



RICH MATHEMATICAL TASK BOOKLET

# GEOMETRY

YEAR 7/8  
EVEN YEARS

Copy Masters

*Year 7/8: Geometry – Even Years*

## **Task 1**

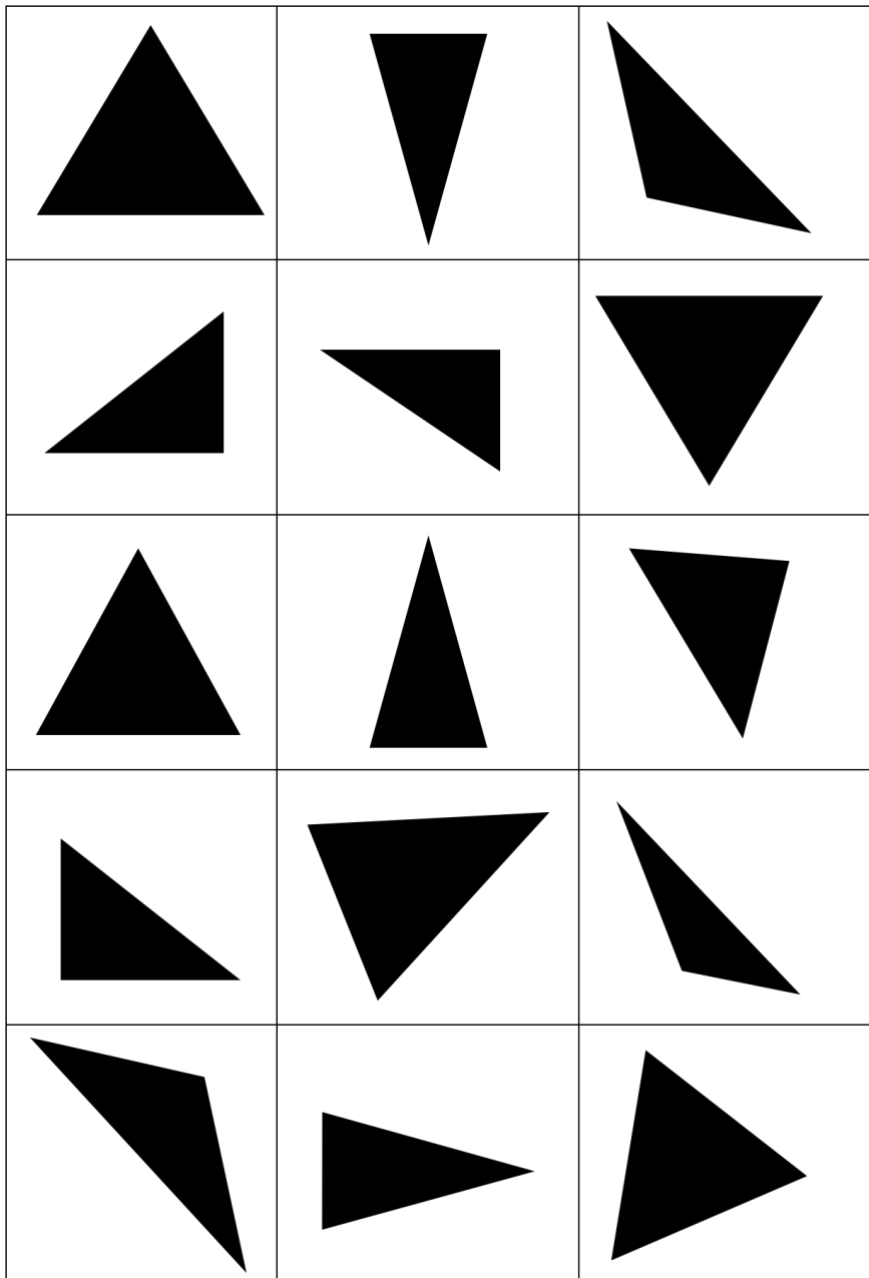
Sort these shapes into three groups.

