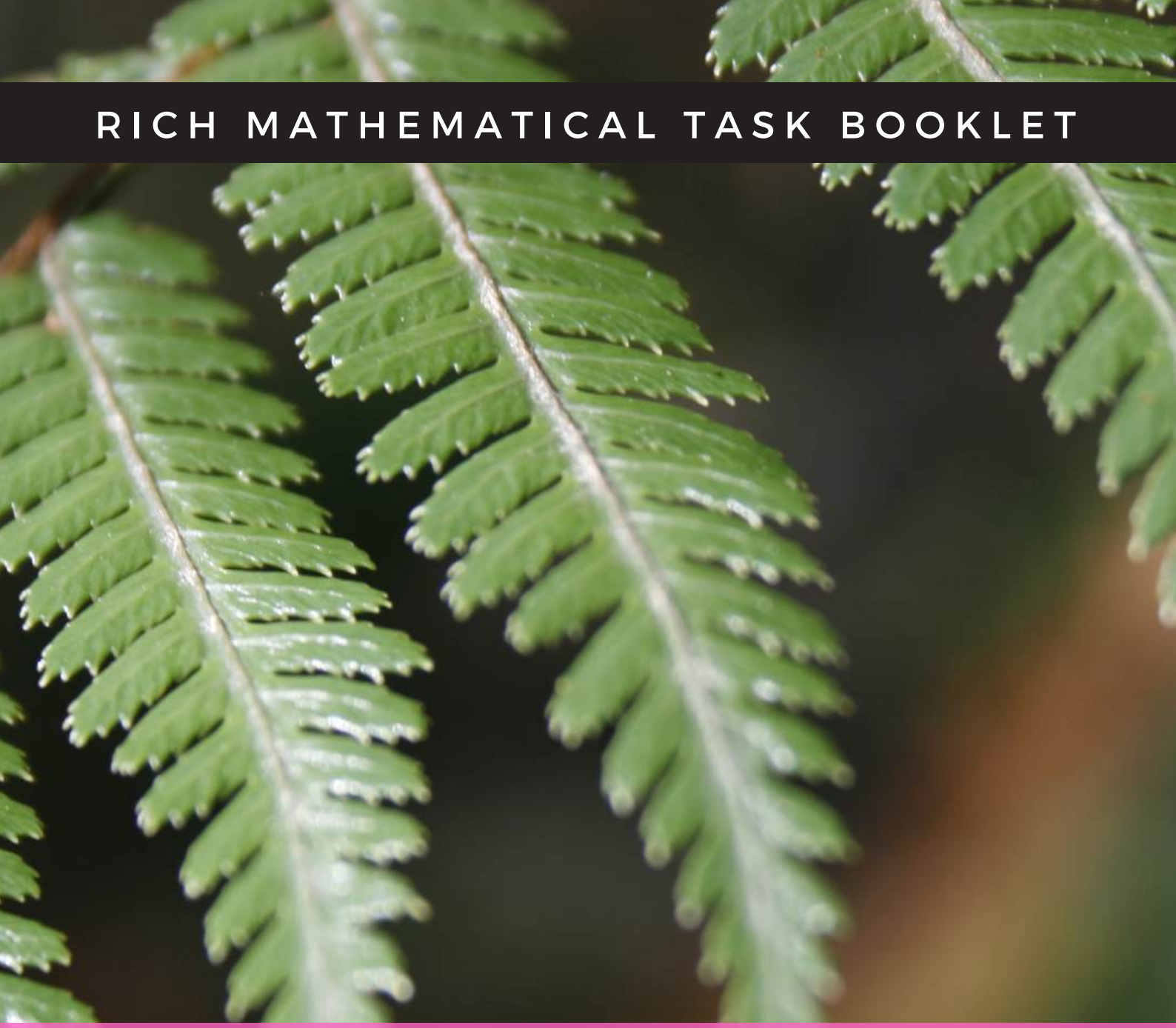
RICH MATHEMATICAL TASK BOOKLET



GEOMETRY

YEAR 7/8
ODD YEARS

Copy Masters

Task 1

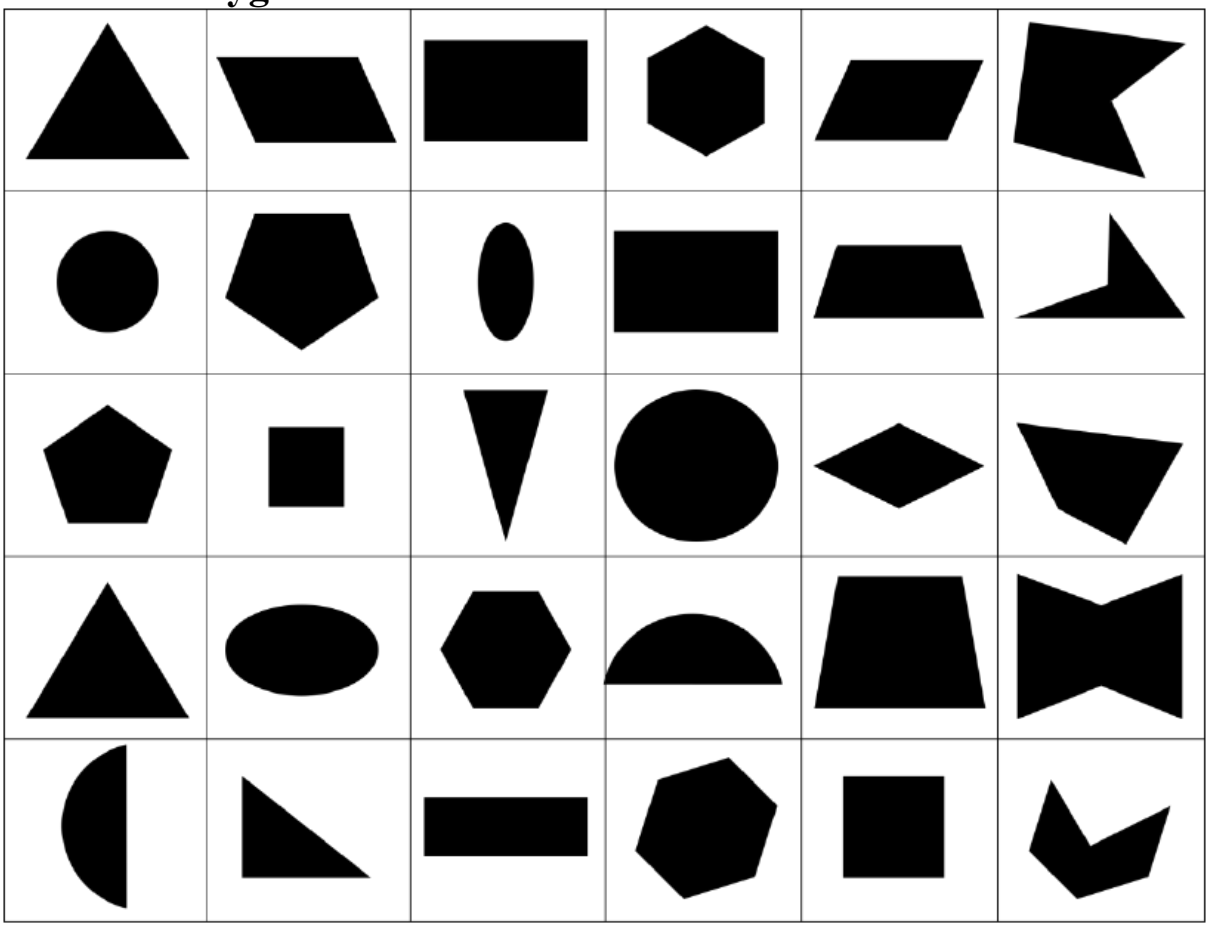
The word polygon is from Greek, poly means many.
Sort these polygons into different groups by their properties.

