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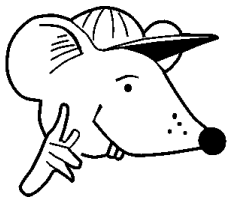
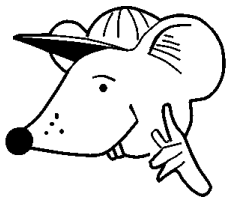


MATHEMATICS



N.S. Yr. 5 P.109

Recognise positions and directions, and use co-ordinates.

Equipment

Paper, pencil, ruler

MathSphere

Concepts

Children should be familiar with the following words and should be able to use, read and write them:

position, direction, ascend, descend, journey, route, map, plan, grid, row, column, origin, x-axis, y-axis, quadrant, co-ordinates, compass, point, north, south, east, west, north-east, north-west, south-east, south-west, horizontal, vertical, diagonal, parallelogram, perpendicular.

Although it is an unbreakable rule that in a pair of co-ordinates the first number refers to the horizontal distance from the origin and the second number refers to the vertical distance from the origin, this is not the case when we name the axes. We can call the axes whatever we like and, in fact, we call them many things (x, y, p, , time, exchange rate, temperature etc).

However, when no particular application is under discussion and we are merely talking about the relationship between two sets of numbers (one on each axis), it is usual to call them the **x-axis** and the **y-axis**. In this case, the x-axis is normally the horizontal one and the y-axis is the vertical one, and at this age it is probably best to stick to this convention.

[For those who seek a more technical explanation, the horizontal axis is used to show the independent variable (the numbers we choose independently) and the vertical axis is used to show the dependent variable (the set of numbers that have a value depending on which numbers we choose on the horizontal axis). For example, if we measure the temperature every hour, the time is the independent variable since we chose to measure time in periods of one hour; temperature is the dependent variable since the temperature depends on the time at which we choose to read the thermometer. Do not try to explain this to ten year old children!]

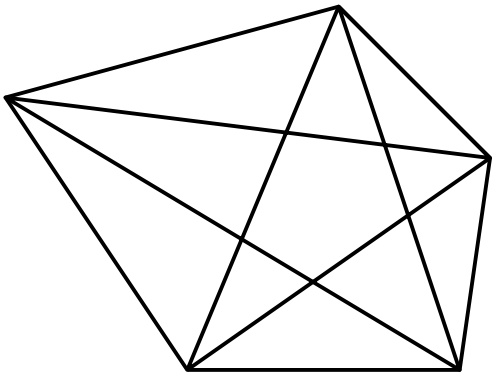
Children should continue to plot and read co-ordinates and look for simple relationships between them. They should be able to plot a set of co-ordinates that give a polygon and name the polygon. They should be able to work out the missing set of co-ordinates for a simple shape such as a square or a rectangle.

N.B. When drawing polygons the shape should be completed by returning to the first point given.

Children should know the words 'parallel' and 'perpendicular' and their meanings. Two or more lines are parallel if they are always the same distance apart. They are perpendicular if they are at right angles.

Children should be able to spot parallel and perpendicular lines in their environment and in known shapes such as rectangles and regular octagons.

They should also know the meaning of the word 'diagonal' and be able to draw diagonals in polygons.

