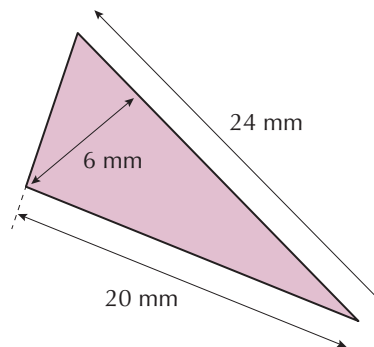
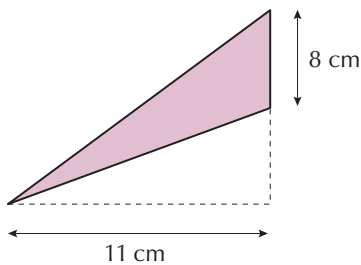
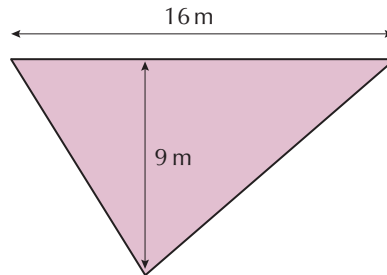
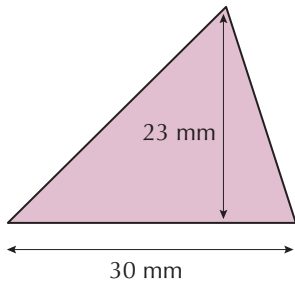
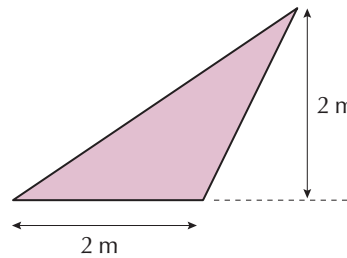
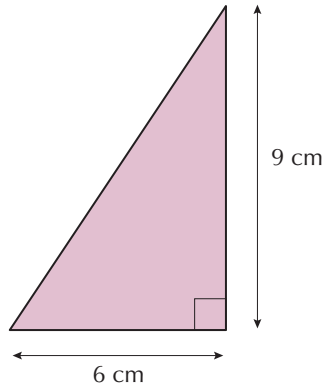


6 Area and volume

6.1 Area of a triangle

1 Calculate the areas of the following triangles.

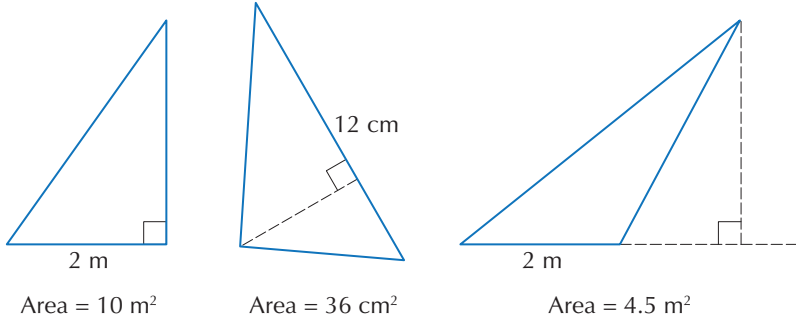


2 Copy and complete the table below which gives the measurements of five triangles.

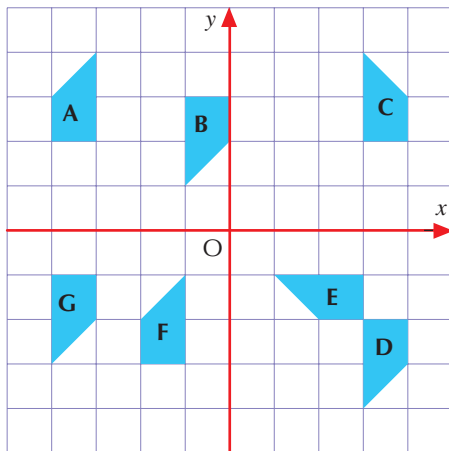
Base	Height	Area
12 cm	9 cm	8 cm
14 cm	6 mm	7 mm
16 cm		64 cm ²
	20 m	100 m ²

- 3 Use squared paper to draw four different triangles with area 24 cm^2 .
 (Hint: Draw the base first, using a whole number of centimetres that is a factor of 48, for example, 8 cm. Then calculate the height of the triangle.)