Use tools to check such things as angles, side lengths, angle congruence, and line symmetry.

What do you notice about their properties?
Create a list of attributes that are shared by all the polygons in each set.
Explain and justify your list of attributes shared by the polygons in each set. Hint: Use the terms 'at least…', 'only…', 'at most…', and 'because…'.
Make statements about the whole set of polygons?

Year 7/8: Geometry – ODD YEARS

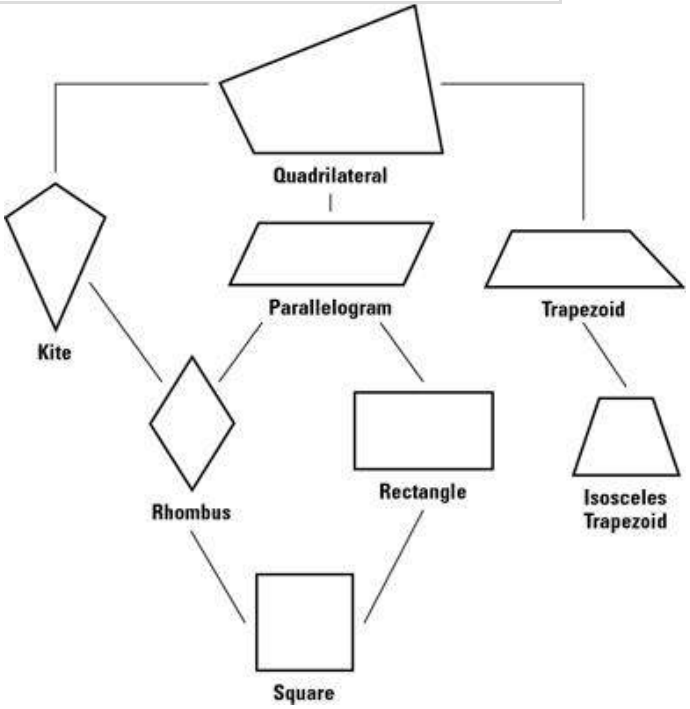
Task 1 – Polygons Resource



Year 7/8: Geometry – ODD YEARS

Task 1 – Supporting Resources

Polygon	No. of Sides	No. of Diagonal	No. of vertices	Interior Angle
Triangle	3	0	3	60
Quadrilateral	4	2	4	90
Pentagon	5	5	5	108
Hexagon	6	9	6	120
Heptagon	7	14	7	128.571
Octagon	8	20	8	135
Nonagon	9	27	9	140
Decagon	10	35	10	144
Hendecagon	11	44	11	147.273
Dodecagon	12	54	12	150
Triskaidecagon	13	65	13	158.308
Tetrakaidecagon	14	77	14	154.286
Pentadecagon	15	90	15	156



Task 1 (Independent)

Mathematics and art are closely related.

Use 2-dimensional shapes to design and make a drawing.
Describe your drawing using the properties of shapes.

For example: In my drawing of a cat, I have used two circles for the eyes. I inserted two rectangles for the pupils of each eye. I used a hexagon for the main body of the cat. This hexagon has 6 sides and 2 right-angles…etc.

Task 2

Sort these shapes into three groups.

Rule: No shape is allowed to belong to two groups.

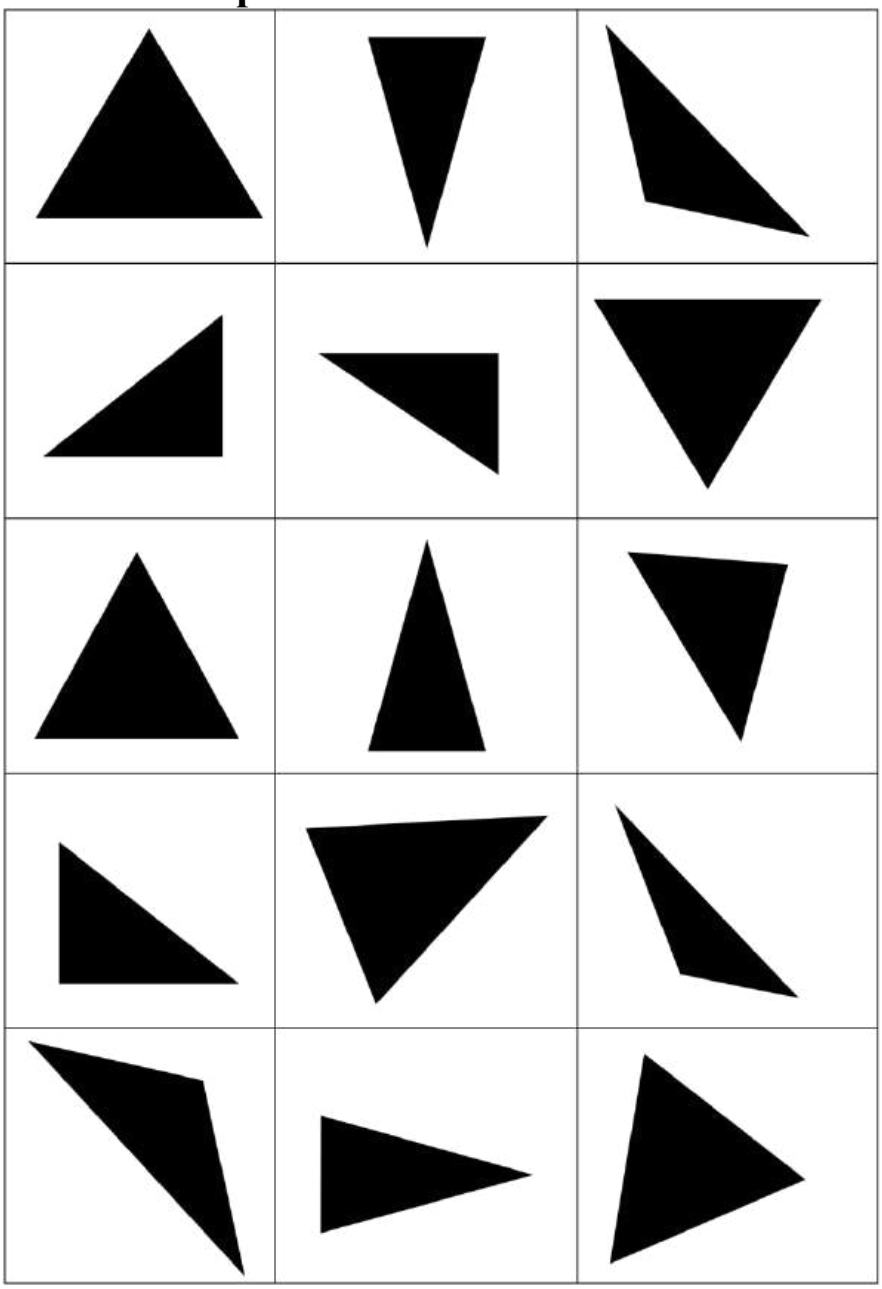
When you have sorted them into three groups record the properties of each group.