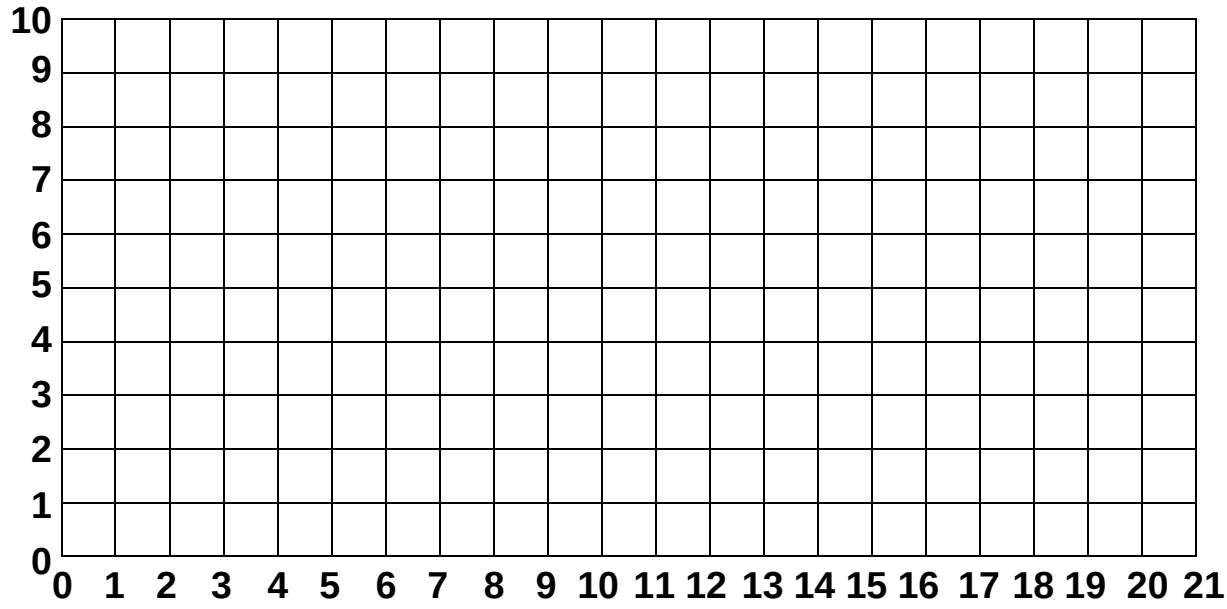


The diagram shows the five diagonals in a pentagon.

The number of diagonals is **not** normally the same as the number of sides.

Plot these points and see what they make:

A star means start a new part of the drawing - do not join it to the other parts.

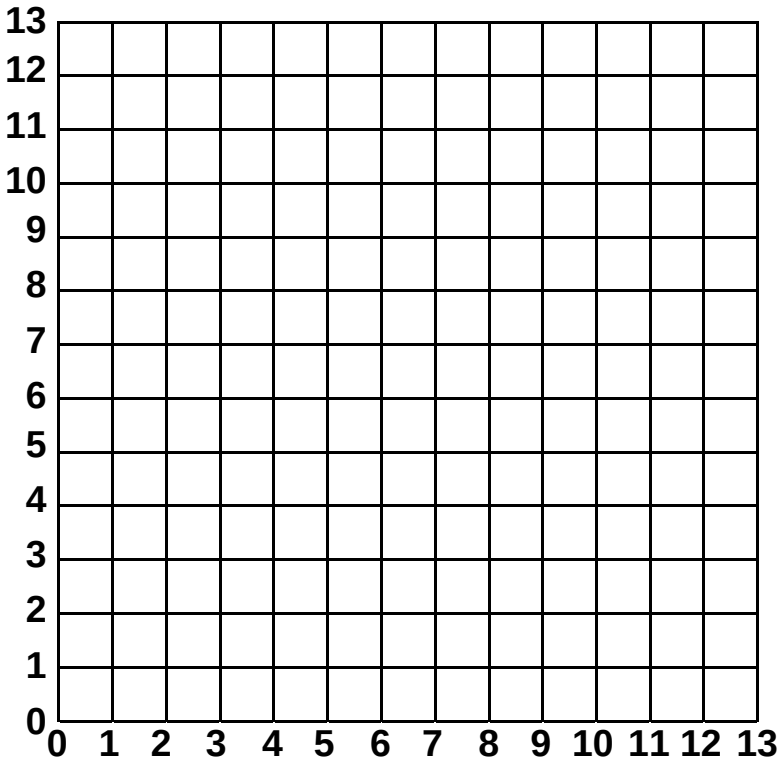


(4,2) (20,2) (20,3) (4,3) (4,2) *
(5,3) (5,7) (7,7) (7,3) *
(11,3) (11,7) (13,7) (13,3) *
(17,3) (17,7) (19,7) (19,3) *
(20,7) (19,10) (5,10) (4,7) (20,7) *
(3,6) (1,5) (1,4) (3,3) (3,6) *
(3,5) (5,5) *
(7,5) (11,5) *
(13,5) (17,5) *
(19,5) (21,5) (21,4) (19,4) *
(17,4) (13,4) *
(11,4) (7,4) *
(5,4) (3,4)
Draw three circles, each 1cm radius, with centres at (6,2), (12,2) and (18,2)

Colour in the shape.