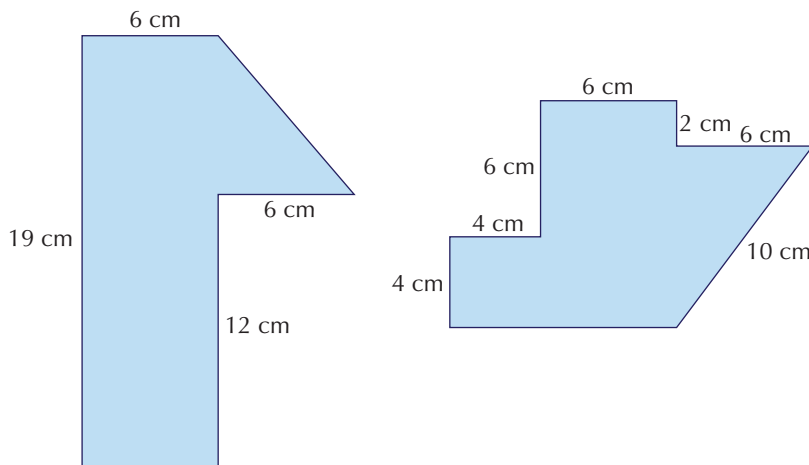
- 4 Calculate the height of each triangle below using the area given.



- 5 Each puzzle piece below is a compound shape, and can be put together to make a complete shape.
 Each small square represents a square centimetre. How much area will the completed puzzle cover?



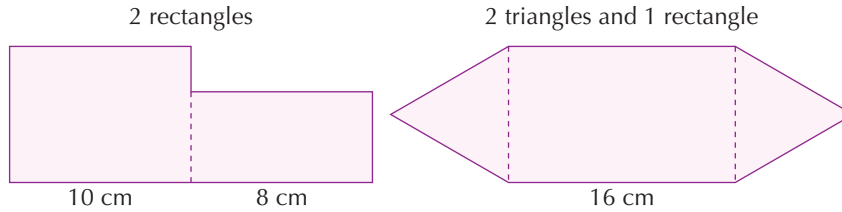
- 6 Work out the area of the shapes below.





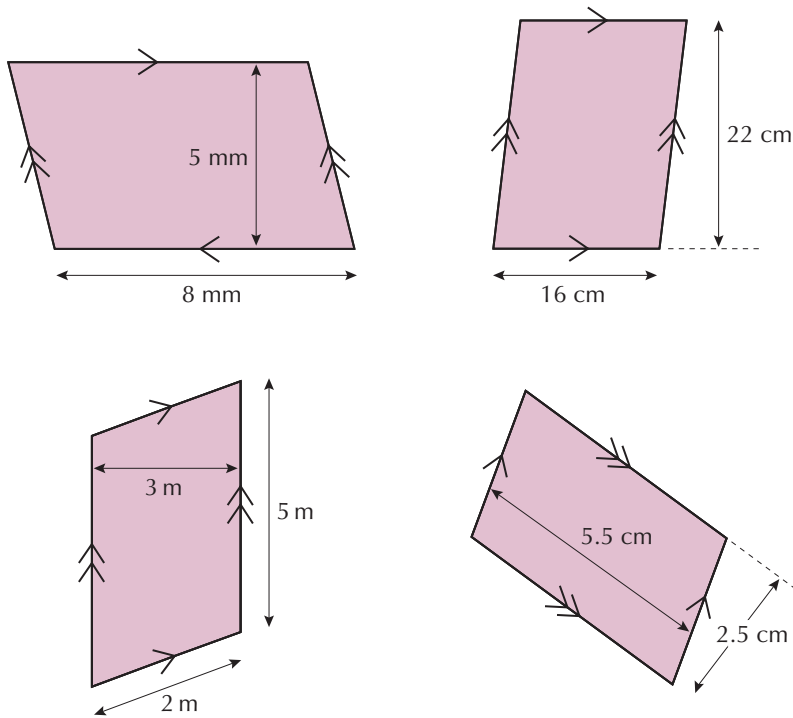
The shapes below both have an area of 120 cm^2 .

- In the two rectangles, the largest is 8 cm high, so how high is the smaller one?
- If the base (dotted line) of the triangles measures 5 cm , what is the area of each triangle?
- What must the height of each triangle be?



6.2 Area of a parallelogram

- Calculate the areas of the following parallelograms.

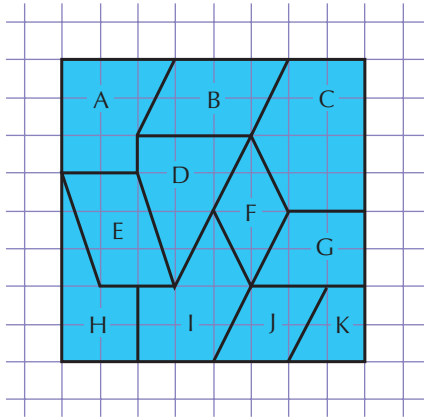


- Copy and complete the table below which gives the measurements of five parallelograms.