Now start again. Re-sort the set into another three groups which are different from your first set. Record the properties of this new group.

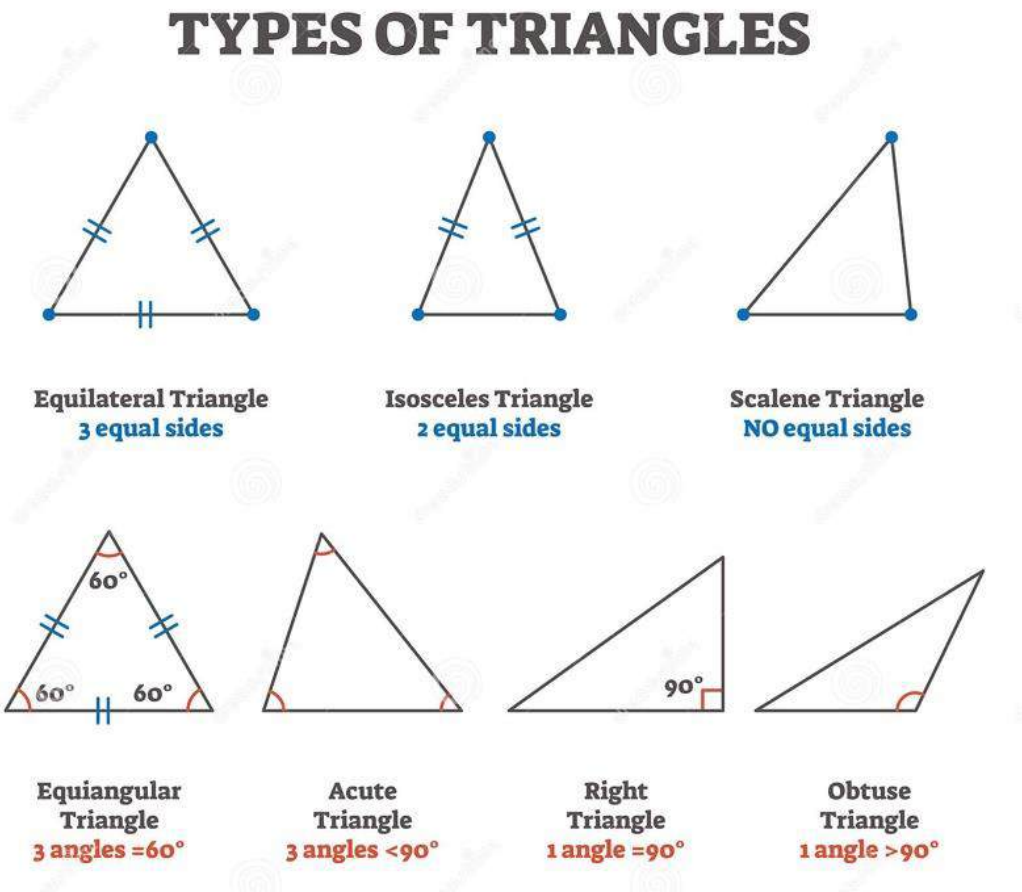
Start to develop some if statements.

Year 7/8: Geometry – ODD YEARS

Task 2 – Shapes



Task 2 – Supporting Resource



Task 2 (Independent)

What do you notice about all the shapes on the placemat that are the same? That are different?

Look closely. What do you notice?

Task 3

What do you notice about the shape of these different items?

Sort them into groups which you think are the same.

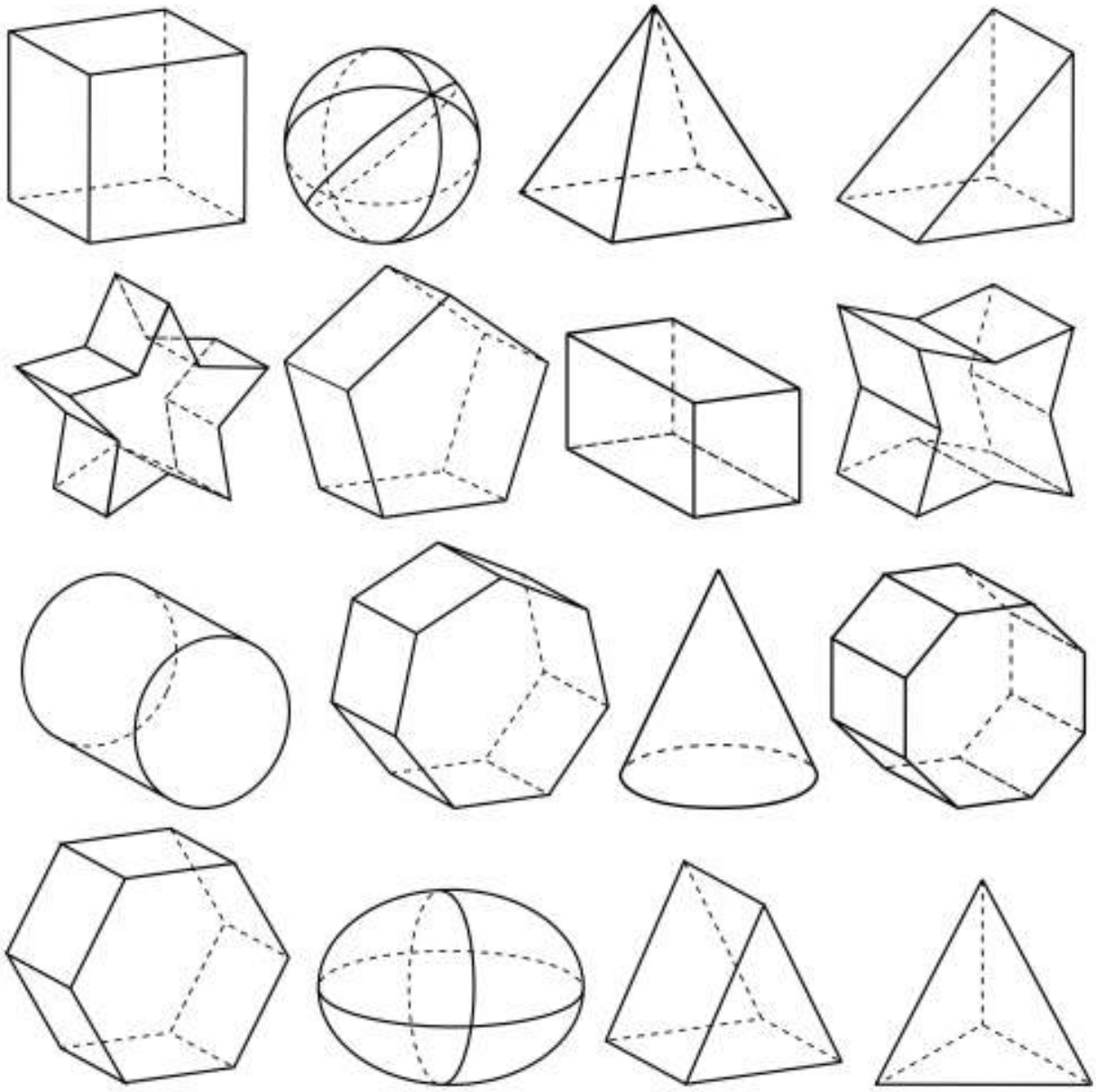
Sort them into groups which you think are different.

Use a table or Venn diagram to record your observations.

Explain and justify your reasoning.

Task 3 (Independent)

Draw a cross section of these different shapes.