Plot these points and see what they make:

A star means start a new part of the drawing - do not join it to the other parts.
(N.B. This shape is not symmetrical.)



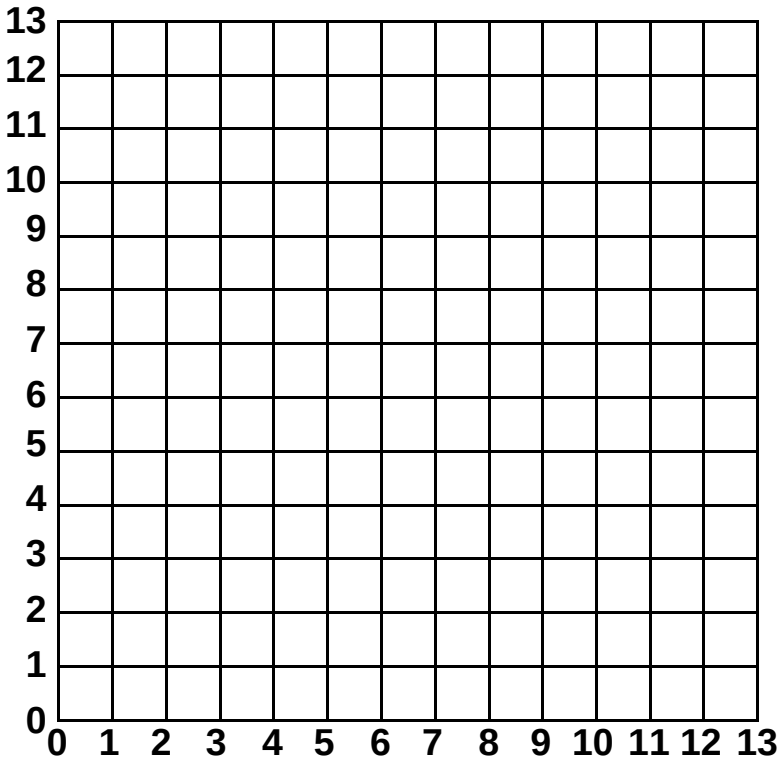
(6,0) (6,1) (4,1) (4,2) (3,3) (3,6) (2,6) (2,5) (1,4) (1,9) (2,8) (2,7) (3,7) (3,9) (5,11) (9,11) (11,9) (11,7) (12,7) (12,8) (13,9) (13,4) (12,5) (12,6) (11,6) (11,3) (10,2) (10,1) (8,1) (8,0) *

(5,3) (9,3) (9,2) (5,2) (5,3) *
(5,4) (8,4) (8,5) (7,6) (6,6) (5,5) (5,4) *
(4,7) (6,7) (6,8) (5,9) (4,8) (4,7) *
(7,7) (9,7) (9,8) (8,9) (7,8) (7,7) *
(7,11) (7,13)(7,12) (6,13) (7,12) (8,13)

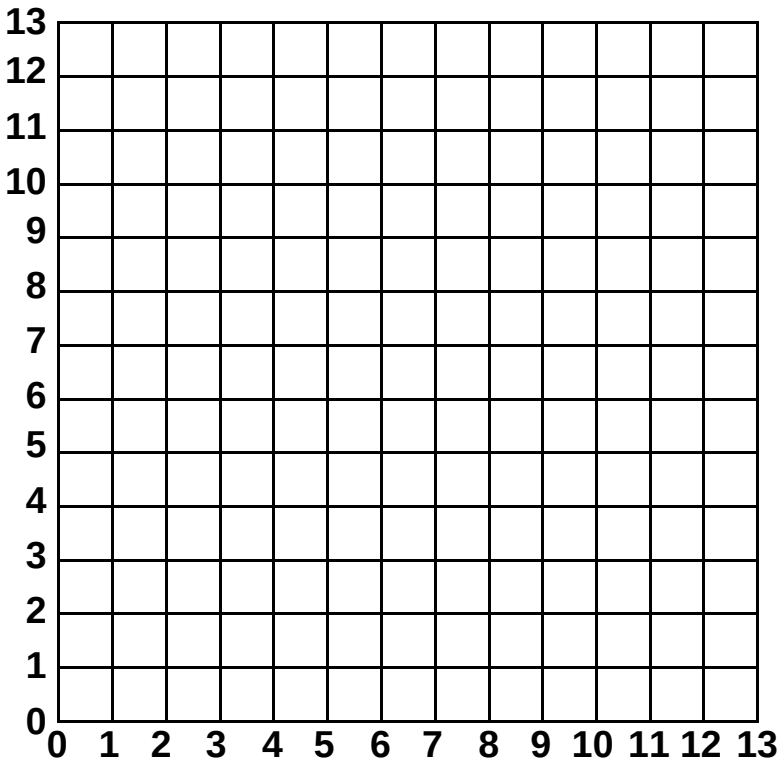
Colour in the squares:
(4,7) (5,7) (5,8) (4,8) *
(7,7) (8,7) (8,8) (7,8)