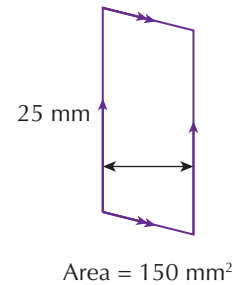
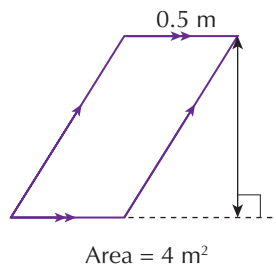
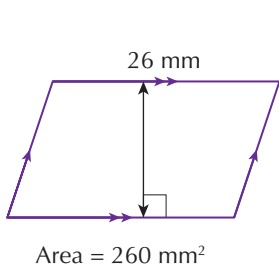
Base	Height	Area
7 cm	13 cm	
9 m	19 m	
250 mm	70 mm	
	15 m	120 m^2
12 cm		30 cm^2

- 3 Use squared paper to draw four different parallelograms with area 48 cm^2 .
 (Hint: Draw the base first, using a whole number of centimetres that is a factor of 48, for example, 8 cm. Then calculate the height of the parallelogram.)

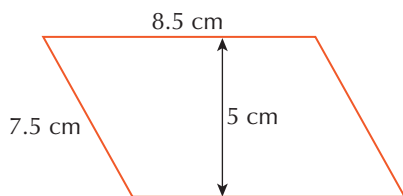
- 4 Find the area of each puzzle piece. Each piece is a compound shape or a parallelogram. Each small square represents a square centimetre. Show your calculations.



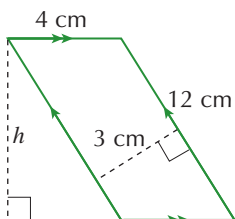
- 5 Calculate the height of each parallelogram below using the area given.



- 6 Work out **a** the perimeter and **b** the area of this parallelogram.



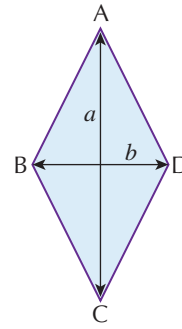
- 7 Work out the value of h in this diagram.



Brain teaser

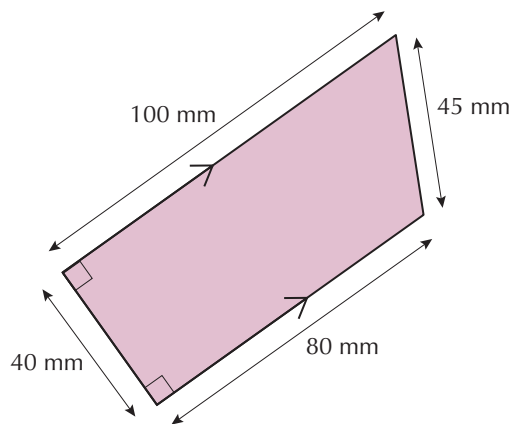
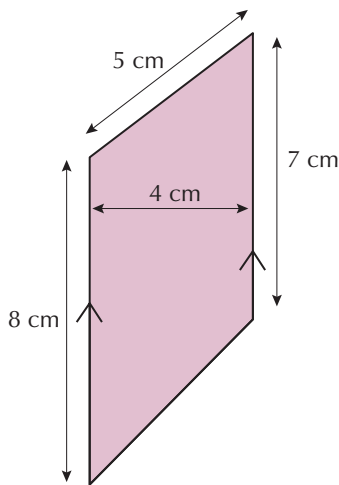
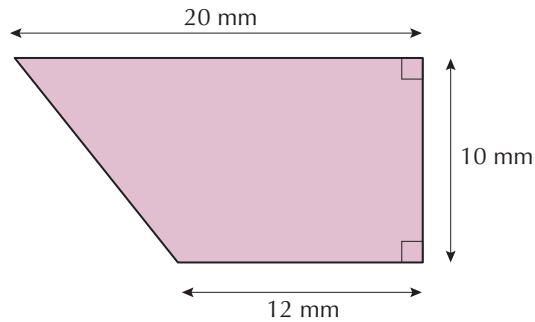
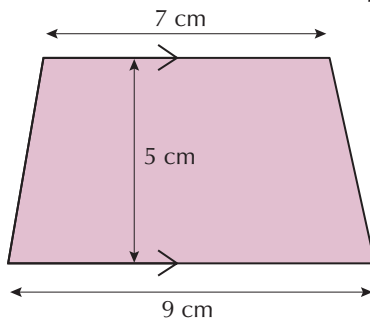
The rhombus shown has an area of 24 cm^2 .

