Properties of 2D shapes

Some definitions which may help you…

Equal = the same size/length

Lines of symmetry = A line of symmetry is a line that cuts a shape exactly in half. This means that if you were to fold the shape along the line, both halves would match exactly. Equally, if you were to place a mirror along the line, the shape would remain unchanged.

Parallel =

Lines on a plane that never meet. They are always the same distance apart.

Here the red and blue line segments are parallel.

In each row, find the statement which is incorrect. You can use a tick✓ or a cross x in each box to record your answers or shade/colour the incorrect statement.

	Every angle in this shape is a right angle.	This shape has six equal sides.	This shape has six lines of symmetry.
	In this shape, opposite sides are equal.	This shape has four right angles.	This is a regular shape.
	This is an octagon.	All the sides in this shape are equal.	This shape has four lines of symmetry.
	This is a trapezium.	This shape has one pair of parallel sides.	This is a regular shape.
	This shape has no lines of symmetry.	All the sides in this shape are equal.	This shape has one right angle.
	This shape has no lines of symmetry.	This shape has five equal sides.	Each angle in this shape is 108º.
	Opposite sides in this shape are parallel.	Opposite angles in this shape are equal.	This shape has two lines of symmetry.

Can you create 2 correct statements and one incorrect statement (like above) for these 2D Shapes; square. Octagon, circle, kite?

2D Shape Symmetry Drawing

Draw the other half of the shape and make sure it is symmetrical.
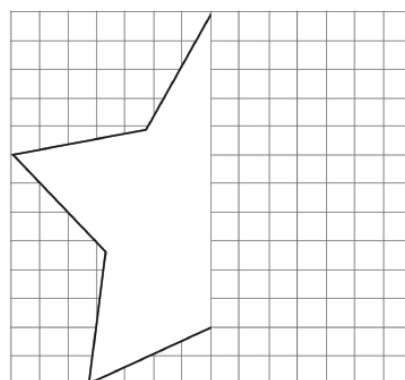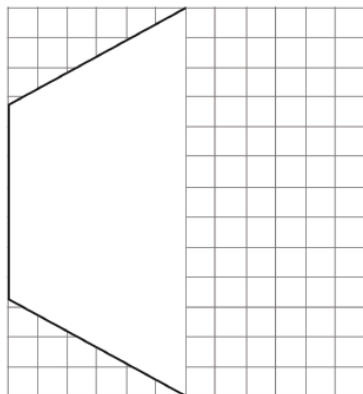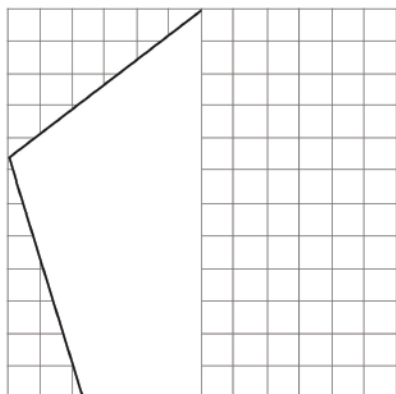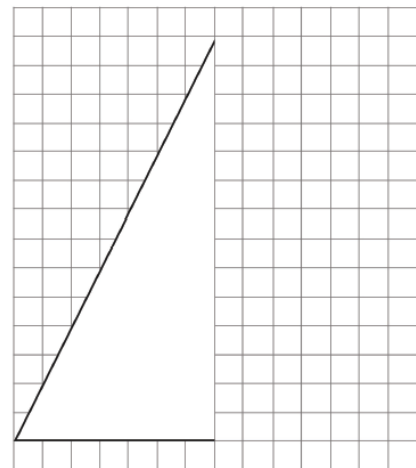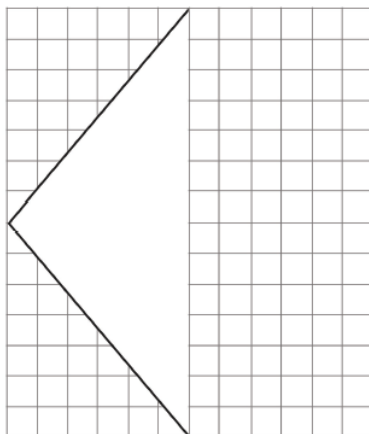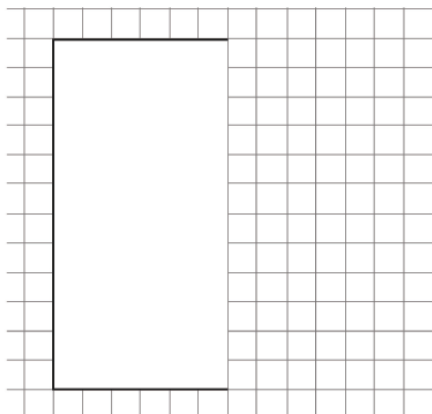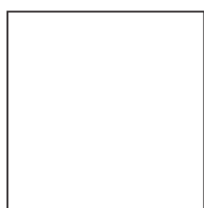
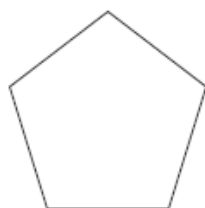## Investigating Lines of Symmetry

Name _____

Sides _____

Lines of Symmetry _____

Name _____

Sides _____

Lines of Symmetry _____

Name _____

Sides _____

Lines of Symmetry _____

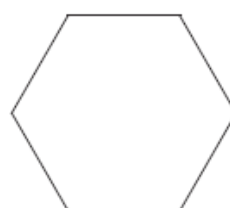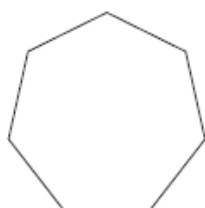Name _____

Sides _____

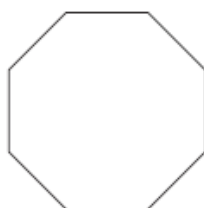Lines of Symmetry _____
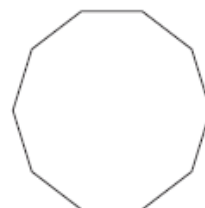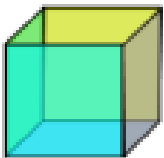
Name _____

Sides _____

Lines of Symmetry _____

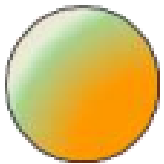Name _____

Sides _____
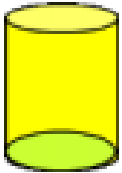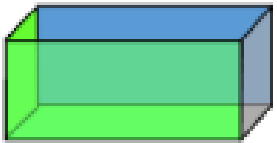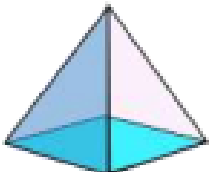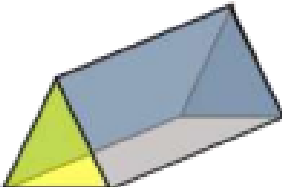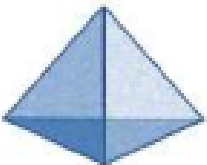
Lines of Symmetry _____

Name _____

Sides _____

Lines of Symmetry _____

3D Shapes

Write the correct name for each shape using the list below.

1)		cuboid	7)		
2)			8)		
3)			9)		
4)			10)		
5)			11)		
6)			12)		

cuboid	cuboid	prism
pyramid	cone	cylinder

Can you create a table for the 6 named 3D Shapes above and record faces (how many and what shape), how many vertices (corners) and how many edges?