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

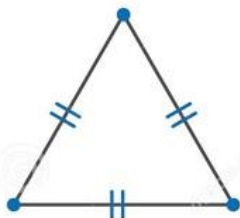
When you have sorted them into three groups record the properties of each group.

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.

Write some “if” statements.

*Year 7/8: Geometry – Even Years***Task 1**

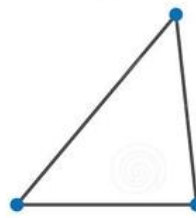
## Task 1: Supporting Resource

**TYPES OF TRIANGLES**

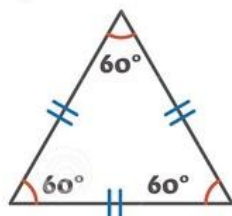
**Equilateral Triangle**  
3 equal sides



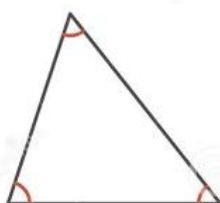
**Isosceles Triangle**  
2 equal sides



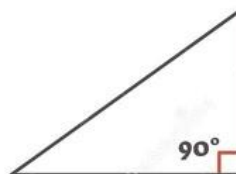
**Scalene Triangle**  
NO equal sides



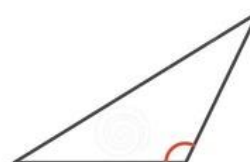
**Equiangular Triangle**  
3 angles =  $60^\circ$



**Acute Triangle**  
3 angles  $< 90^\circ$



**Right Triangle**  
1 angle =  $90^\circ$



**Obtuse Triangle**  
1 angle  $> 90^\circ$

**Task 1 (Independent)**

Are all the three-sided shapes on this piece of ngatu triangles?

Explain and justify your answer using all the three-sided figures on this piece of ngatu.

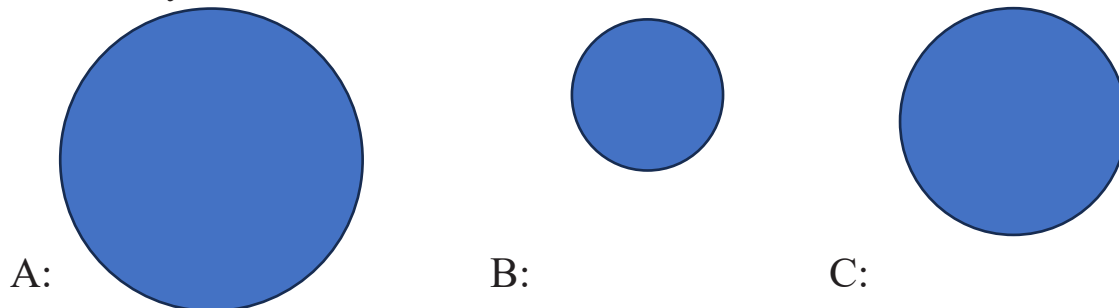


**Task 2**

Frankie thinks there is a relationship between the radius of a circle and the diameter.

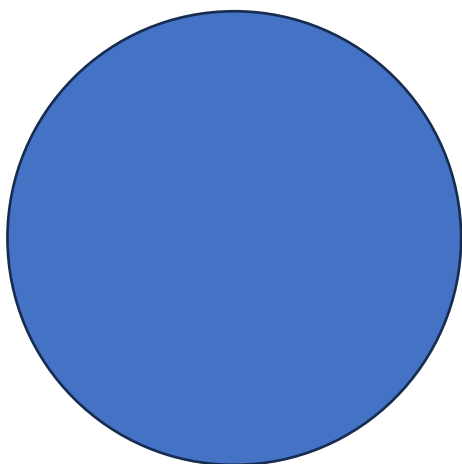
Using the different sized circles, fill in the table below.

What do you notice?



	Radius	Diameter
A:		
B:		
C:		
D:		

D:



**Task 2 (Independent)**

Match the words with their definition.