There are five possible whole number values of a and b ; can you find them all?



6.3 Area of a trapezium

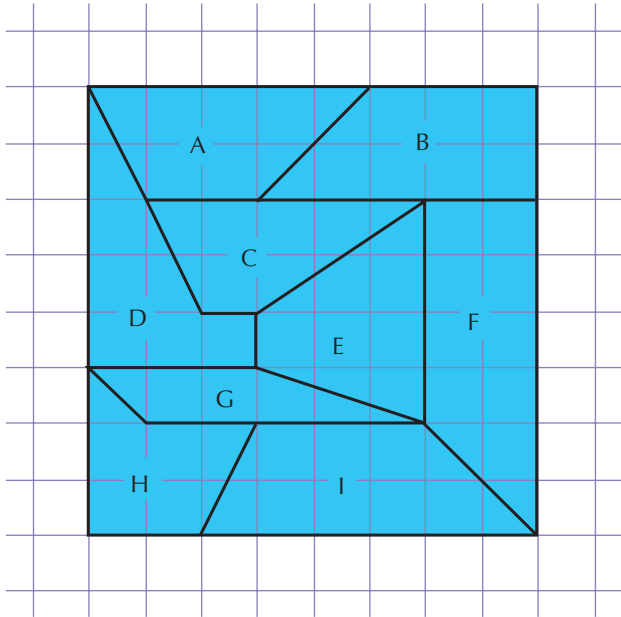
1 Calculate the areas of the trapezia below.



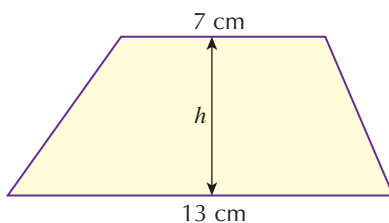
2 Copy and complete the table below for trapezia a through e.

Trapezium	Parallel side a	Parallel side b	Height h	Area
a	7 cm	9 cm	3 cm	
b	13 m	8 m	5 m	
c	2 mm	6 mm		32 mm^2
d		4 m	6 m	60 m^2
e	12 cm		10 cm	250 cm^2

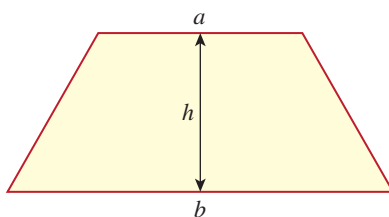
- 3 Use squared paper to draw four different trapezia with area 24 cm^2 .
 (Hint: Decide the lengths of the parallel lines first and make sure that their total length is a factor of 48. For example, parallel sides 7 cm and 5 cm have a total length of 12 cm, which is a factor of 48. Then calculate the height of the trapezium.)
- 4 Find the area of each puzzle piece. Each piece is a compound shape or a trapezium. Each small square represents a square centimetre. Show your calculations.



- 5 Work out the height, h , of the trapezium below if it has an area of:
 a 110 cm^2 b 75 cm^2

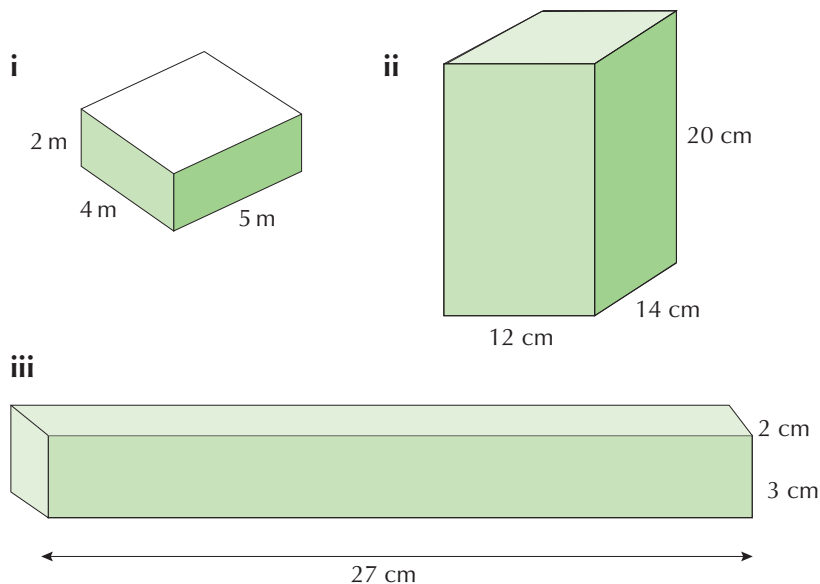



- 6 The area of this trapezium is 9 cm^2 . Work out three different whole number values of a , b and h , with $b > a$.