Areas of Rectangles

Calculate the area of the following rectangles.

The shapes are not to scale.

1.

6cm

3cm

2.

7cm

4cm

3.

8cm

5cm

4.

10cm

3cm

5.

11cm

4cm

6.

12cm

7cm

7.

9cm

3cm

8.

6cm

6cm

9.

9cm

5cm

10.

8cm

7cm

11.

12cm

9cm

12.

11cm

3cm
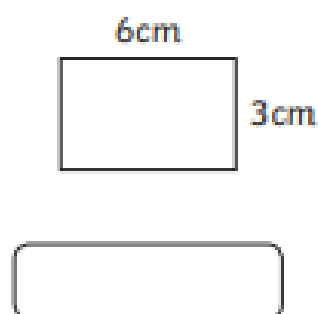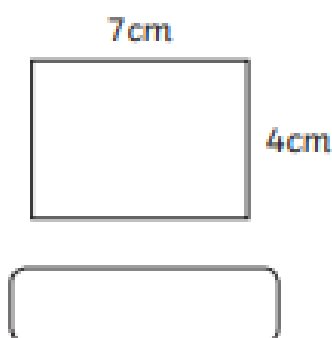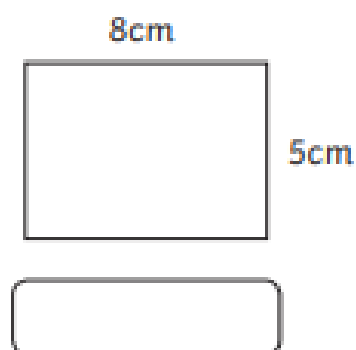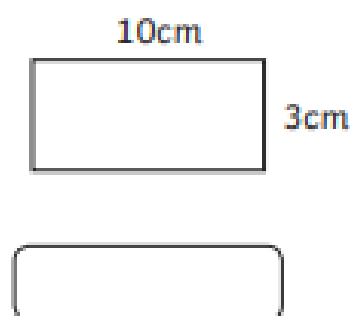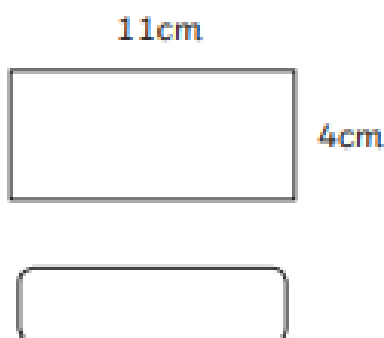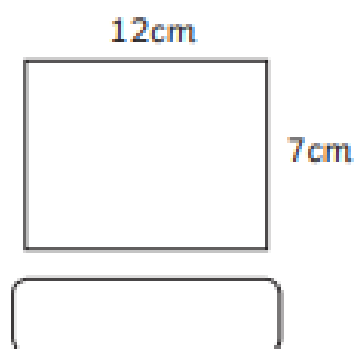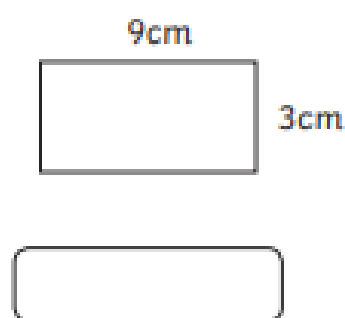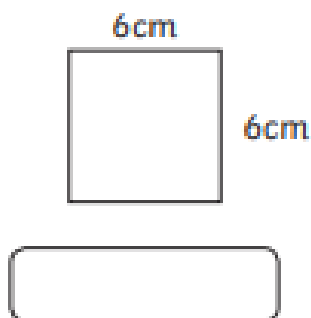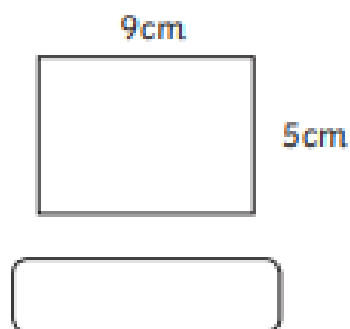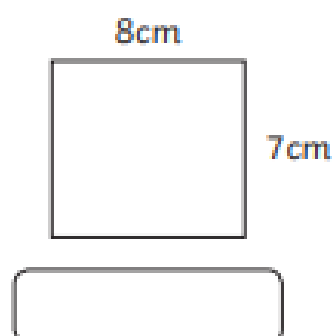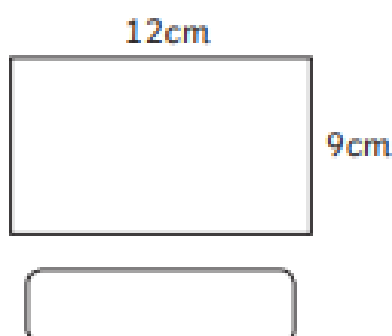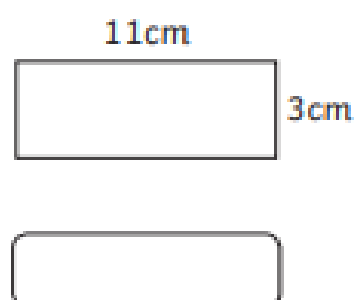
Describe positions on a 2-D grid as coordinates in all 4 quadrants

Remember: Along the corridor (x-axis) and up the stairs (y-axis)