Word	Definition
1. Polygon	A. A triangle with all three sides the same length
2. Irregular Polygon	B. A four-sided polygon
3. Radius	C. A line segment from the center of a circle to its edge
4. Diameter	D. A line segment that passes through the center of a circle and connects two points on the circle
5. Circumference	E. A polygon whose sides and/or angles are not all equal
6. Pi ( $\pi$ )	F. An angle that measures exactly $90^\circ$
7. Quadrilateral	G. A mathematical constant approximately equal to 3.14
8. Scalene Triangle	H. A 2D shape made of 3 or more straight sides
9. Equilateral Triangle	I. A triangle with no equal sides
10. Isosceles Triangle	J. The distance all the way around a circle
11. Right Angle	K. A triangle with at least two sides of equal length

**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.

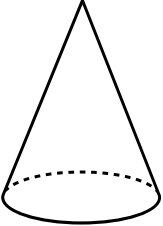
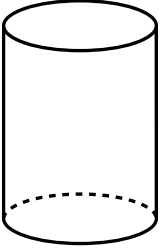
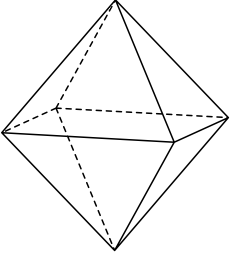
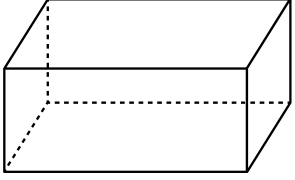
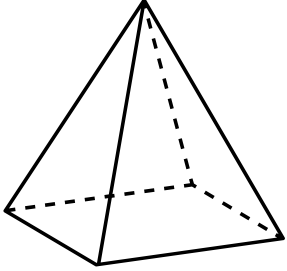
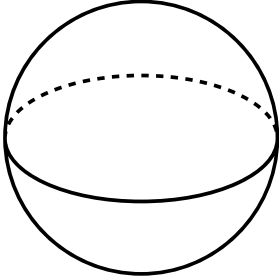
Use a table or Venn diagram to record your observations.

Explain and justify your reasoning.

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### **Task 3 (Independent)**

Draw the horizontal and vertical cross sections for these different shapes.

	Vertical Cross Section	Horizontal Cross Section
		
		
		
		
		
		

