## Area and volume

## 6.1 Area of a triangle



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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 <sup>2</sup>	
	20 m	100 m <sup>2</sup>	

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**3** Use squared paper to draw four different triangles with area 24 cm2.

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(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.)

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





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?





Work out the area of the shapes below.



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- In the two rectangles, the largest is 8 cm high, so how high is the smaller one? а

- If the base (dotted line) of the triangles measures 5 cm, what is the area of each b triangle?
- What must the height of each triangle be? С



# 6.2 Area of a parallelogram



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

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Base	Height	Area	
7 cm	13 cm		
9 m	19 m		
250 mm	70 mm		
	15 m	120 m <sup>2</sup>	
12 cm		30 cm <sup>2</sup>	



**3** Use squared paper to draw four different parallelograms with area 48 cm2.

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(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.)



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.





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





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





Work out the value of *h* in this diagram.



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6 Area and volume

### Brainteaser



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### 6.3 Area of a trapezium



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

Trapezium	Parallel side <i>a</i>	Parallel side <i>b</i>	Height <i>h</i>	Area
a	7 cm	9 cm	3 cm	
b	13 m	8 m	5 m	
С	2 mm	6 mm		32 mm <sup>2</sup>
d		4 m	6 m	60 m <sup>2</sup>
е	12 cm		10 cm	250 cm <sup>2</sup>

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6.3 Area of a trapezium



(**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.)

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.



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Work out the height, *h*, of the trapezium below if it has an area of:



The area of this trapezium is 9 cm<sup>2</sup>. Work out three different whole number values of a, b and h, with b > a.







**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.
- cThe area of the logo on the packet front of each box is as shown below:small box 40 cm²medium box 448 cm²lgiant box 900 cm²Work out the fraction taken up by the logo each time in its simplest form.

6.4 Surface area of cubes and cuboids

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#### **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.

a What area of wood has to be covered with i 1 coat? ii 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.

A

- **b** Oil-based tins cost £45.99 for 2.5 litres, can cover 20 m2 but only needs one coat.
- **c** How much area can the water-based tin cover in total? How many tins are needed?
- **d** How much will be left over from these tins after two coats are applied?
- e How many square metres does the oil-based tin cover per litre?
- f Which tin works out cheapest and by how much per litre?

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