Use the coordinate grid to work out the coordinates below.
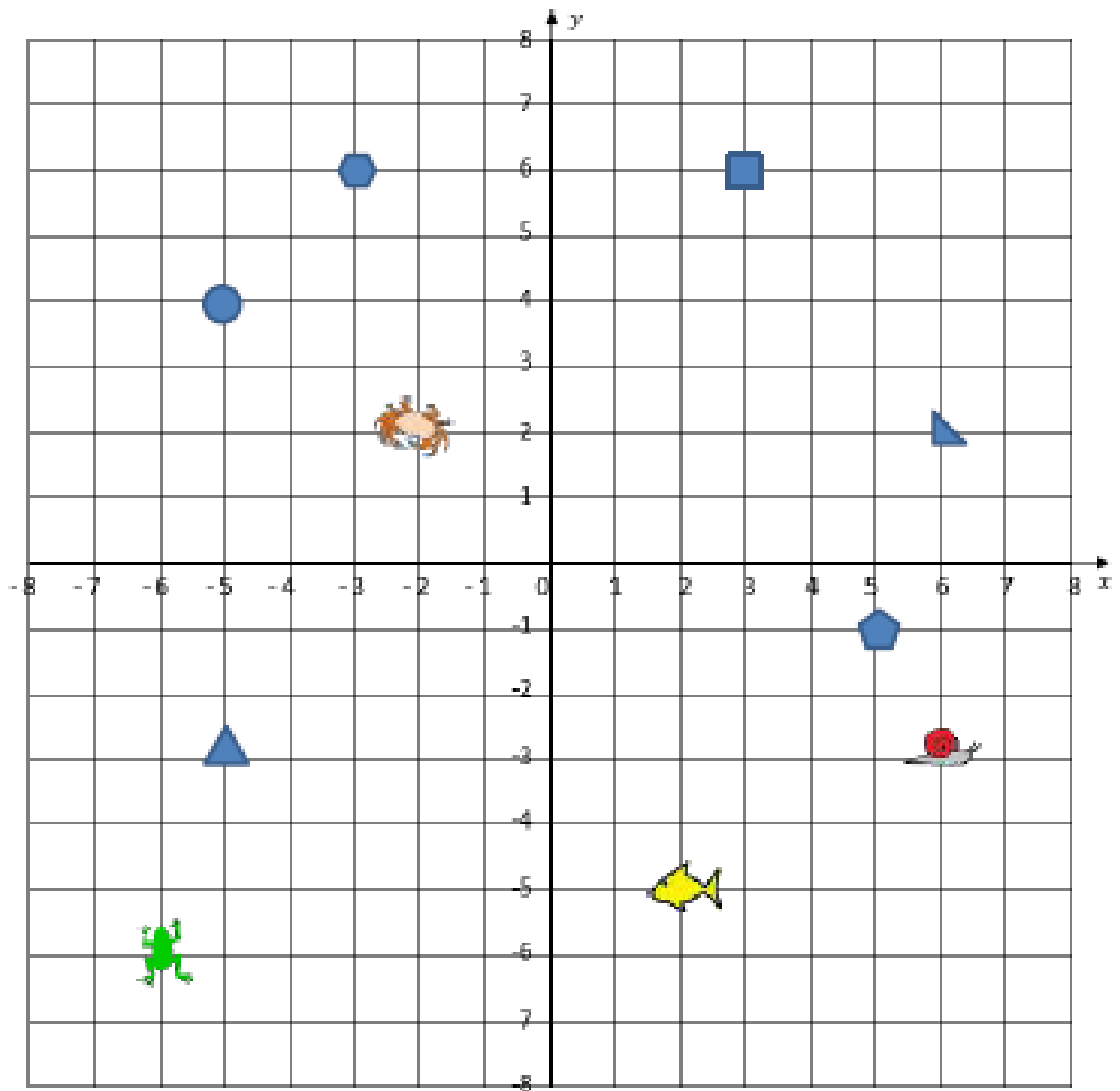
1) Circle (-5, 4)
2) Square (____, ____)
3) Hexagon (____, ____)
4) Frog (____, ____)
5) Fish (____, ____)
6) Pentagon (____, ____)
7) Right triangle (____, ____)
8) Equilateral triangle (____, ____)
9) Crab (____, ____)
10) Snail (____, ____)

FIND AND PLOT THE COORDINATES 2
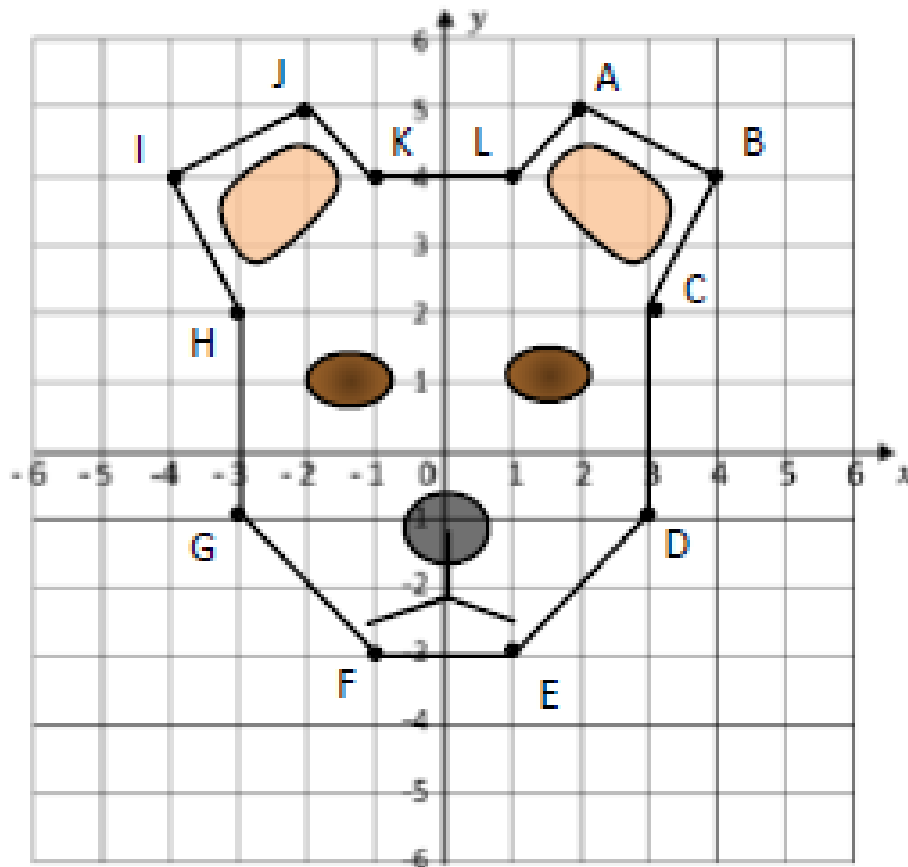
1) Write down the coordinates of each point of the face.

A (,)   G (,)
B (,)   H (,)
C (,)   I (,)
D (,)   J (,)
E (,)   K (,)
F (,)   L (,)
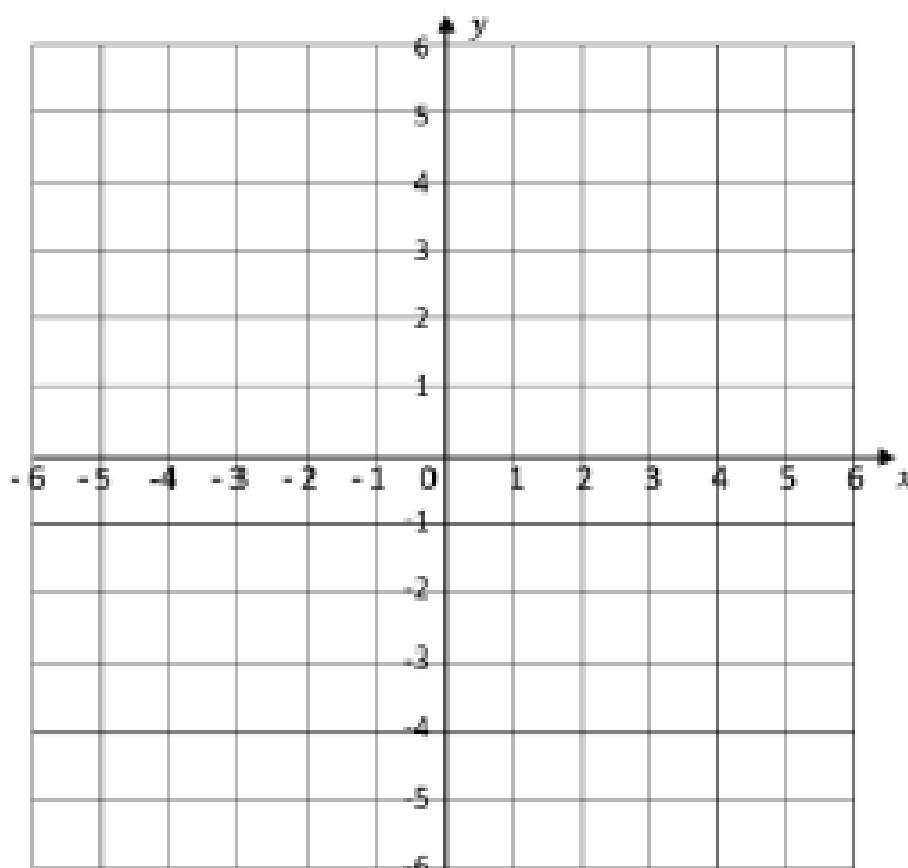
2) Draw your own face using the grid below and write down the coordinates of the outline.