Task 4

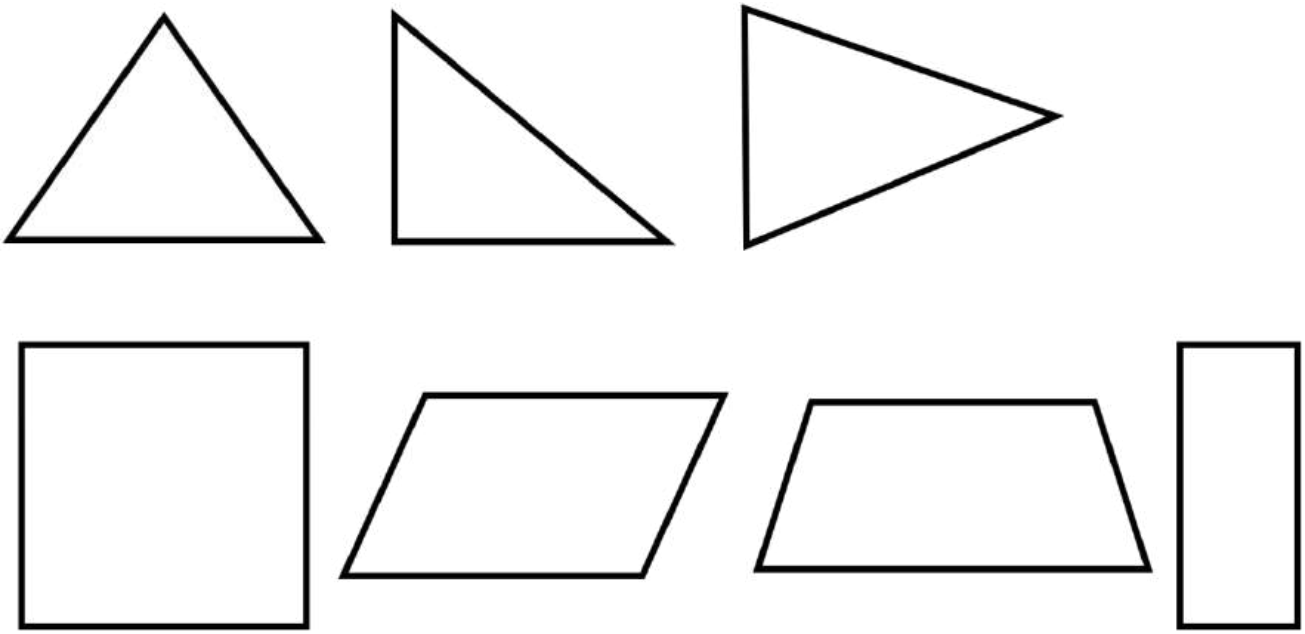
Use a protractor to investigate the interior angles of these triangles and quadrilaterals.

What do you notice about:

The sum of the interior angles of each shape?

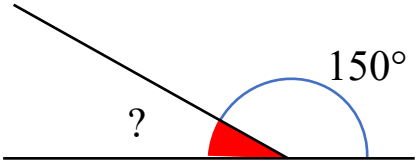
The size of opposite angles?

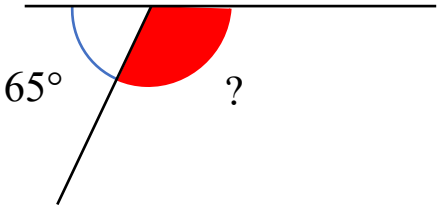
Make statements about interior angles and opposite angles for triangles and quadrilaterals? Are the statements always true?

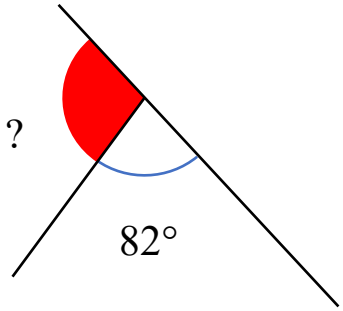


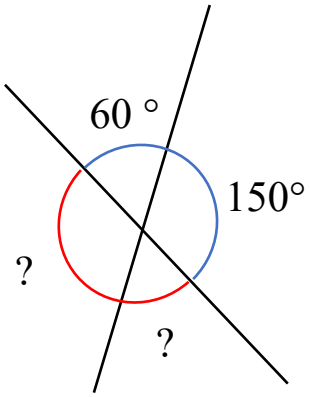
Task 4 (Independent)

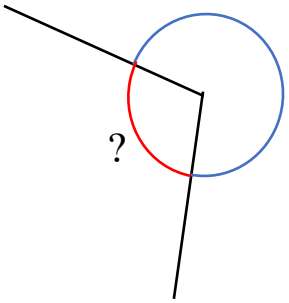
Calculate the missing angles:

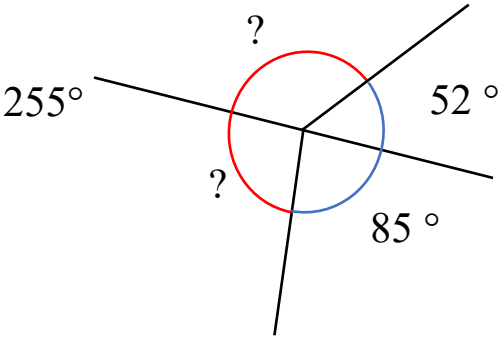












Task 5

When the box makers were designing these cuboids, they drew a 2D representation of their net. What 2D shapes did they draw?

Draw what you think it will look like as a net.

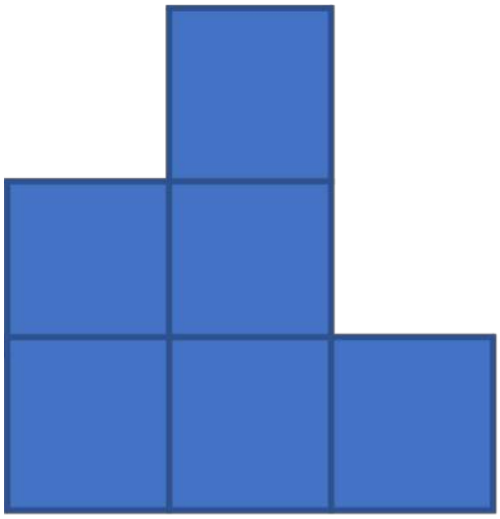
Task 5 (Independent)

Draw a net for a pyramid.
Draw a net to make a triangular packet to hold six tennis balls.
Draw a net for these chocolate boxes.

Draw a net for another shape of your choice.

Task 6

Here is a shape made with linking cubes. When you look at it from one side, it looks like this.



What does the whole structure looks like?

Visualise what you think it looks like. Draw this structure on isometric paper and then build it with the cubes.

Look at your construction from a different view. Draw this view on isometric paper.

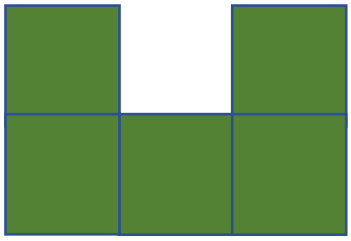
Draw different views of the construction onto the isometric paper.

Year 7/8: Geometry – ODD YEARS

Task 6 Connect Resource

Task 6 (Independent)

Here is a shape made with linking cubes. When you look at it from one side, it looks like this.



When you look at it from one side, it looks like this.

What do you think the whole structure looks like?

