Composite Shapes

Year 9 Mathematics

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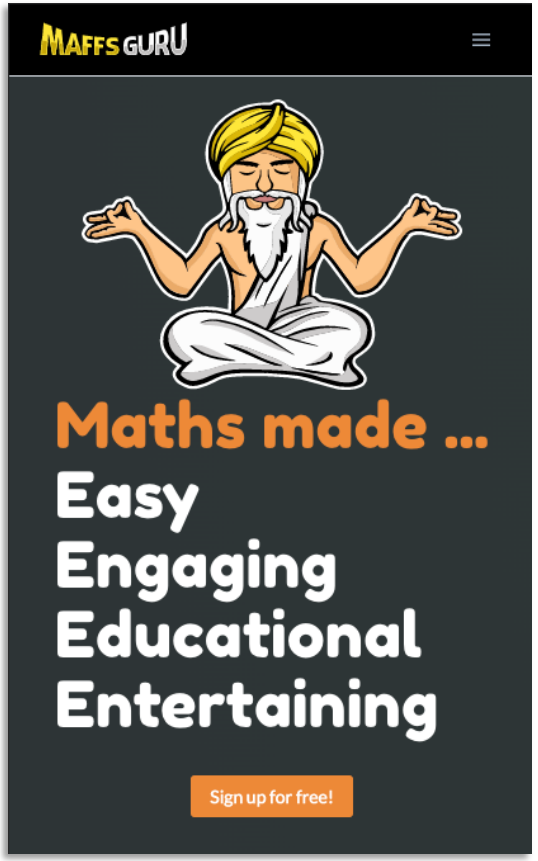

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Learning Objectives

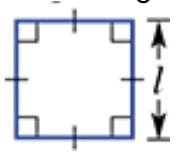
By the end of the lesson I would hope that you have an understanding and be able to apply to questions the following concepts:

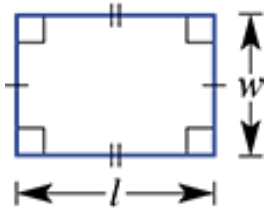
- Understand what a composite shape is
- Identify the regular shapes which make up a composite shape
- Find areas and perimeters of composite shapes

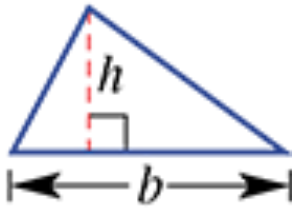
Recap

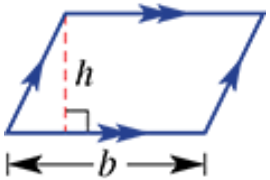
We have spent some time looking at how to find the perimeters and areas of a range of basic and complex shapes.

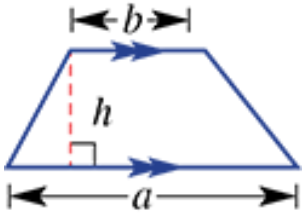
We can combine these shapes to make more interesting and more complex shapes.

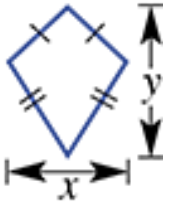




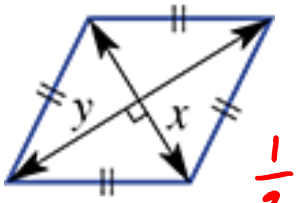








$\frac{1}{2}xy$



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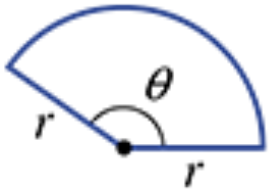


Image source: Cambridge Essentials Year 9 Textbook

Composite shapes

A composite shape is one which is made up by combining more basic shapes.

Examples might be a simple house, a donut, a running track.

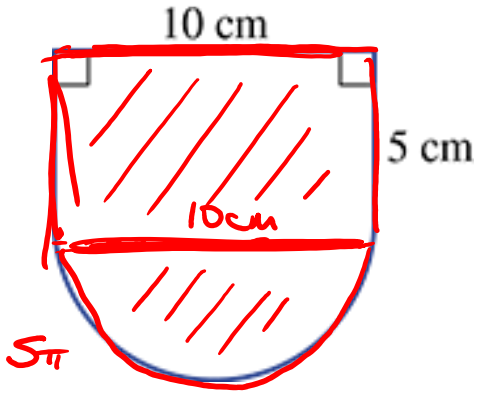
Image source: Cambridge Essentials Year 9 Textbook

Finding the perimeter and area of composite shapes

We know how to find the perimeter and area of a shape.