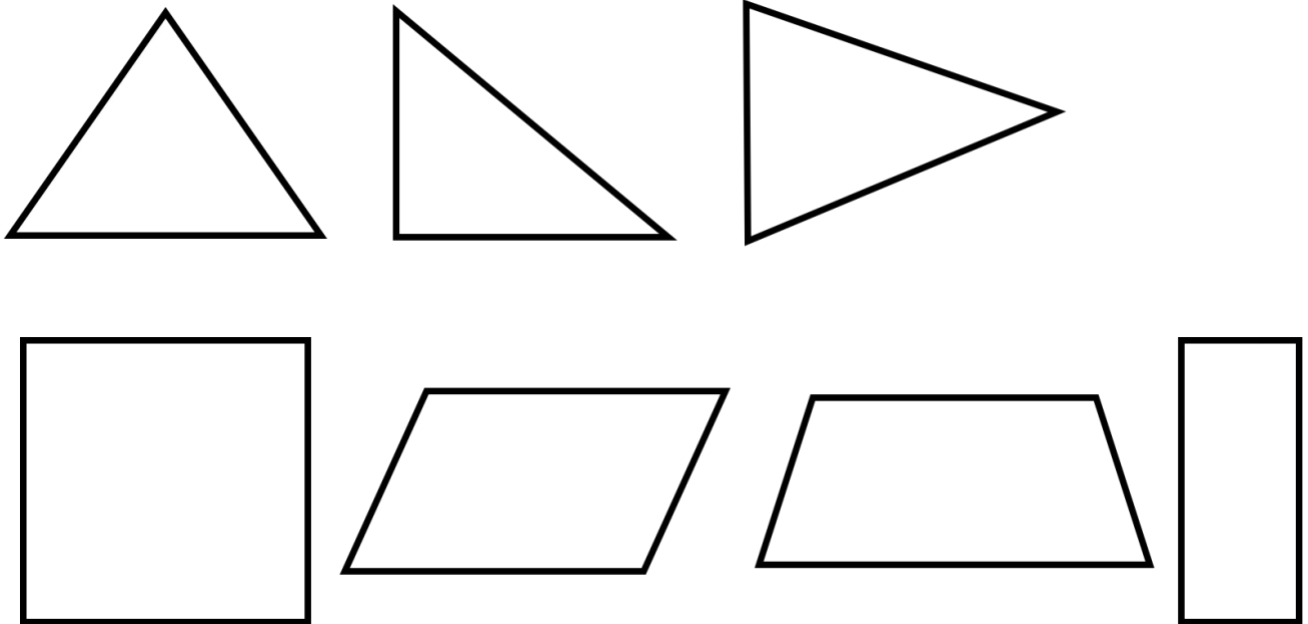
**Task 4**

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

Are these statements true or false? Prove it.

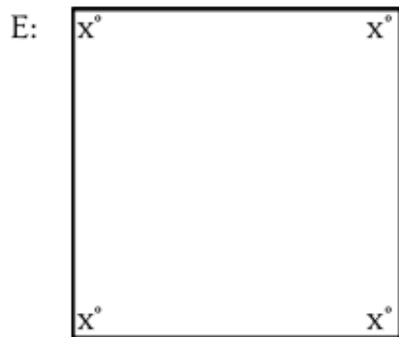
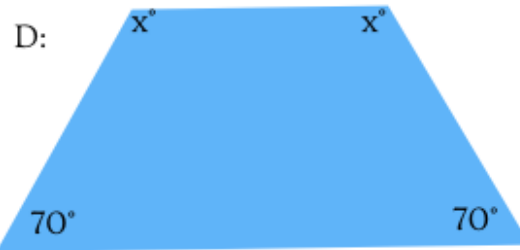
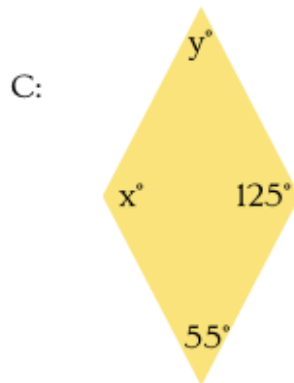
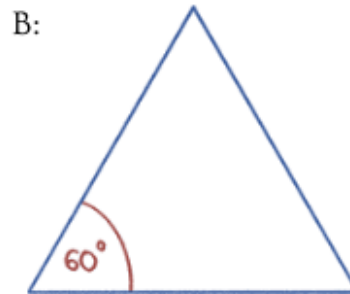
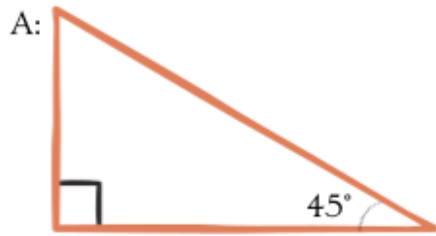
- All interior angles of a triangle add to  $180^\circ$
- Congruent angles (opposite angles) are always the same.
- Quadrilateral interior angles always add to  $360^\circ$  as a quadrilateral can be divided into two triangles.

What other statements can you make about internal angles of triangles or quadrilaterals.



*Year 7/8: Geometry – Even Years***Task 4 (Independent)**

Calculate the missing angles:



*Year 7/8: Geometry – Even Years***Task 5**

George believes there are more than five different ways to draw a net for a cube.

Is he correct?

How many different nets can you create?

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### **Task 5 (Independent)**

Draw a net for this can.



Draw a net for this juice carton.

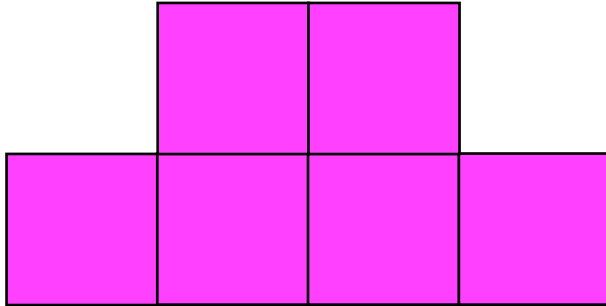


Draw a net for a carton that would hold this sandwich.