A (,)   H (,)
B (,)   I (,)
C (,)   J (,)
D (,)   K (,)
E (,)   L (,)
F (,)   M (,)
G (,)   N (,)

Calculating the Perimeter of composite rectilinear shapes

Use the centimetre grid to measure the length of each side of the shapes, writing the length next to each side. Then add the lengths together to find the perimeter.

1.

2.

3.

4.

5.

6.

7.

8.

9.

10.

Calculate the perimeter of each composite rectilinear shape

9cm

4cm

2cm

4cm

4cm

5cm

3cm

8cm
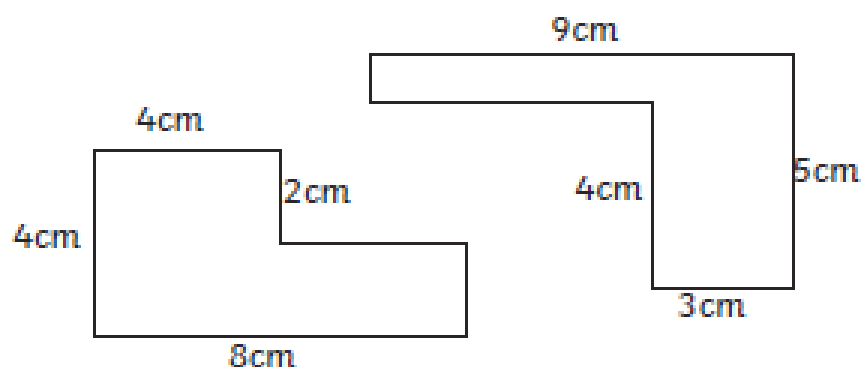
perimeter = _____

perimeter = _____

10cm

6cm

3cm

7cm

perimeter = _____

10cm

4cm

3cm

2cm

perimeter = _____

6cm

6cm

5cm

3cm

perimeter = _____

6cm

4cm

1cm

7cm

perimeter = _____

7cm

5cm

3cm

3cm

perimeter = _____

5cm

6cm

2cm

9cm

perimeter = _____

2cm

8cm

1cm

9cm
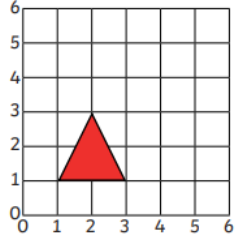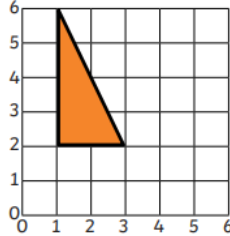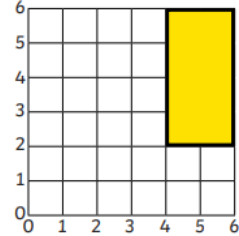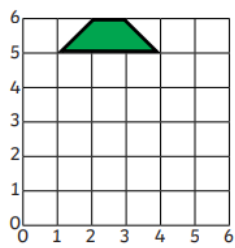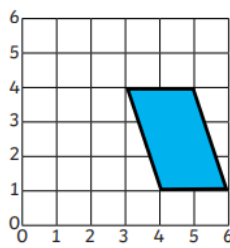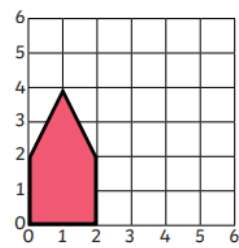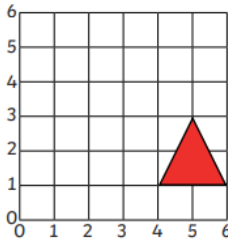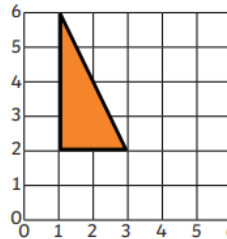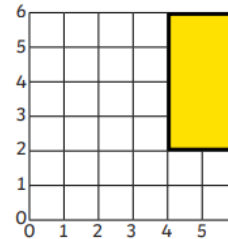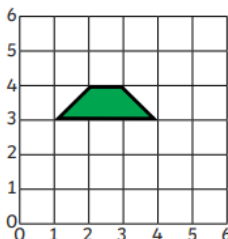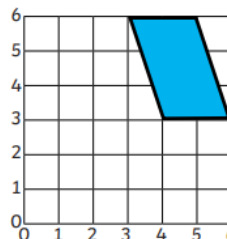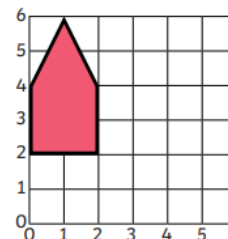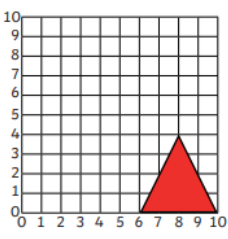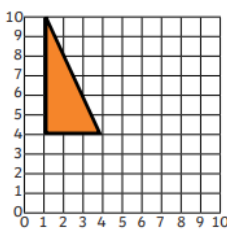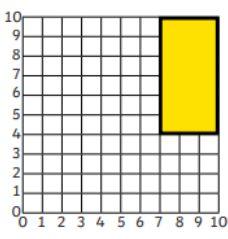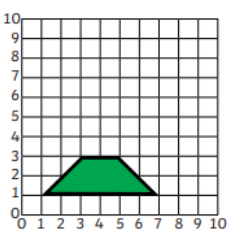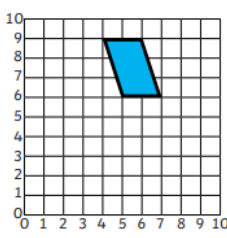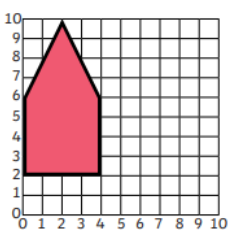
perimeter = _____

Draw Translated Shapes

Draw the 2D shapes in their new positions after a translation along one or both axis

This equilateral triangle is translated **up 3**.

Draw the triangle in its new position.

This right-angled triangle is translated **right 3**.

Draw the triangle in its new position.

This rectangle is translated **left 4**.

Draw the rectangle in its new position.
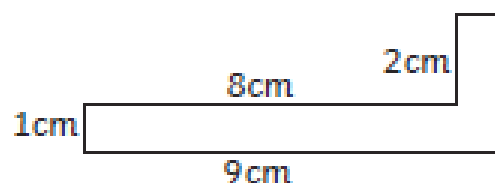
This trapezium is translated **down 2**.

Draw the trapezium in its new position.

This parallelogram is translated **left 3**.

Draw the paraellelogram in its new position.

This pentagon is translated **right 3**.

Draw the pentagon in its new position.

This equilateral triangle is translated **left 3, up 3**.

Draw the triangle in its new position.

This right-angled triangle is translated **right 3, down 2**.

Draw the triangle in its new position.

This rectangle is translated **left 4, down 1**.

Draw the rectangle in its new position.

This trapezium is translated **right 2, up 2**.

Draw the trapezium in its new position.

This parallelogram is translated **left 3, down 2**.