Composite shapes throw us a **curve ball** in the way of finding perimeters and areas.

Let's looks at the shape on the right



$\frac{1}{2}$ circle

$$\text{Arc length} = \frac{180^\circ}{360^\circ} \times 2 \times \pi \times r$$

$$= \frac{1}{2} \times 2 \times \pi \times 5$$

$$= 5\pi$$

$$P = 5\pi + 5 + 10 + 5$$

$$= 5\pi + 20$$

$$= 35.71 \text{ cm}$$

$$A_{\square} = 5 \times 10$$

$$= 50 \text{ cm}^2$$

$$A_{\circ} = \frac{1}{2} \times \pi r^2$$

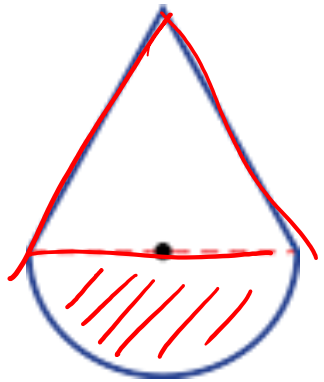
$$= \frac{1}{2} \times \pi \times 5^2 = 39.2699\ldots$$

$$\therefore A = 89.27 \text{ cm}^2$$

Image source: Cambridge Essentials Year 9 Textbook

Perimeter is the distance around the edge

We know how to find the perimeter and area of a shape.



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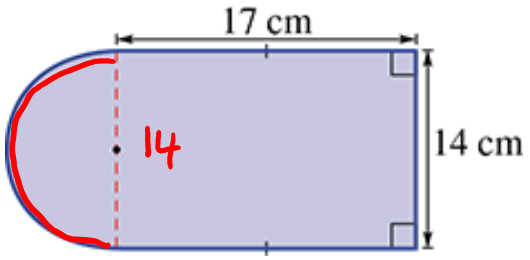
Examples

Find the perimeter and area of this composite shape, rounding answers to two decimal places.



$r = 7$

$\text{Arc} = \frac{1}{2} \times 2\pi \times r$

$= \pi \times 7$

$= 7\pi$

$P = 7\pi + 17 + 14 + 17$

$= 70.00\text{cm}$

$A_{\text{O}} = \frac{1}{2} \times \pi r^2$

$= \frac{1}{2} \times \pi \times 7^2$

$= \frac{49\pi}{2}\ \text{cm}^2$

$A_{\square} = 17 \times 14$

$= 238\ \text{cm}^2$

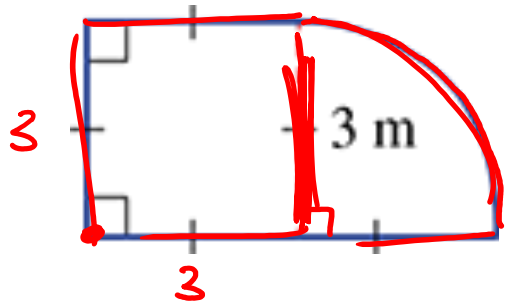
$\therefore TSA = \frac{49\pi}{2} + 238$

$= 314.97\ \text{cm}^2$

Image source: Cambridge Essentials Year 9 Textbook

Examples

Find the perimeter and area of this composite shape, rounding answers to two decimal places.