**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 look 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.

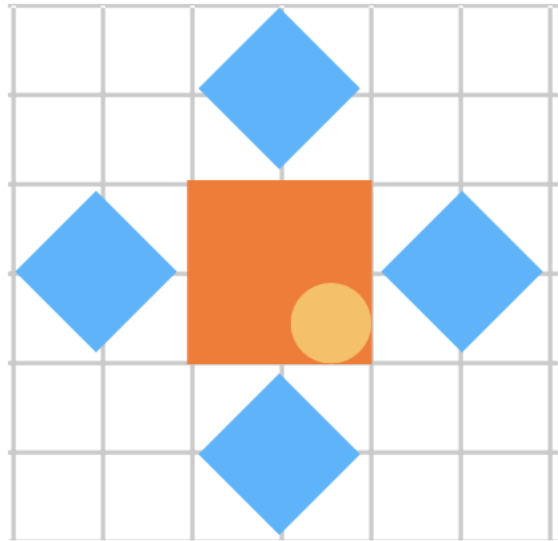
Draw different views of the construction onto the isometric paper.

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### **Task 6 (Independent)**

Imagine you are a bird. What would your school look like from above.

Use the grid paper to draw out this perspective.

**Task 7**

Draw this image on your grid paper  
Now enlarge the image by scale factor 2.  
Repeat again enlarging the image by scale factor 3.

*Year 7/8: Geometry – Even Years***Task 7 (Independent)**

Use three or four shapes to design an image. This is the start of a wallpaper design. Make the design 4 cm wide and 6 cm high

The wallpaper company enlarges a pattern by a scale factor of 5.

- What will the new width be?
- What will the new height be?
- How many times larger is the area?

Explain your thinking using diagrams and measurements.

**Task 8**

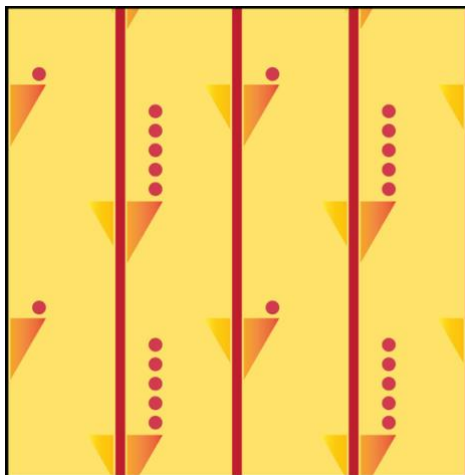
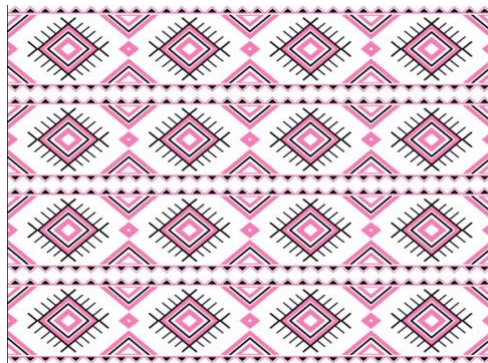
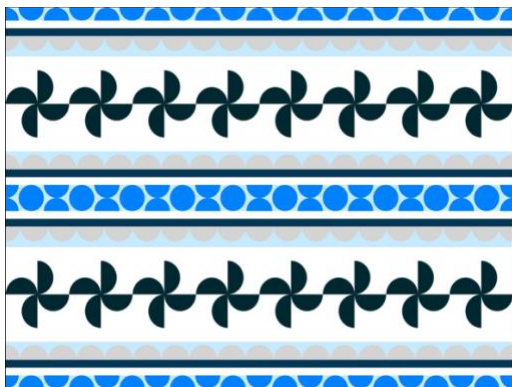
Many wallpaper designs in homes, hotels, and public buildings use repeating patterns. From a distance, the wallpaper may look the same all the way across the wall, but a closer look often reveals different shapes and arrangements.

What do you notice in these wall papers.

What wallpapers have mirror symmetry?