Draw your own face. It could be a robot, a cartoon character or an animal.

Use a star to mean 'start a new part of the drawing - do not join it to the other parts'.



Write down the co-ordinates of the points in your face.
You could give the co-ordinates to a friend for him/her to draw your face.



The co-ordinates of the vertices of some polygons are given below.
Draw the shapes on the grid above. **Then <u>name</u> the shapes.**

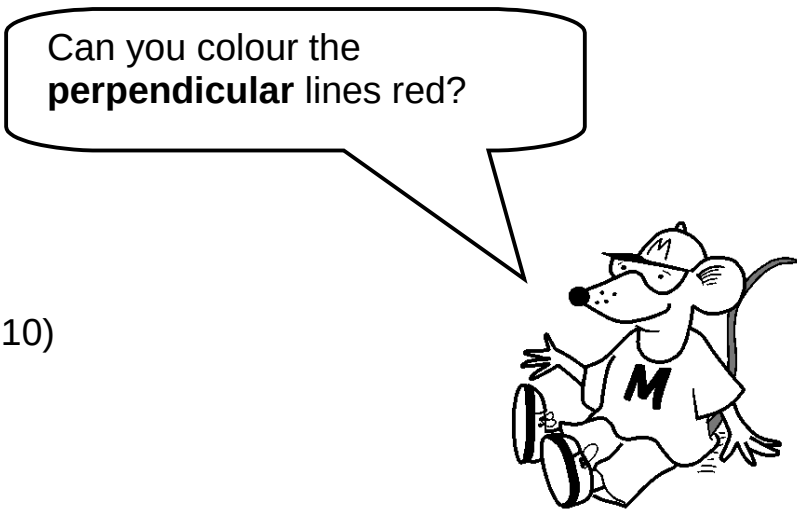
Shape 1.
(1,1) (3,1) (3,3) (1,3)

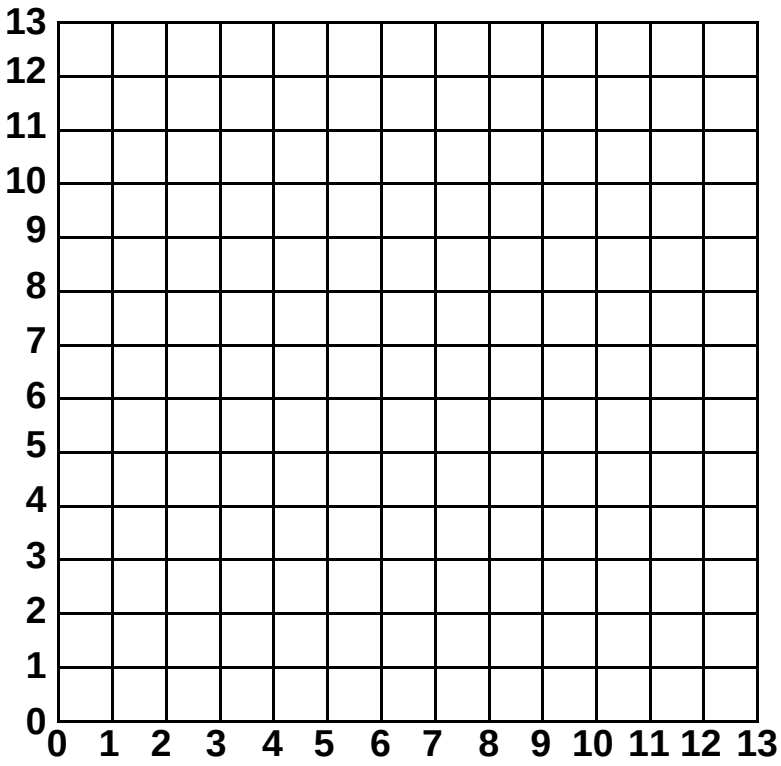
Shape 2.
(7,1) (10,1) (11,2) (11,3) (10,4) (7,4) (6,3) (6,2)

