 256°, 8.2KM

**S9. MATHS ISLAND**
Follow these directions
Start at Triangle Beach

BEARING 180°, 5KM
BEARING 304°, 3.6KM
BEARING 248°, 10.8KM
BEARING 006°, 9.1KM
BEARING 079°, 10.2KM
BEARING 284°, 8.2KM

**P1 MATHS ISLAND**
Follow these directions
Start at the Summer House

WEST 2km
NORTH 7km
WEST 2km
NORTH 4km
EAST 11km
SOUTH 7km

**P2. MATHS ISLAND**
Follow these directions
Start at Right Angle Harbour

SOUTH 7km
EAST 4km
NORTH 9km
EAST 7km
SOUTH 5km

**P3. MATHS ISLAND**
Follow these directions
Start at Triangle Beach

WEST 11km
SOUTH 7km
EAST 7km
NORTH 4km

**P4. MATHS ISLAND**
Follow these directions
Start at Summer House

South East 4.2km
North 10km
North East 5.7km
West 5km
South West 2.8km
South East 9.9km
North 2km
West 1km

**P5. MATHS ISLAND**
Follow these directions
Start Right Angle Harbour

North East 11.3km
West 7km
South West 8.5km
North 4km
South 6km
South West 4.2km

**P6. MATHS ISLAND**
Follow these directions
Start at Triangle Beach

North West 5.7km
South 11km
North West 15.6km
East 8km
North East 5.7km
South 11km

**P7. MATHS ISLAND**
Follow these directions
Start at Summer House

Bearing 023°, 7.6km
Bearing 294°, 9.7km
Bearing 090°, 8km
Bearing 045°, 2.8km
Bearing 112°, 5.4km
Bearing 203°, 7.6km

**P8. MATHS ISLAND**
Follow these directions
Start at Right Angle Harbour

Bearing 063°, 4.5km
Bearing 124°, 3.6km
Bearing 225°, 9.9km
Bearing 090°, 9km
Bearing 063°, 4.5km
Bearing 304°, 3.6km

**P9. MATHS ISLAND**
Follow these directions
Start at Triangle Beach

Bearing 0°, 4km
Bearing 292°, 5.4km
Bearing 194°, 4.1km
Bearing 283°, 9.2km
Bearng 114°, 9.8km
Bearing 164°, 7.3km
Bearing 014°, 4.1km