What wallpapers has translation?

What wallpapers have rotation?



**Task 8 (Independent)**

Design your own wallpaper border using at least:

- 2 different shapes
- 1 repeating pattern
- 1 line of symmetry
- Acute, right, and obtuse angles

Draw enough repeats to show how your wallpaper could continue across an entire wall.

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**Task 9**

Design a pattern for a large rug.

Your challenge is to use simple shapes to make a complex pattern using rotation, translation and flipping.

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### **Task 9 (Independent)**

Design your own rug, wall paper or tile design by creating a complex pattern and using rotation, translation and flipping.

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### Task 10

Aroha lives in Wellington and flies a small plane.

In which compass direction does she fly to get from:

- Wellington to Palmerston North?
- Palmerston North to Napier?
- Wellington to Nelson?
- Nelson to Blenheim?
- Wellington to New Plymouth?
- New Plymouth to Hamilton?
- Wellington to Christchurch?
- Christchurch to Timaru?
- Nelson to Westport?
- Napier to Gisborne?



**Task 10 (independent)**

Use a map of your area of New Zealand.

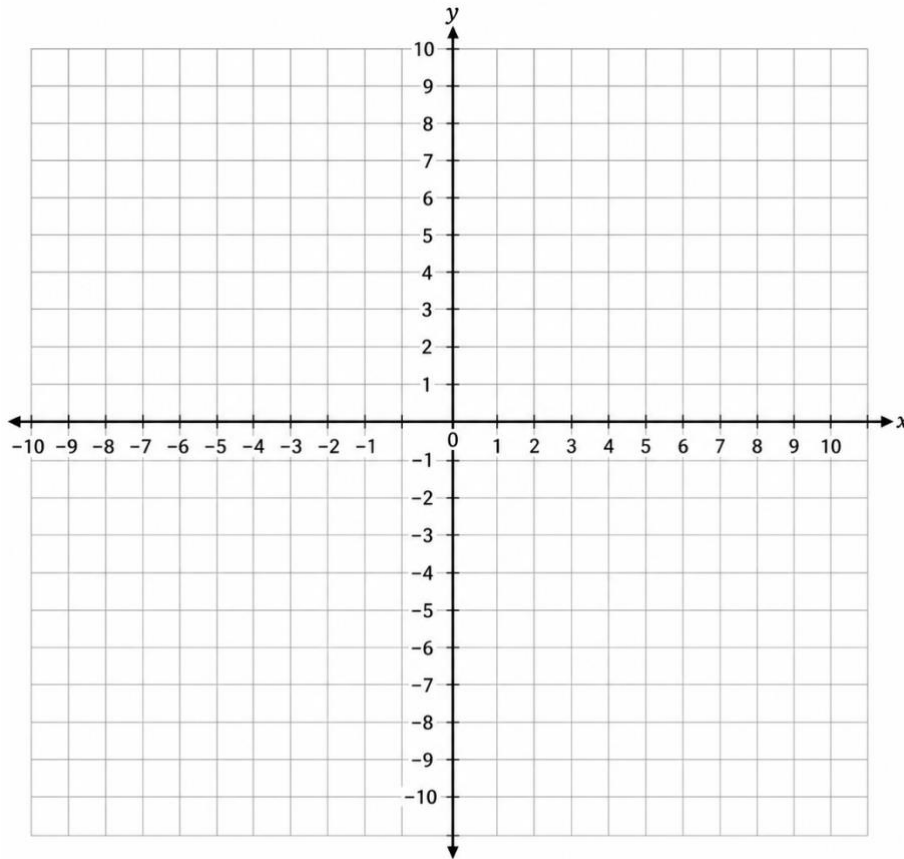
Write a set of 10 directions using compass points to navigate an explorer around that area.

You can choose their mode of transport e.g car or helicopter.

You can choose if they are going to travel all over New Zealand or stay local There must be ten sets of directions.

**Task 11**

Make your own computer game map that involves finding objects. You can choose your own setting, but you need to use coordinates. Mark where the hunt begins on your map. Provide 10 coordinates or clues for another group to find the objects.