Shape 3.
(2,5) (5,6) (2,8)

Shape 4.
(2,9) (2,12) (5,12)

Shape 5.
(7,7) (9,7) (11,9) (9,11) (7,10)



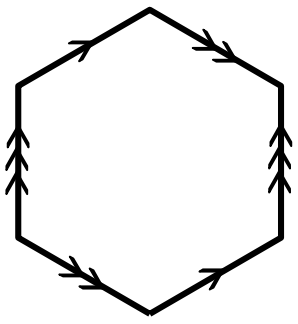


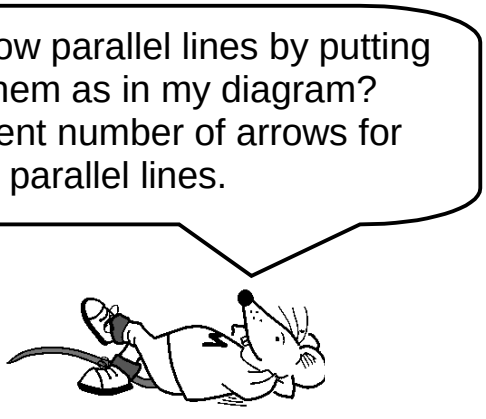
The co-ordinates of the vertices of some polygons are given below.
Draw the shapes on the grid above. **Then <u>name</u> the shapes.**

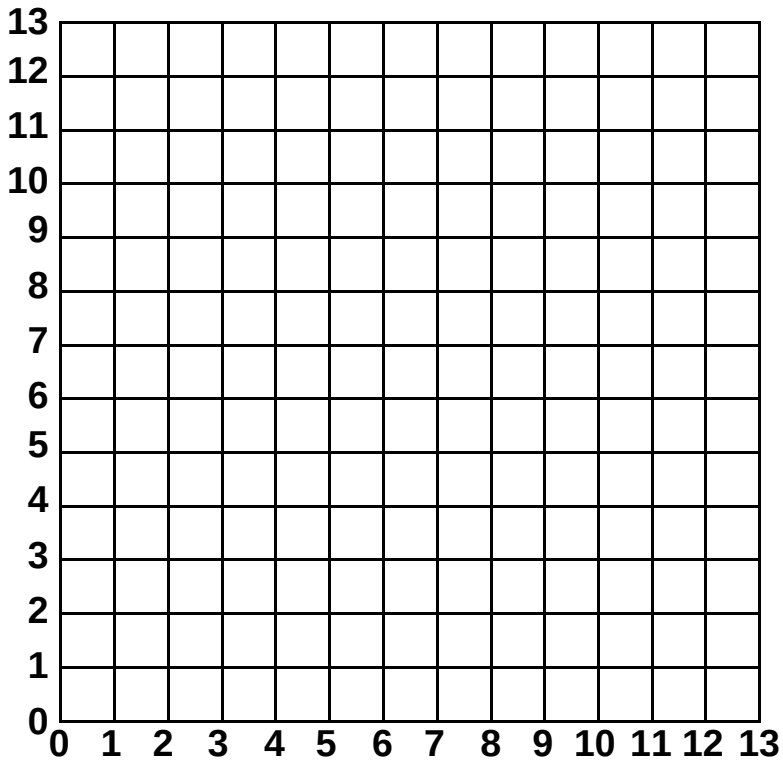
Shape 1.
(1,2) (5,2) (3,6)

Shape 2.
(7,2) (13,2) (13,5) (10,6) (8,6) (7,4)

Shape 3.
(0,7) (6,7) (8,11) (8,12) (5,13) (2,13) (0,9)







Here are some shapes. In each shape one pair of co-ordinates is missing.
Draw the shapes on the grid and say what the missing co-ordinates are.