Draw the paraellelogram in its new position.

This pentagon is translated **right 4, down 2**.

Draw the pentagon in its new position.

This equilateral triangle is translated **left 5, up 5**.

Draw the triangle in its new position.

This right-angled triangle is translated **right 6, down 3**.

Draw the triangle in its new position.

This rectangle is translated **left 5, down 2**.

Draw the rectangle in its new position.

This trapezium is translated **right 2, up 7**.

Draw the trapezium in its new position.

This parallelogram is translated **left 3, down 5**.

Draw the parallelogram in its new position.

This pentagon is translated **right 6, down 2**.

Draw the pentagon in its new position.

Angles
An angle measures a turn
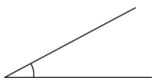
A right angle is the corner of a square

2 right angles make a straight line
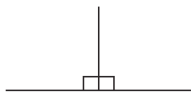
Angles

Read the information at the top of this page about angles, and then use this to help you with the questions below.

An acute angle is less than a right angle (90°)
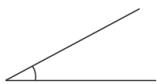
An obtuse angle is between a right angle and a straight line.

1. Order these angles from smallest to largest.
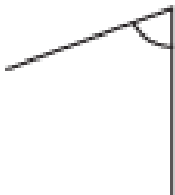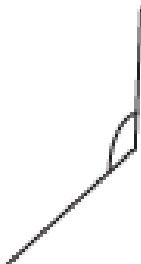
A   B   C   D

2. Tick all the shapes that have **obtuse** angles.
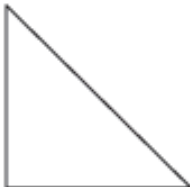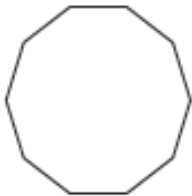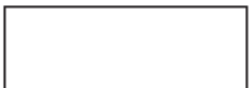
3.   Measure the angle: _____
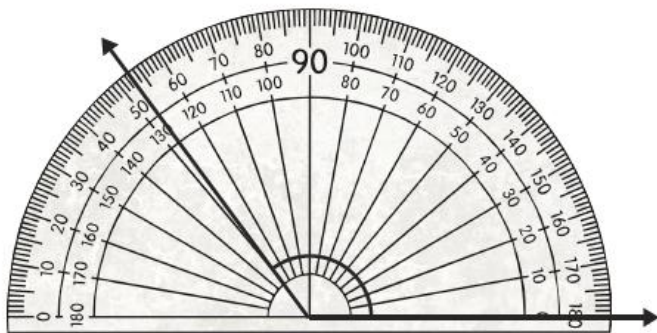
4. Using the information from the top of the page, complete these statements.

An _____ measures a turn.

A _____ _____ is the corner of a square.
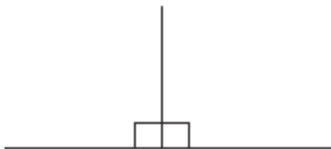
_____ right angles make a straight line.

An _____ angle is less than a right angle (90°).
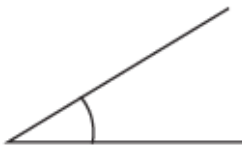
An _____ angle is between a right angle and a straight line.

Bar Charts

1. Here is a bar chart showing Year 4's favourite X Factor Judges:
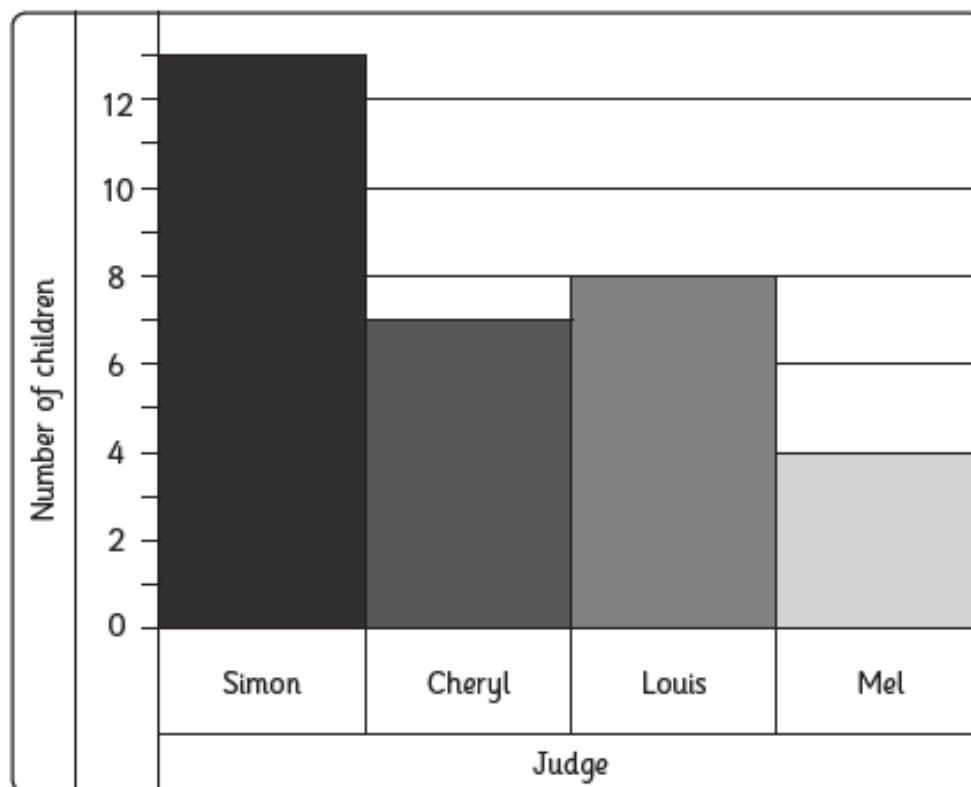
a) How many children like Cheryl the best?

b) How many more children prefer Simon than Louis?

c) Chris was absent when the survey was taken, he said he liked Louis the best, so including Chris' vote, how many children liked Louis the best?

2. Year 4 did a survey outside school and collected the following data regarding the colours of cars that passed their school:

colour of car	number that passed by
red	20
blue	16
silver	9
white	5
gold	1
yellow	2

