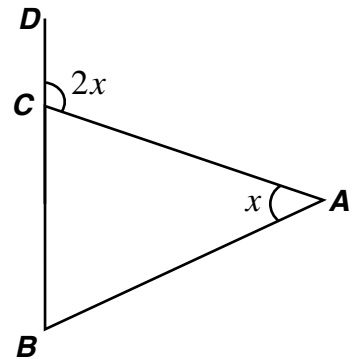


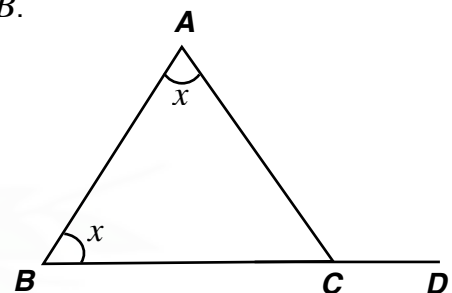
Areas

Starter

1. (Review of last lesson) Prove that $\triangle ABC$ is isosceles.



2. (Review of last lesson) $\triangle ACD$ is double the size of $\triangle ACB$. Prove that the $\triangle ABC$ is equilateral.



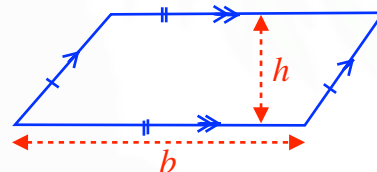
Notes

E.g. 1 Write down the formulae, with accompanying diagrams, for the:

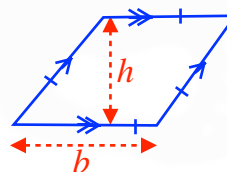
- (a) area of a triangle
- (b) area of a circle
- (c) area of trapezium

Here are some additional area formulae:

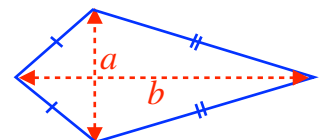
Area of parallelogram = base times perpendicular height
 $= b \times h$



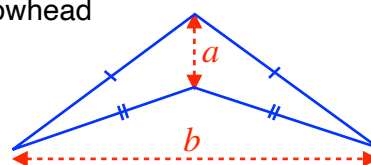
Area of rhombus = base times perpendicular height.
 $= b \times h$



- E.g. 2** (a) By splitting the area of the kite shown into triangles, find a formula for its area in terms of a and b .

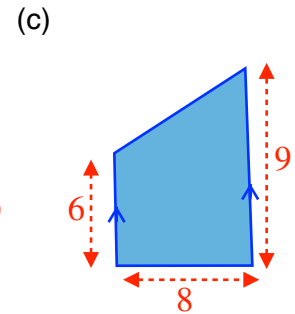
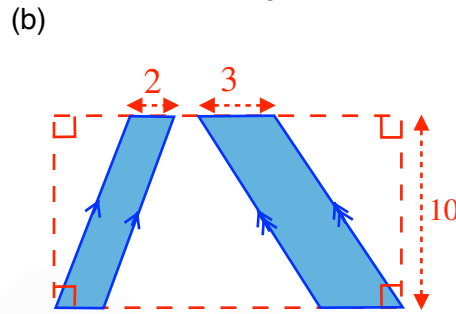
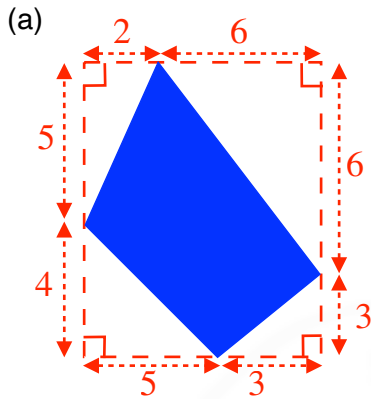


- (b) Hence write down a formula for an arrowhead



N.B. In quadrilaterals, the **diagonals** connect the vertices that are opposite each other.

E.g. 2 Calculate the shaded area of these shapes (all lengths in cm):



Working:

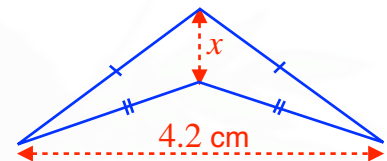
(a) *The blue shape is not a trapezium so we should calculate the areas of the four triangles and take them away from the area of the rectangle.*

$$\text{Area of rectangle} = 8 \times 9 = 72$$

$$\text{Area of triangles} = \frac{5 \times 2}{2} + \frac{6 \times 6}{2} + \frac{3 \times 3}{2} + \frac{4 \times 5}{2} = 37.5$$

$$\text{Shaded area} = 72 - 37.5 = 34.5 \text{ cm}^2$$

E.g. 3 The area of the arrowhead is 6 cm^2 . Find the value of x .
Leave your answer as an improper fraction



E.g. 4 The parallel sides of a trapezium of area 105 cm^2 are 15 cm apart. Given that one of the parallel sides has length 5 cm, calculate the length of the other parallel side.

E.g. 5 The side of the small square is half the length of the side of the large square. The L-shape has an area of 75 cm^2 . Find the length of the side of the large square.



E.g. 6 Calculate the radius of a circle with an area equal to the sum of the areas of three circles of radii 2 cm, 3 cm and 4 cm respectively. Give your answer to 3 s.f..

Video: [Area of a trapezium](#)
Video: [Area of a triangle](#)
[Need area of circle](#)

[Solutions to Starter and E.g.s](#)

Exercise

9-1 class textbook: p424 M13.1 Qu 1-16 Draw all diagrams
A*-G class textbook: p379 M13.1 Qu 1-15, 17 Draw all diagrams.
9-1 homework book: p143 M13.1 Qu 1-10 Draw all diagrams
A*-G homework book: p105 M13.1 Qu 1-10 Draw all diagrams

Summary

Area of triangle = half base times perpendicular height

Area of circle = πr^2

Area of trapezium = half sum of parallel sides times distance between them.

Area of parallelogram = base times perpendicular height

Area of rhombus = base times perpendicular height.

Area of kite = half the product of the diagonals.

Area of arrowhead = half the product of the diagonals.

N.B. In quadrilaterals, the **diagonals** connect the vertices that are opposite to each other.