**Task 11 (Independent)**

Plot ten points on this grid and record their co-ordinates.

**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.

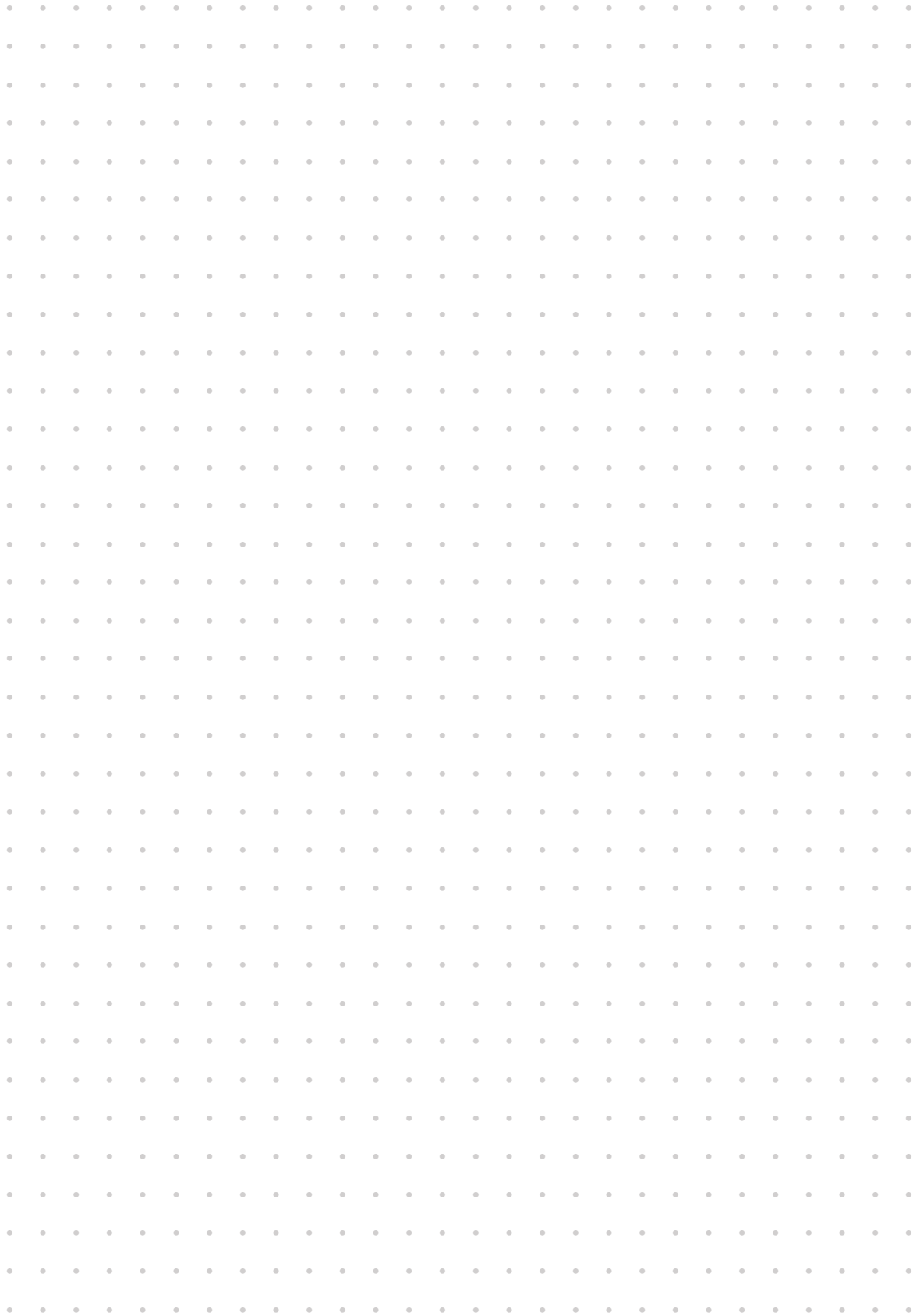
You can use a geographic online map as your base (such as a screen shot from google maps) or draw your own map.