Continue over page…

a) Use the data to draw a bar chart on the grid below. Make sure you label the axes, give the chart a title and choose a suitable scale for the axes.
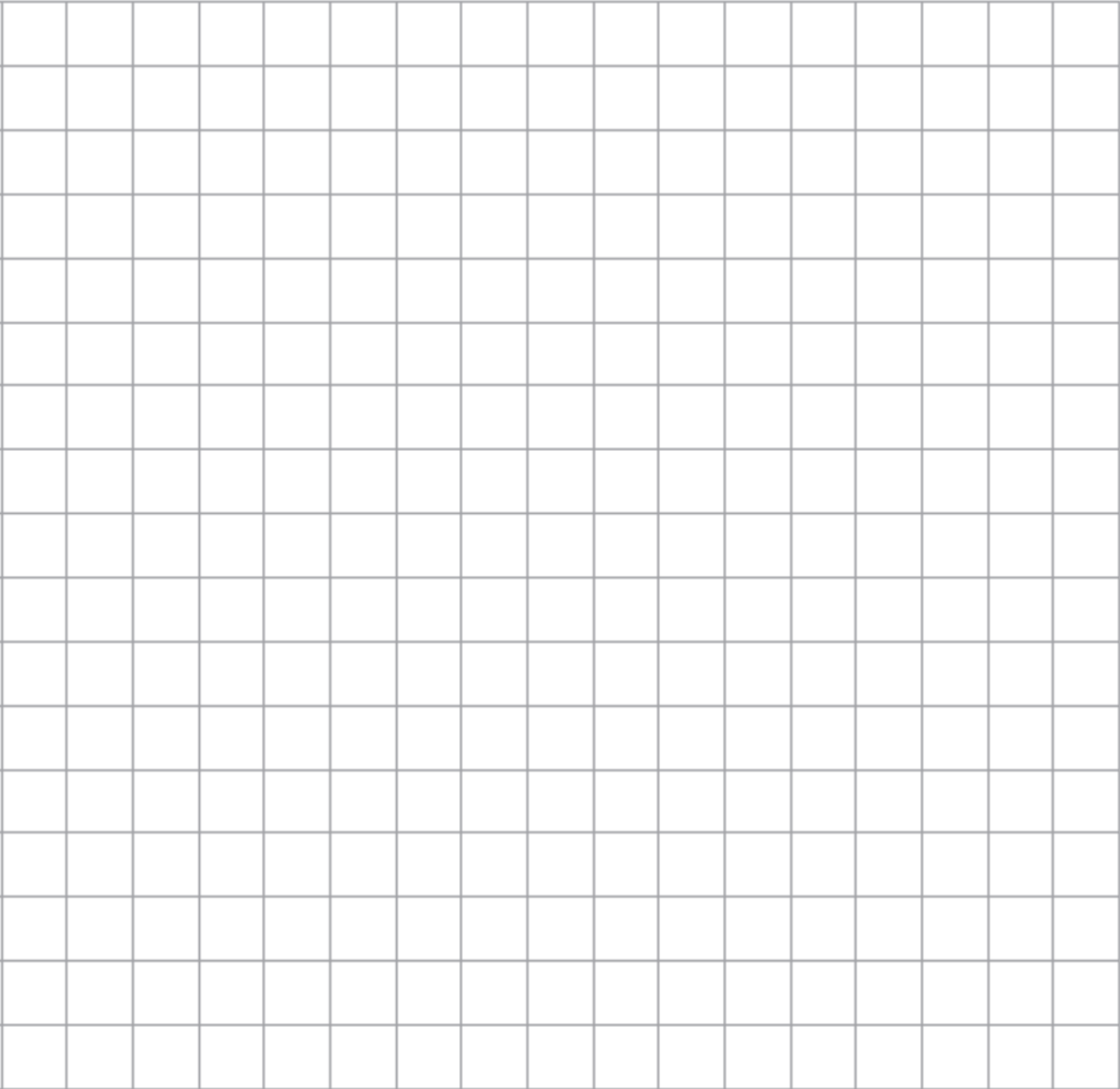
Answer these questions about the graph:

b) How many more blue cars were there than yellow?

c) Which is the biggest total: Red and yellow or blue and silver?

d) How many cars passed by the school altogether?

Line graphs & pictograms

3. Here is a line graph to show the maximum temperatures in a town across a week:
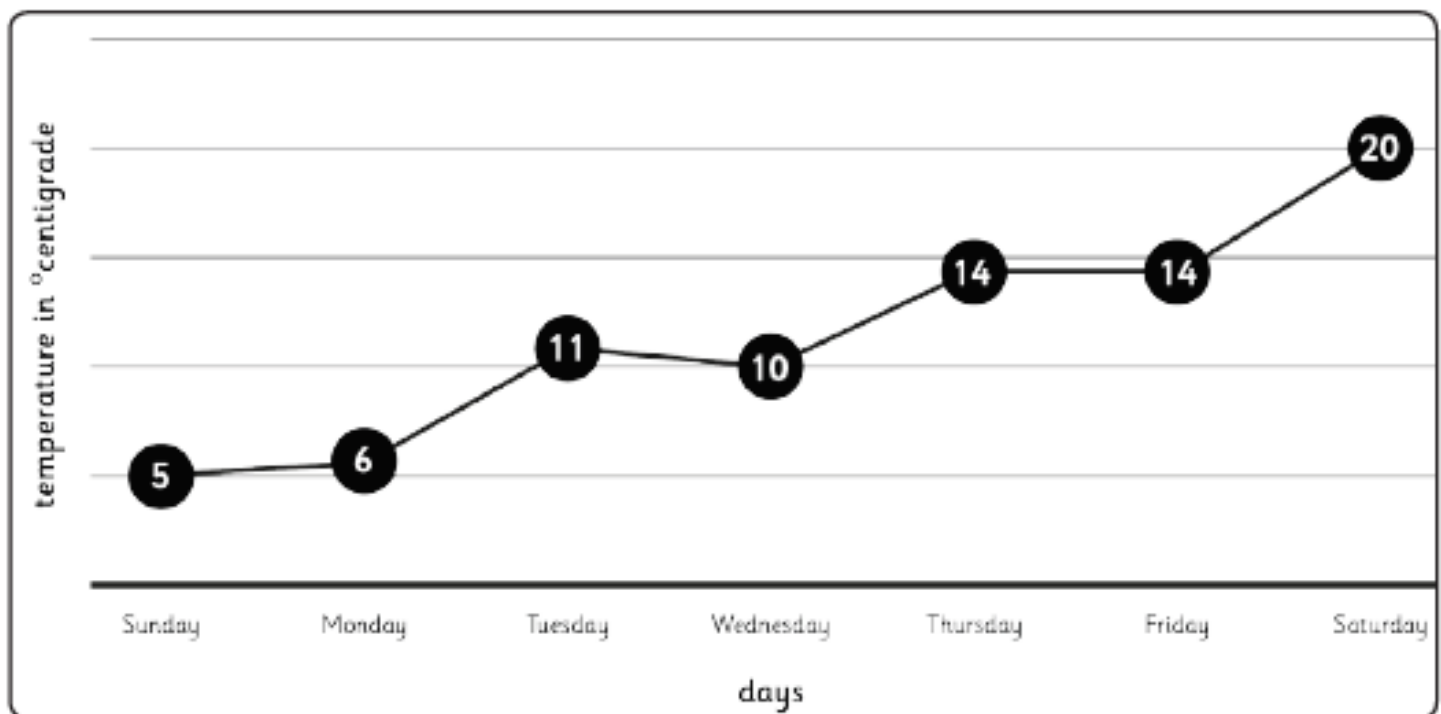
a) Was the temperature gradually getting warmer or colder across the week?

b) Between which 2 days was there a fall in the temperature?

c) What was the difference in temperature between the coldest and the warmest days?

d) What was the difference in temperature between Tuesday and Thursday?