Make a drawing of what you think it might look like on isometric paper and then build it with the cubes.

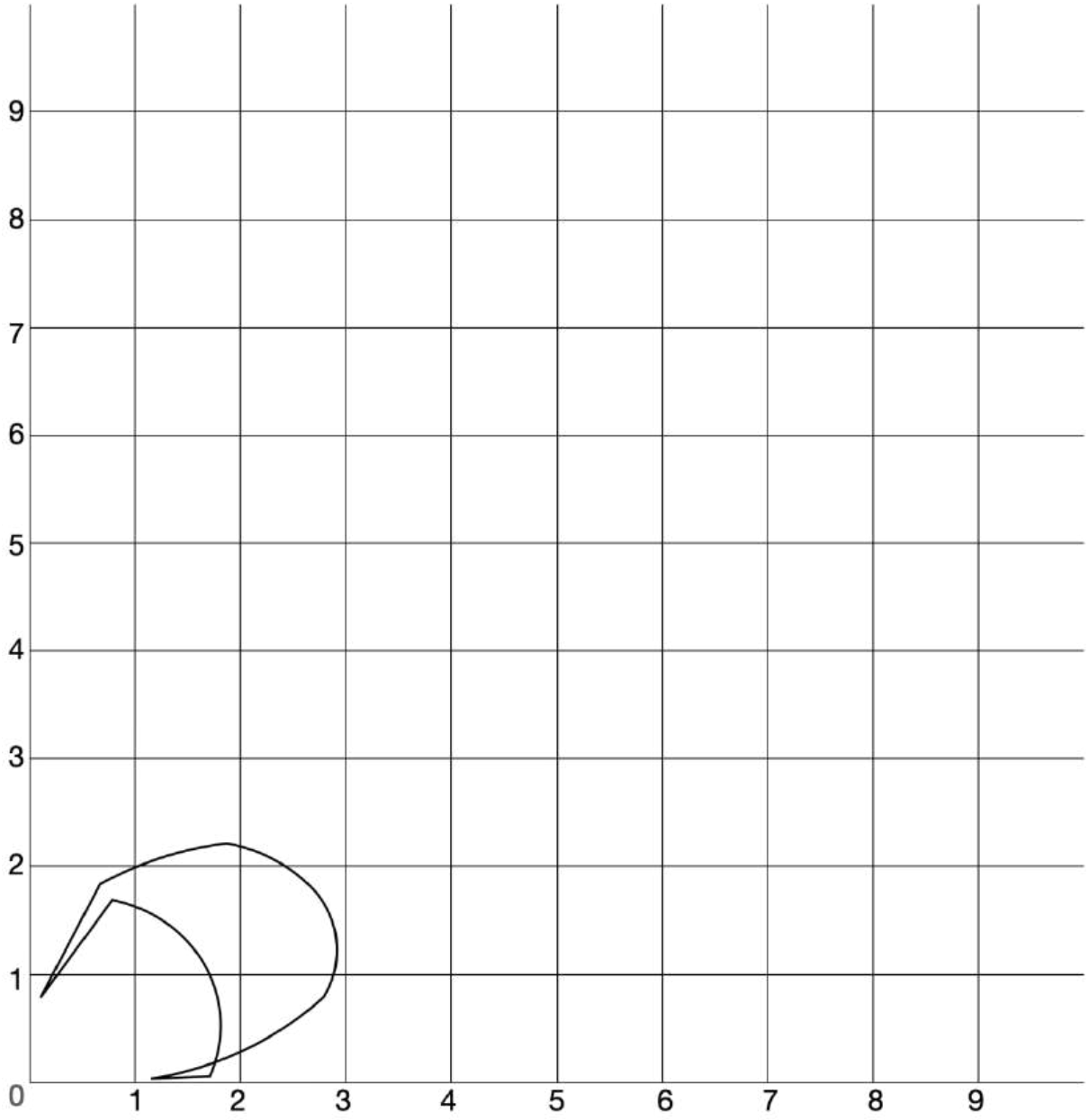
Now look at your construction from a different view. Draw this view on isometric paper.

How many different views of the construction can you draw on isometric paper?

Task 7

Explore how to enlarge the kiwi to twice its size.

What is the area of the large kiwi compared to the area of the kiwi at the original size?

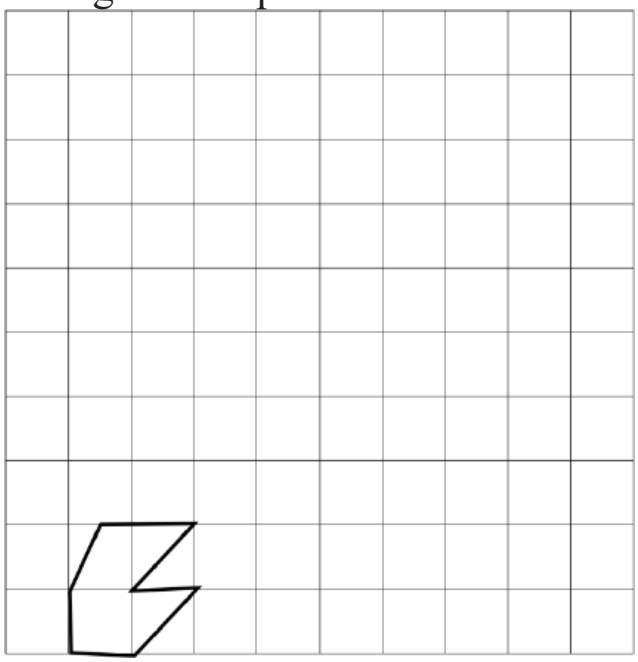


Draw a simple house on the grid paper.
Reduce the size of the house while maintaining the exact same house.

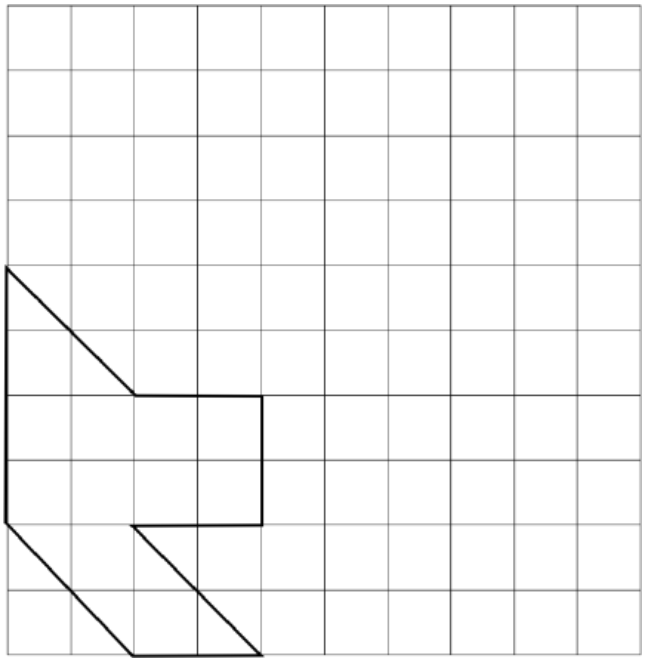
What is the area of the larger house compared to the area of the house reduced to a smaller size?

Task 7 (Independent)

Enlarge the shape to a scale factor of 2.



Reduce the shape by a scale factor of 0.5



Task 8

Patterned tiles in public buildings often appear to look the same. Here is an example of an entrance way.