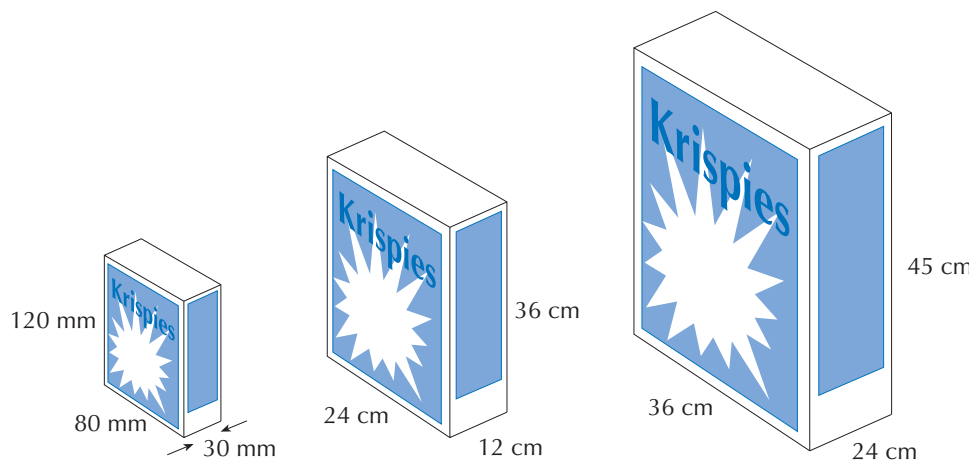


6.4 Surface area of cubes and cuboids

- 1 Find the surface area of each of the following cuboids.

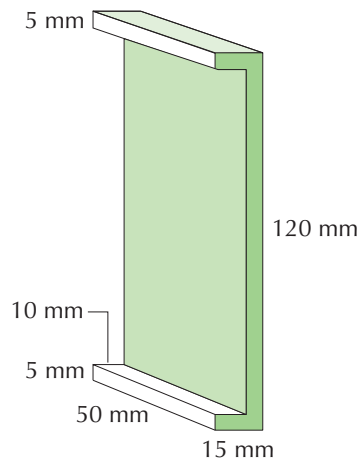
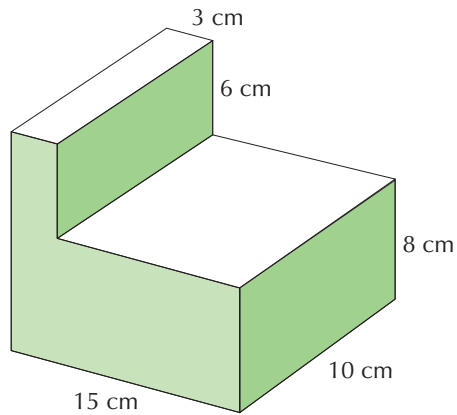


- 2 Calculate the surface area of a cube of side 6 cm.
- 3 If a cube has a surface area of 150 cm^2 , what is the length of each side?
- 4  Krispies are sold in three sizes: mini, medium and giant.



- a Calculate the surface area of each box.
(Hint: Convert mm to cm.)
- b How many times more cardboard is needed to manufacture the medium box compared to the small box (to the nearest whole number)? Do the same for the giant to the medium, to one decimal place.
- c The area of the logo on the packet front of each box is as shown below:
small box – 40 cm^2 medium box – 448 cm^2 giant box – 900 cm^2
Work out the fraction taken up by the logo each time in its simplest form.

- 5 Calculate the surface area of each of the following 3-D shapes.



FS Brainteaser

A scout group construct a wooden log store on a concrete base to keep their wood supply dry. The storage is a cuboid shape, 2.5 m long, 2 m wide and 1 m high with a hinged lid. To keep it waterproof it has to be coated in woodstain.

- What area of wood has to be covered with
 - 1 coat?
 - 2 coats?
 Water-based woodstain can be bought at £24.99 for 2.5 litres. It claims to cover 8 m² per litre and recommends applying two coats.
- Oil-based tins cost £45.99 for 2.5 litres, can cover 20 m² but only needs one coat.
- How much area can the water-based tin cover in total? How many tins are needed?
- How much will be left over from these tins after two coats are applied?
- How many square metres does the oil-based tin cover per litre?
- Which tin works out cheapest and by how much per litre?