Shape 1. A Rectangle.

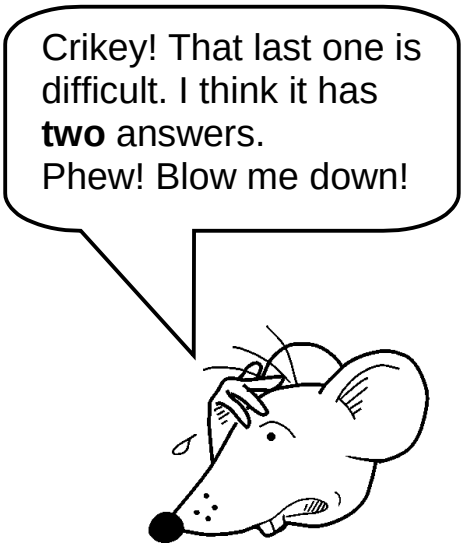
(1,5) (1,0) (2,0) Missing co-ordinates (,)

Shape 2. A Square.

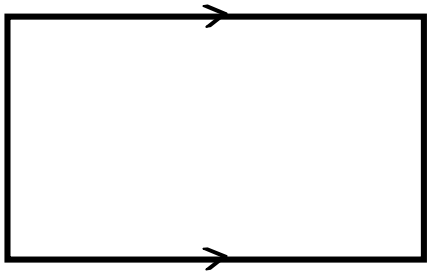
(8,2) (8,6) (4,6) Missing co-ordinates (,)

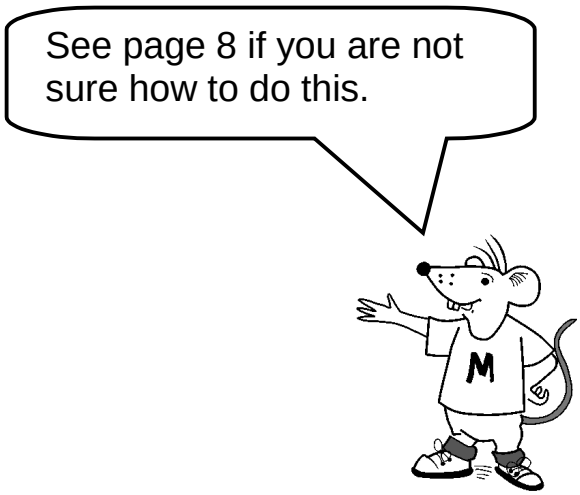
Shape 3. An Isosceles Triangle.

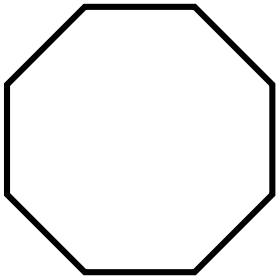
(8,9) (10,12) Missing co-ordinates (,)

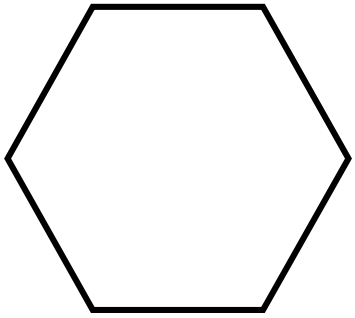


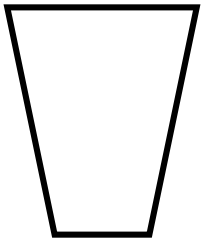
Mark the pairs of parallel sides in each shape using arrows.
One pair has been done for you.

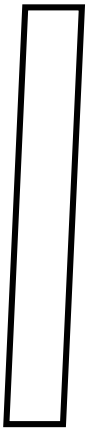


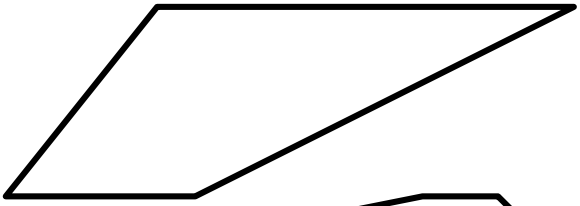


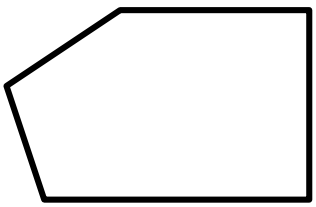


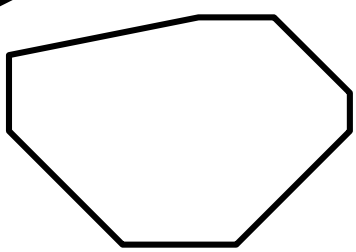












Remember:
P**arallel** lines are lines that are always the same distance apart like the edges of a ruler.
Perpendicular lines are lines at right angles like two edges of a desk that meet.