Look closer at the patterns below which are along the centre of the tiles. Discuss and identify what is the same and what is different about them.

Task 8 - continued

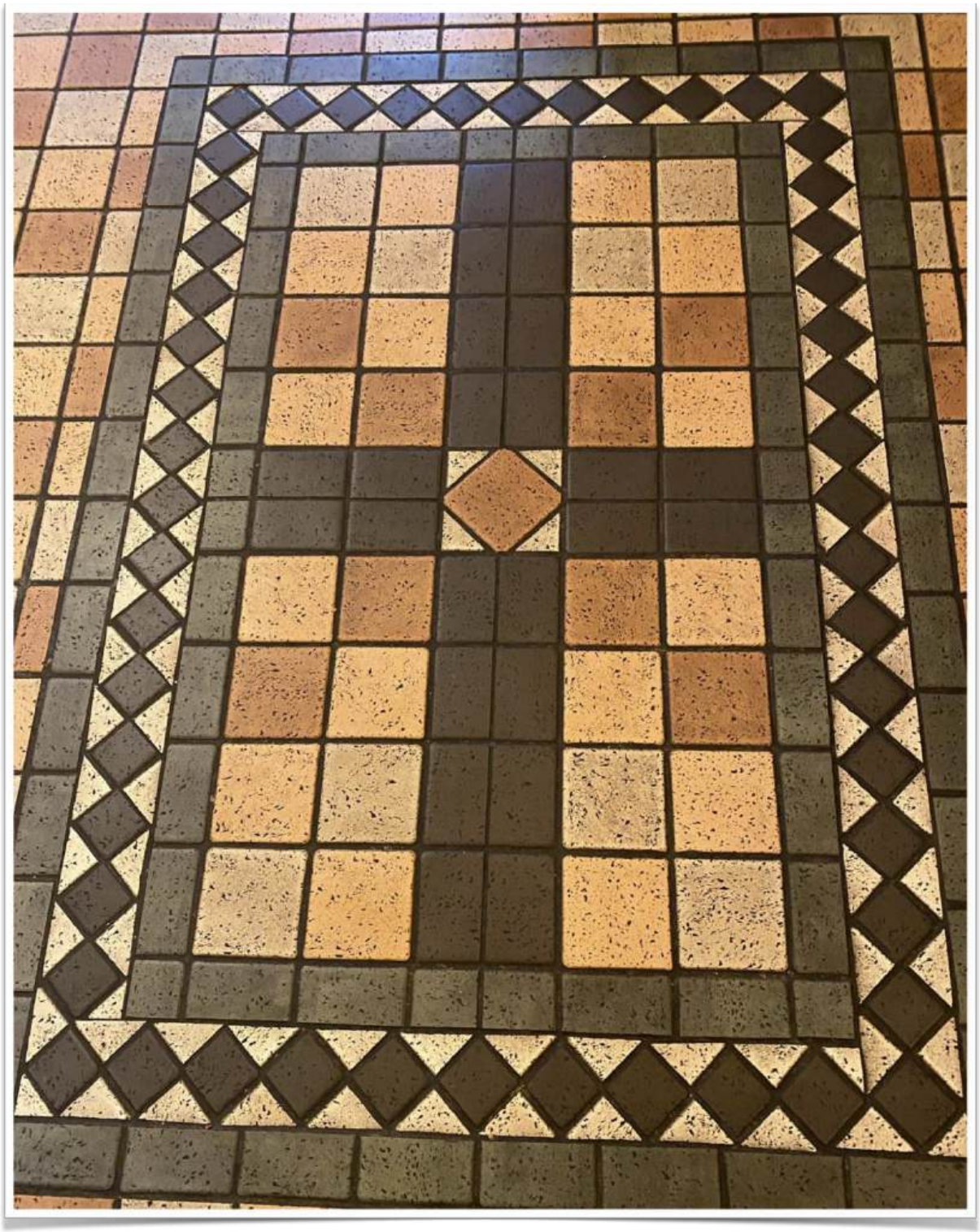
Look again at the first picture of the main tiled area. What patterns is it made from? What are at the ends?

Describe the pattern. How many of each type of tile are included in the pattern? How might you extend the pattern extend sideways?

Look closely at how angles have been used. Be ready to explain the types of angles you can identify.

Year 7/8: Geometry – ODD YEARS

Task 8 – Connect Resource



Task 8 (Independent)

Take a 2-D shaped pattern block and use it repeatedly to construct a patterned tile entrance.

How many different aspects of the pattern can you use in your overall set of tiles to create an interesting but balanced pattern. Include the use of colour.

Task 9

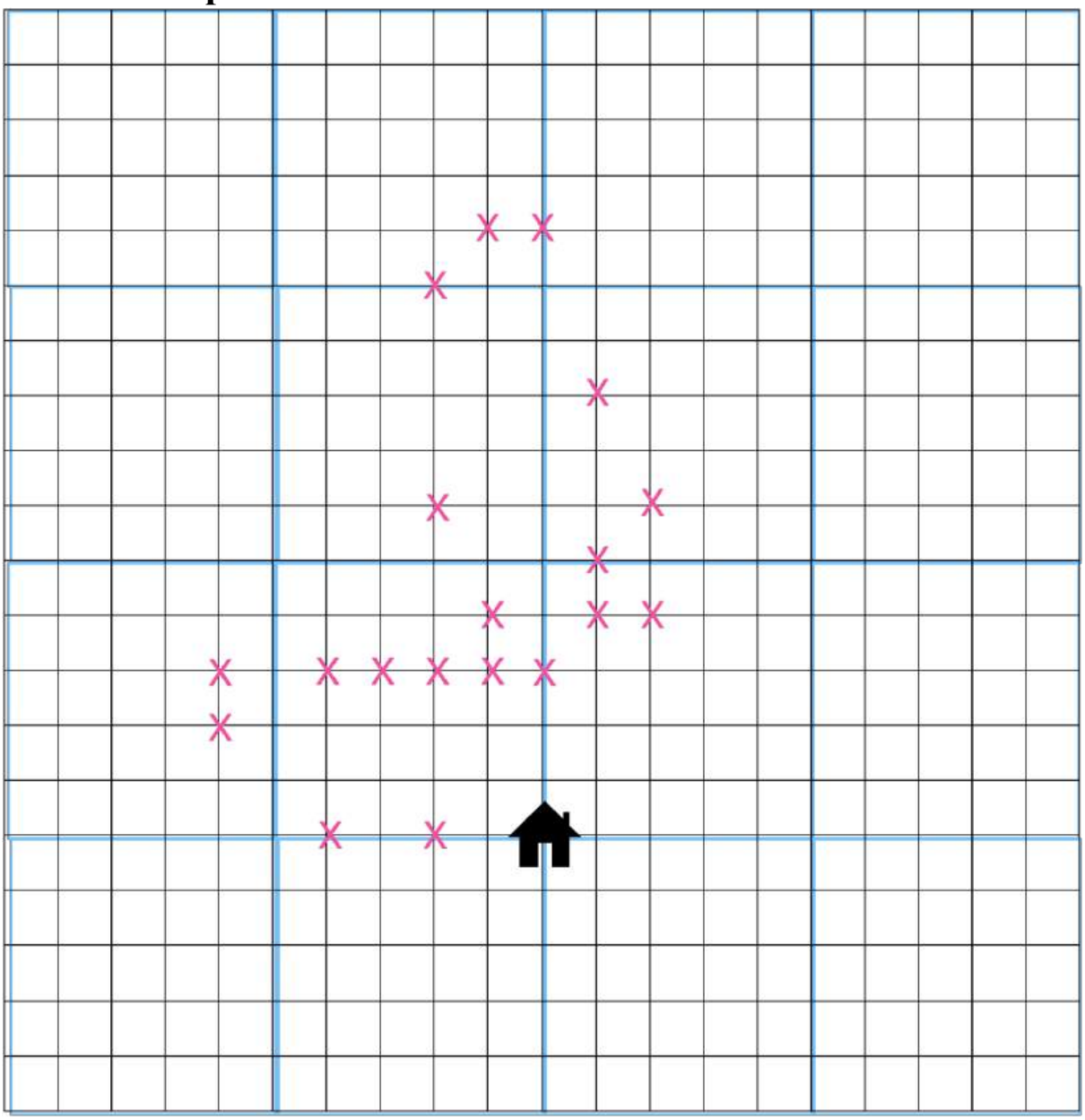
In a board game you must collect as many diamonds as possible and then bring them back to your home base before anyone else.