Continue over page…

4. The following pictogram shows a tree planting project in a local town:

week 1	🌳🌳🌳🌳
week 2	🌳
week 3	🌳🌳◗
week 4	
week 5	🌳🌳🌳
week 6	🌳🌳🌳🌳🌳◗
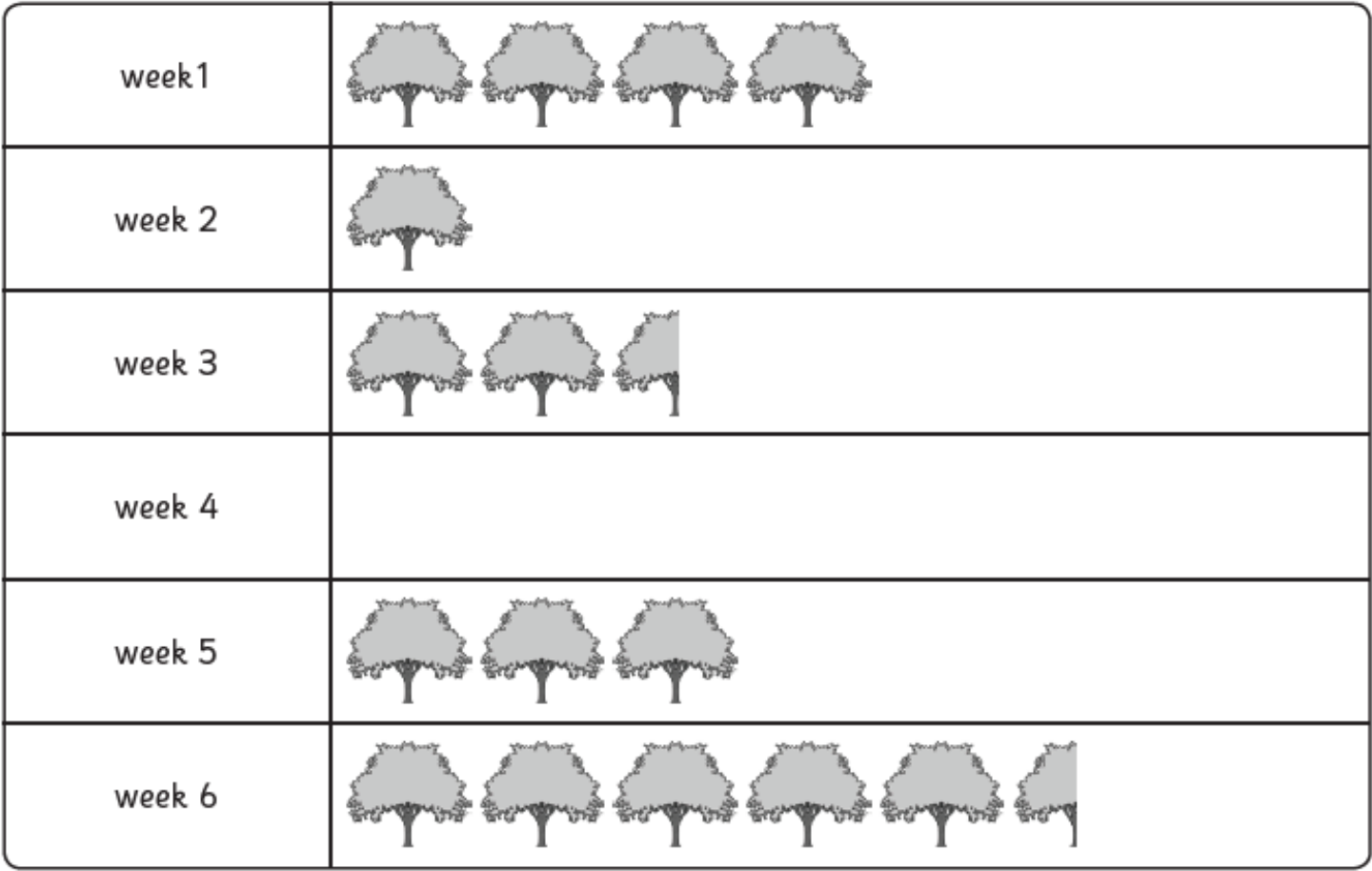
🌳 = 2 trees

a) What does ◗ represent?

b) There were 4 trees planted in week 4, add this to the chart.

c) Which week were the most trees planted?

d) How many trees were planted in week 6?

Answers

When you have completed your work each day – check/mark your answers to see how you have performed.

Properties of 2D shape – Lesson 1

(hexagon)	**Every angle in this shape is a right angle.**	This shape has six equal sides.	This shape has six lines of symmetry.
(rectangle)	In this shape, opposite sides are equal.	This shape has four right angles.	**This is a regular shape.**
(octagon)	This is an octagon.	All the sides in this shape are equal.	**This shape has four lines of symmetry.**
(trapezium)	This is a trapezium.	This shape has one pair of parallel sides.	**This is a regular shape.**
(right-angled triangle)	This shape has no lines of symmetry.	**All the sides in this shape are equal.**	This shape has one right angle.
(pentagon)	**This shape has no lines of symmetry.**	This shape has five equal sides.	Each angle in this shape is 108⁰.
(parallelogram)	Opposite sides in this shape are parallel.	Opposite angles in this shape are equal.	**This shape has two lines of symmetry.**

2D Shape symmetry drawing – Lesson 2

Investigating Lines of Symmetry Answers
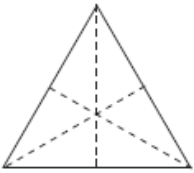
Name <u>triangle (equilateral)</u>

Sides <u>3</u>

Lines of Symmetry <u>3</u>
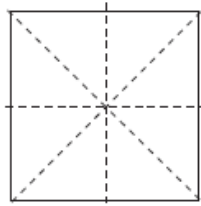
Name <u>square</u>

Sides <u>4</u>

Lines of Symmetry <u>4</u>
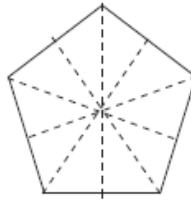
Name <u>pentagon</u>

Sides <u>5</u>

Lines of Symmetry <u>5</u>
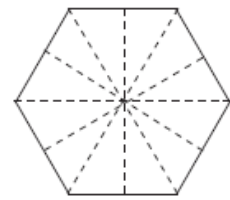
Name <u>hexagon</u>

Sides <u>6</u>

Lines of Symmetry <u>6</u>
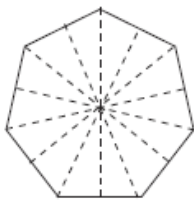
Name <u>heptagon</u>

Sides <u>7</u>

Lines of Symmetry <u>7</u>
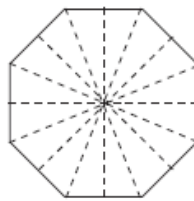
Name <u>octagon</u>

Sides <u>8</u>

Lines of Symmetry <u>8</u>
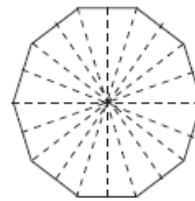
Name <u>decagon</u>

Sides <u>10</u>

Lines of Symmetry <u>10</u>

3D Shapes - Lesson 3

Write the correct name for each shape using the list below.

1)		cuboid	7)		cylinder
2)		sphere	8)		cuboid or prism
3)		cylinder	9)		cone
4)		cuboid or prism	10)		prism
5)		pyramid	11)		sphere
6)		prism	12)		pyramid

Area of rectangles – Lesson 4

1. $6 \times 3 = 18cm^2$
2. $4 \times 7 = 28cm^2$
3. $5 \times 8 = 40cm^2$
4. $10 \times 3 = 30cm^2$
5. $4 \times 11 = 44cm^2$
6. $12 \times 7 = 84cm^2$
7. $3 \times 9 = 27cm^2$
8. $6 \times 6 = 36cm^2$
9. $9 \times 5 = 45cm^2$
10. $7 \times 8 = 56cm^2$
11. $12 \times 9 = 108cm^2$
12. $3 \times 11 = 33cm^2$

Describe positions on a 2-D grid as coordinates in all 4 quadrants – Lesson 5

1) Circle (-5, 4)
2) Square (3, 6)
3) Hexagon (-3, 6)
4) Frog (-6, -6)
5) Fish (2, -5)
6) Pentagon (5, -1)
7) Right triangle (6, 2)
8) Equilateral triangle (-5, -3)
9) Crab (-2, 2)
10) Snail (6, -3)

Challenge Sheet
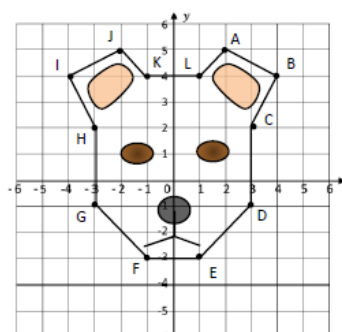
2) Write down the coordinates of each point of the face.