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

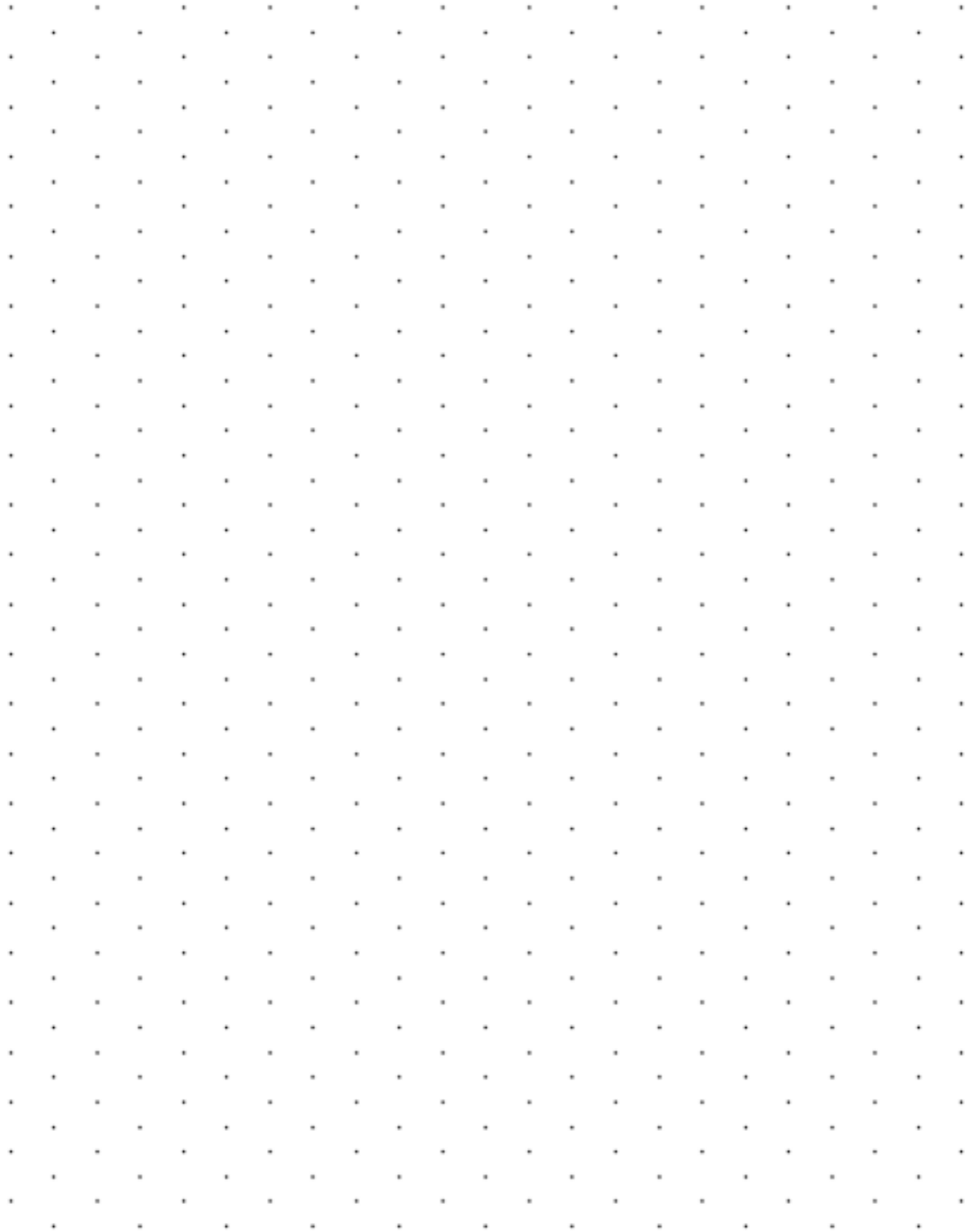
Mark where the tourist trail begins on your map.

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

# Dotty Paper



**Isometric Dotty Paper**



**Resource – Squared Grid Paper**