Unless you have one of those new fangled hexagonal desks, of course!

Fill in the table below with some ideas for parallel and perpendicular lines around your home or classroom.

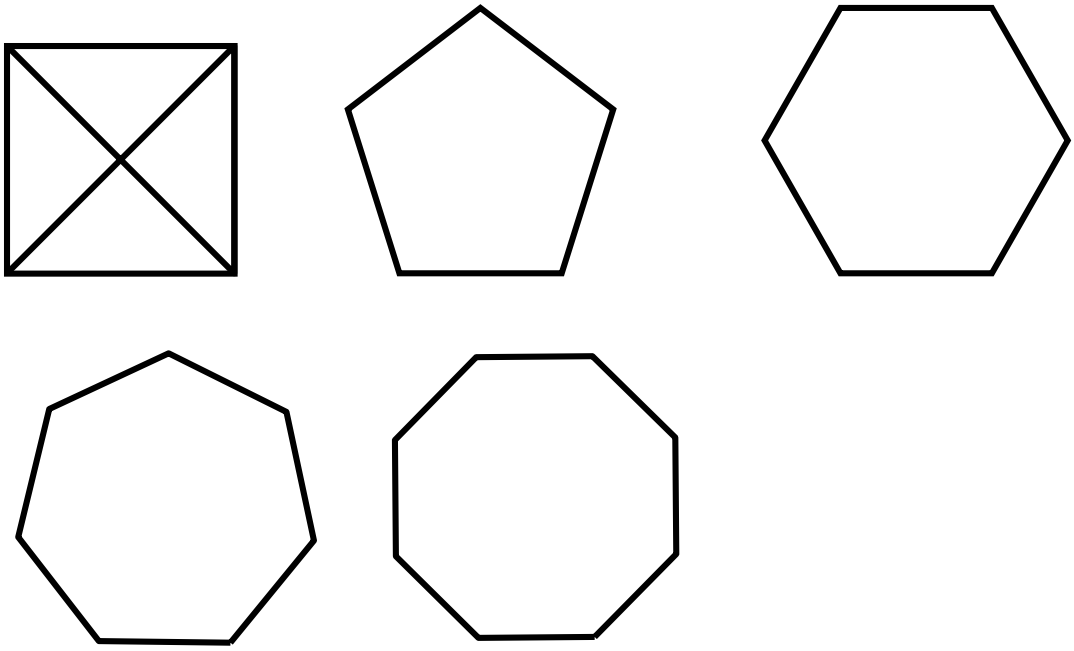
Here are some suggestions to start you off.

Parallel Lines	Perpendicular Lines
Opposite edges of a table.	Edges of a book that meet.
Furrows in a farmer's field.	The floor and a table leg.

A diagonal is a straight line from one corner of a polygon to another (but not to the corners next to it - these are sides).

Draw in all the diagonals in these polygons and write the number in the table.

The first is done for you.



Name of Shape	Number of Diagonals
Square	2

Answers

Page 4 The picture is a medieval battering ram.	**Page 8** Shape 1: Isosceles triangle Shape 2: Hexagon (not regular) Shape 3: Heptagon (not regular)
Page 5 The picture is a robot type face.	**Page 9** Shape 1: Missing Co-ord (2,5) Shape 2: Missing Co-ord (4,2) Shape 3: Missing Co-ord (12,9) or (6,12)
Page 7 Shape 1: Square Shape 2: Octagon (not regular) Shape 3: Scalene triangle Shape 4: Isosceles right-angled triangle Shape 5: Pentagon (not regular)	**Page 12** Square 2 Pentagon 5 Hexagon 9 Heptagon 14 Octagon 20