The rules say that you can draw straight lines through the diamonds using the four points of the compass (North, South, East, West). You are only allowed to use up to ten straight lines of any length to create your pathway from your home base and back again.

Are you able to improve your pathway so that you collect even more diamonds? Is it possible to collect all the diamonds each time?

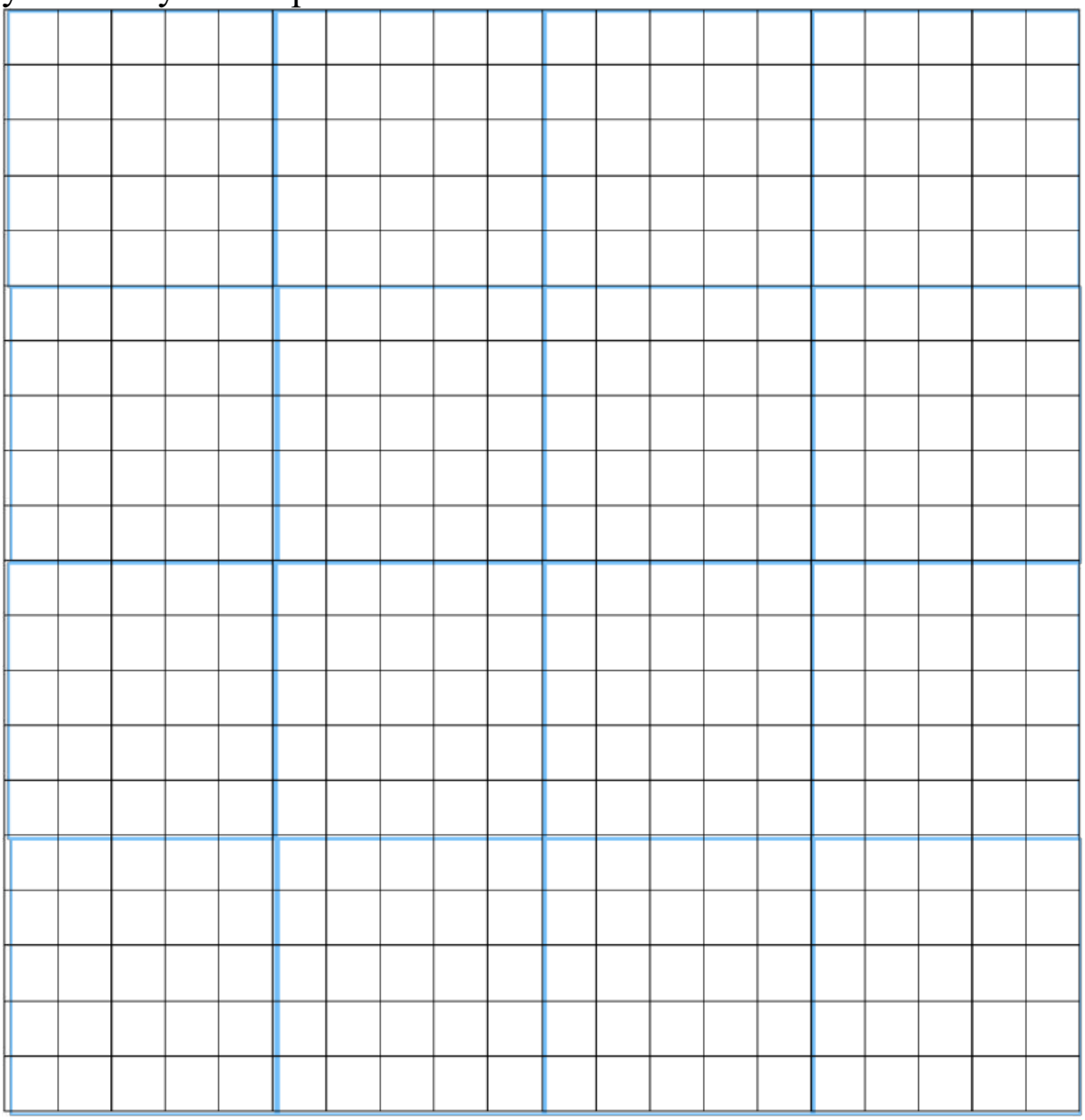
Make sure you record the directions you took so that you can explain and justify this as the best way.

Task 9 – Map and Diamonds



Task 9 (Independent)

Make your own grid map with a home base and diamonds which you need to gather. Make it as challenging as possible and then give it to your buddy to complete.