A (2, 5)	G (-3, -1)
B (4, 4)	H (-3, 2)
C (3, 2)	I (-4, 4)
D (3, -1)	J (-2, 5)
E (1, -3)	K (-1, 4)
F (-1, -3)	L (1, 4)

Calculating the perimeter of composite rectilinear shapes – Lesson 6

Challenge Sheet

perimeter – 24cm
perimeter – 28cm
perimeter – 32cm

perimeter – 28cm
perimeter – 24cm
perimeter – 28cm

perimeter – 24cm
perimeter – 32cm
perimeter – 24cm
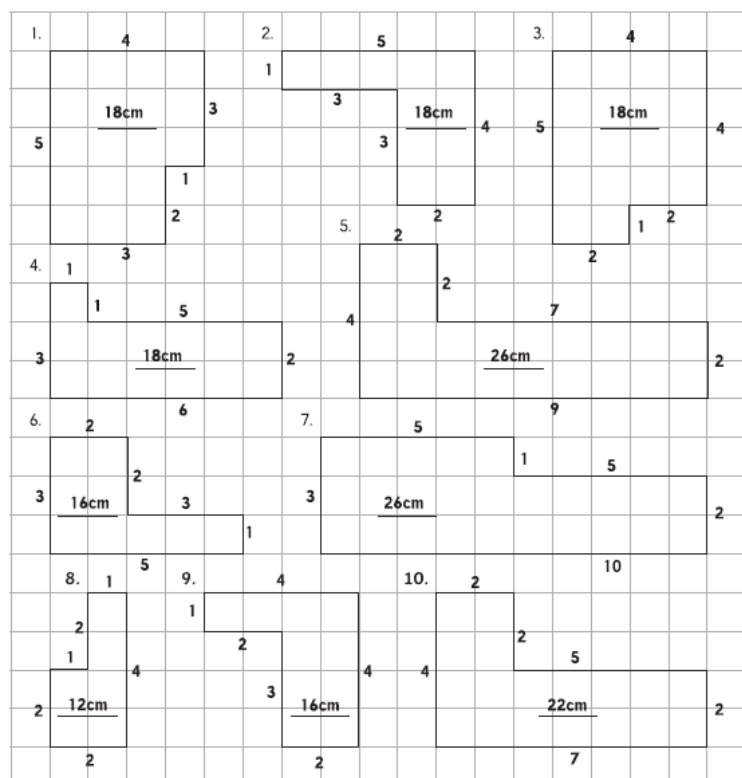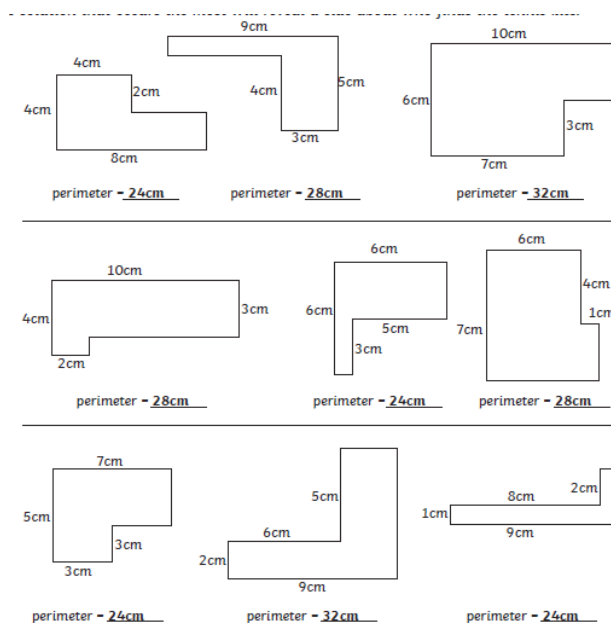
Draw Translated Shapes – Lesson 7

This equilateral triangle is translated **up 3**.

Draw the triangle in its new position.

This right-angled triangle is translated **right 3**.

Draw the triangle in its new position.

This rectangle is translated **left 4**.

Draw the rectangle in its new position.

This trapezium is translated **down 2**.

Draw the trapezium in its new position.

This parallelogram is translated **left 3**.

Draw the paraellelogram in its new position.

This pentagon is translated **right 3**.

Draw the pentagon in its new position.

This equilateral triangle is translated **left 3, up 3**.

Draw the triangle in its new position.

This right-angled triangle is translated **right 3, down 2**.

Draw the triangle in its new position.

This rectangle is translated **left 4, down 1**.

Draw the rectangle in its new position.

This trapezium is translated **right 2, up 2**.

Draw the trapezium in its new position.

This parallelogram is translated **left 3, down 2**.

Draw the paraellelogram in its new position.

This pentagon is translated **right 4, down 2**.

Draw the pentagon in its new position.

This equilateral triangle is translated **left 5, up 5**.

Draw the triangle in its new position.

This right-angled triangle is translated **right 6, down 3**.

Draw the triangle in its new position.

This rectangle is translated **left 5, down 2**.

Draw the rectangle in its new position.

This trapezium is translated **right 2, up 7**.

Draw the trapezium in its new position.

This parallelogram is translated **left 3, down 5**.

Draw the parallelogram in its new position.

This pentagon is translated **right 6, down 2**.
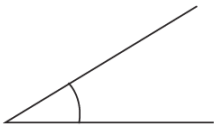
Draw the pentagon in its new position.

Angles – Lesson 8

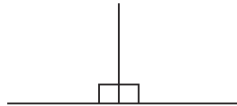1. D, A, C, B

2.

3. The angle measures 127˚
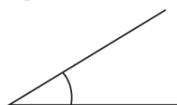
4.

An **angle** measures a turn.

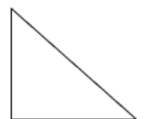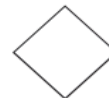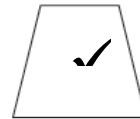A **right angle** is the corner of a square.

2 right angles make a straight line.

An **acute** angle is less than a right angle (90°).

An **obtuse** angle is between a right angle and a straight line.

Bar Chart – Lesson 9

1a	7	
1b	5	
1c	9	
2a	Award 1 mark for each of the following: Suitable title Suitable label for horizontal axis Suitable label for vertical axis Suitable scale, equally spaced Bars drawn accurately for each colour of car Bars equally spaced and equally drawn on the chart	
2b	14	
2c	blue and silver	
2d	53	

Bar Chart – Lesson 10

3a	warmer	
3b	Tuesday and Wednesday	
3c	15°	
3d	3°	
4a	1 tree	
4b	2 whole trees drawn in week 4	
4c	week 6	
4d	11	