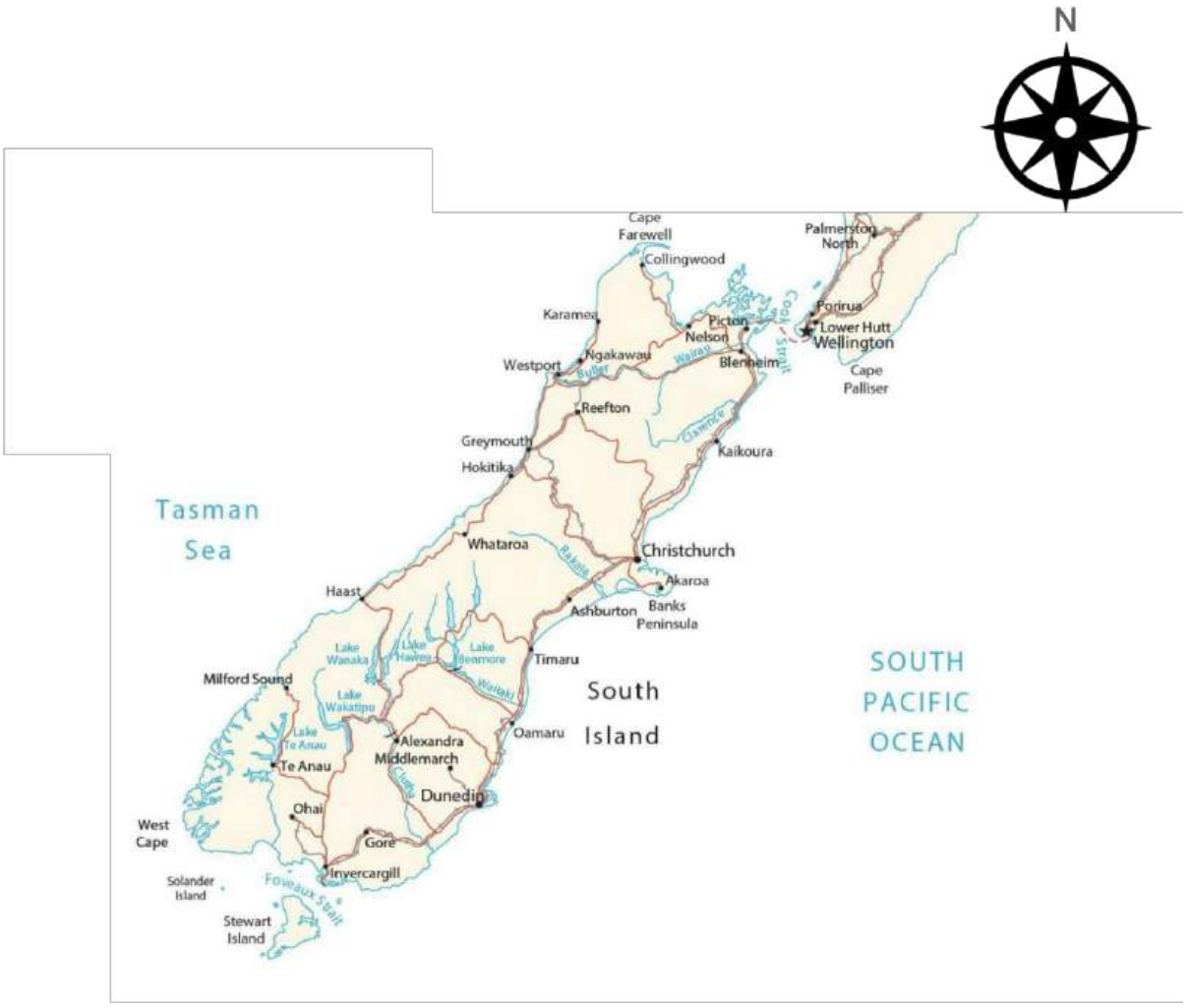


Task 10

Cooper lives in Christchurch and flies a small plane.

In which direction does he fly to get from:

1. Christchurch to Dunedin?
2. Dunedin to Ashburton?
3. Christchurch to Blenheim?
4. Westport to Christchurch?
5. Queenstown to Dunedin?
6. Queenstown to Invercargill?
7. Blenheim to Wellington?



Task 10 (independent)

Use a map of one area of New Zealand.
Write a set of questions for someone else to answer about what direction you travel in to drive from one place to another.

Task 11

Make your own computer game map involving finding objects. You can choose your own setting, but you need to use a grid with the sides numbered and the top lettered and decide on a scale and have a legend.

Mark where the hunt begins on your map.

Provide at least 10 clues of where to find the hidden objects using your scale, legend and the grid labels.

Task 11 (Independent)

Investigate how Māori and Pacific voyagers were able to locate their position and navigate the direction they travelled. What special navigation techniques did they develop and use as they explored the Pacific Ocean?

Task 12

Create your own tourist map for somewhere in your local area.

This could be natural attractions such as bush or river walks or a local attraction map such as a town map showing shopping malls, indoor playgrounds or other places of interest.

You can use a geographic online map as your base (such as a screen shot from google maps) or draw your own map.

You need to use a grid with the sides numbered and the top lettered, decide on a scale and have a legend.

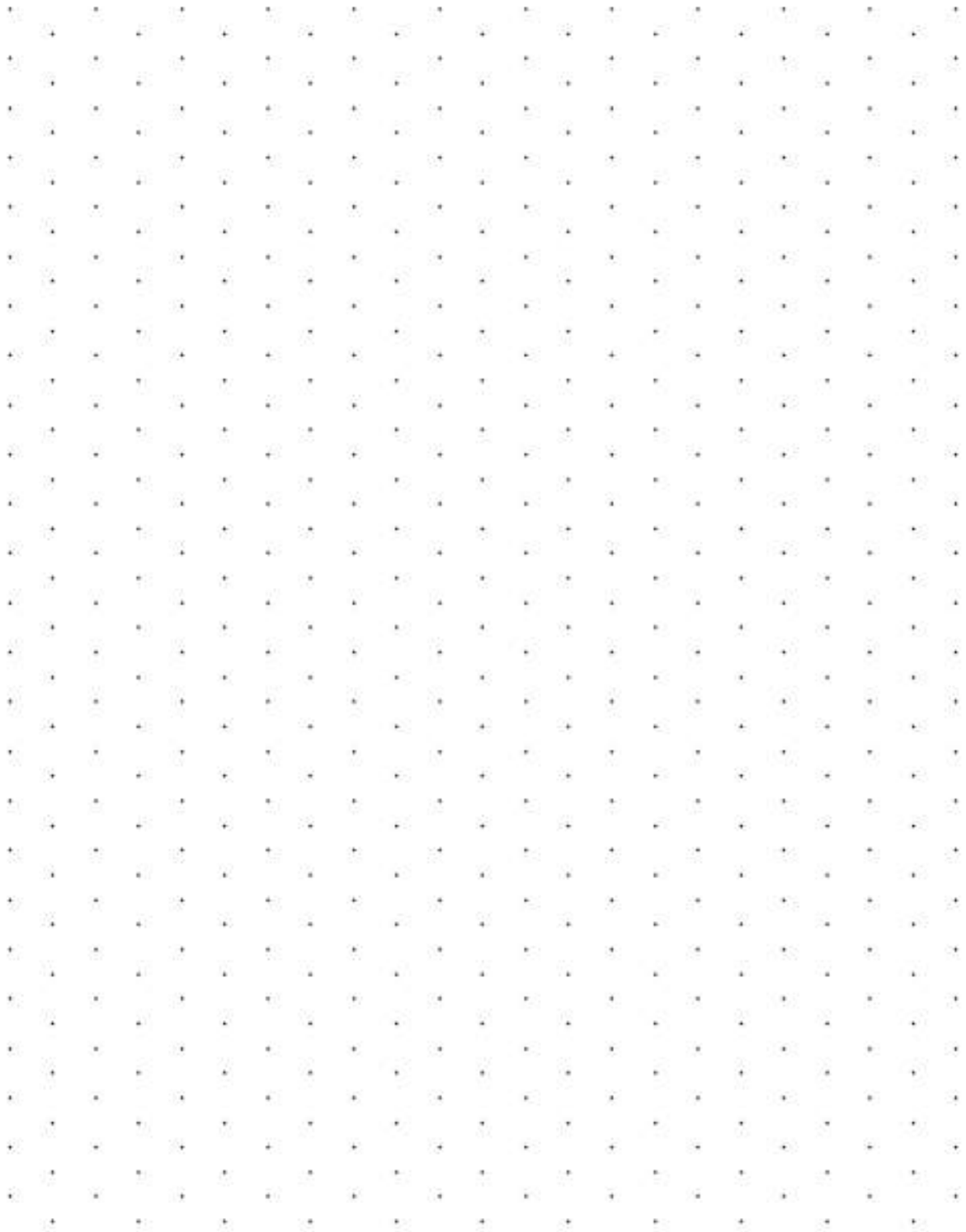
Mark where the tourist trail begins on your map.

Provide 10 instructions for a tourist to follow so that they can see the sights on your map.

Dotty Paper

Year 7/8: Geometry – ODD YEARS

Isometric Dotty Paper



Year 7/8: Geometry – ODD YEARS

Resource – Squared Grid Paper

Resource – Triangular Grid Paper