Arc length $= \frac{1}{4} \times 2 \times \pi \times r$

$= \frac{1}{2} \times \pi \times 3$

$= \frac{3\pi}{2}$ m

$\therefore P = 3 + 3 + \frac{3\pi}{2} + 3 + 3$

$= 12 + \frac{3\pi}{2}$

$= 16.71$ m

$\text{Area}_{\square} = 3 \times 3 = 9\text{m}^2$

$\text{Area}_{D} = \frac{1}{4} \times \pi r^2$

$= \frac{1}{4} \times \pi \times 3^2$

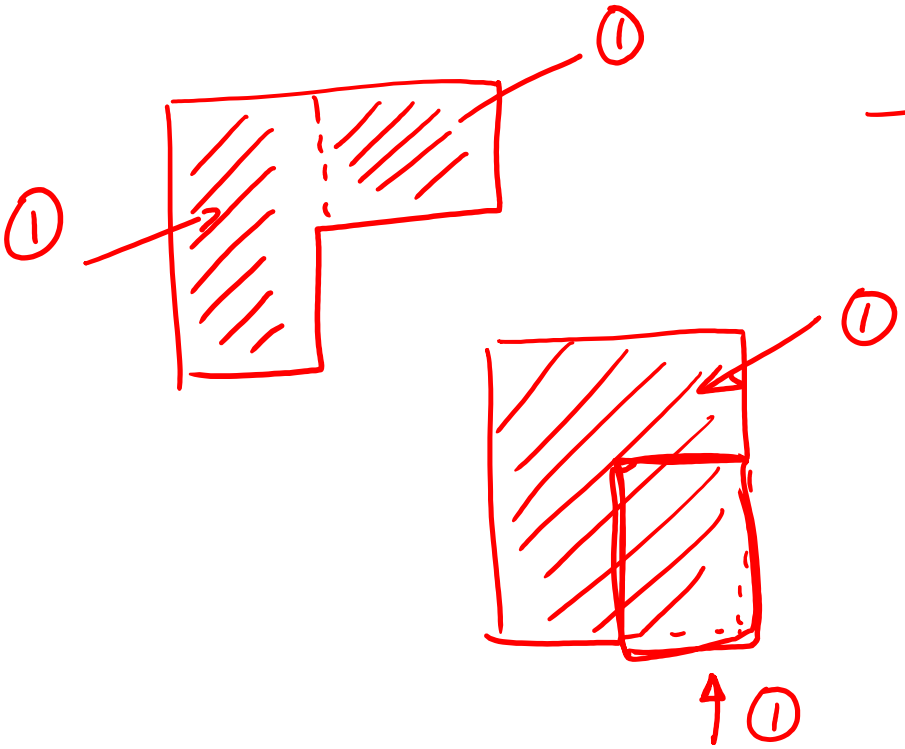
$= \frac{9\pi}{4}\text{m}^2$

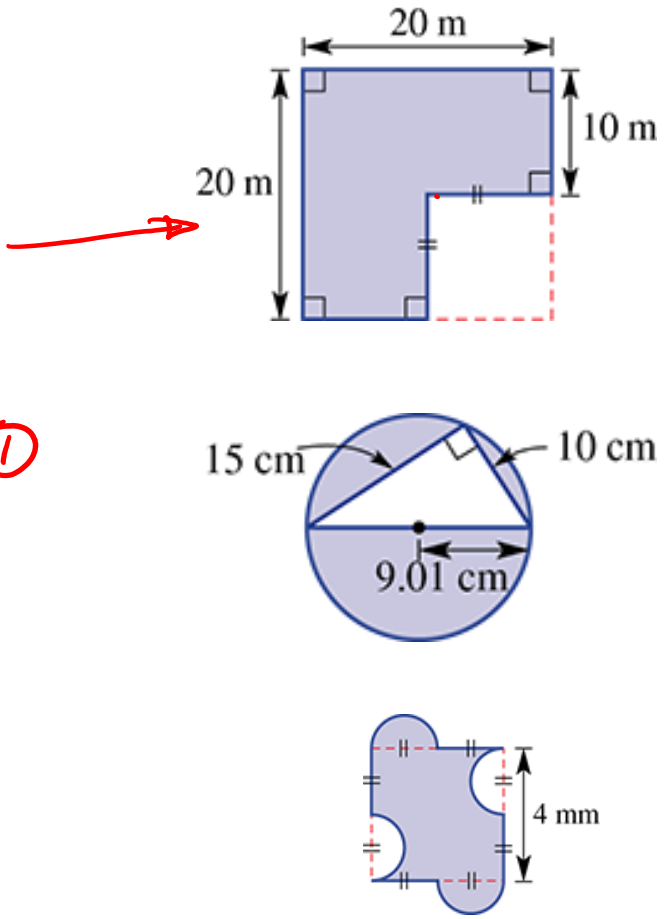
$\therefore TA = 9 + \frac{9\pi}{4} = 16.07\text{m}^2$

Image source: Cambridge Essentials Year 9 Textbook

The tricks used to confuse you

The diameter of a circle and the length of a side.
The two little lines to mean the lengths of sides are the same.
Subtracting an area instead of adding it





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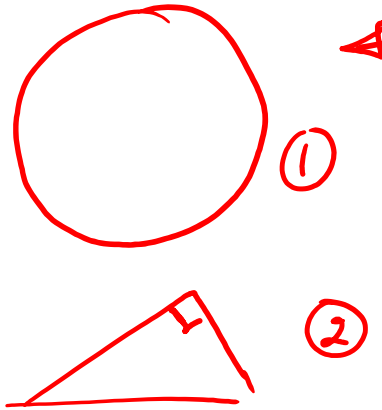

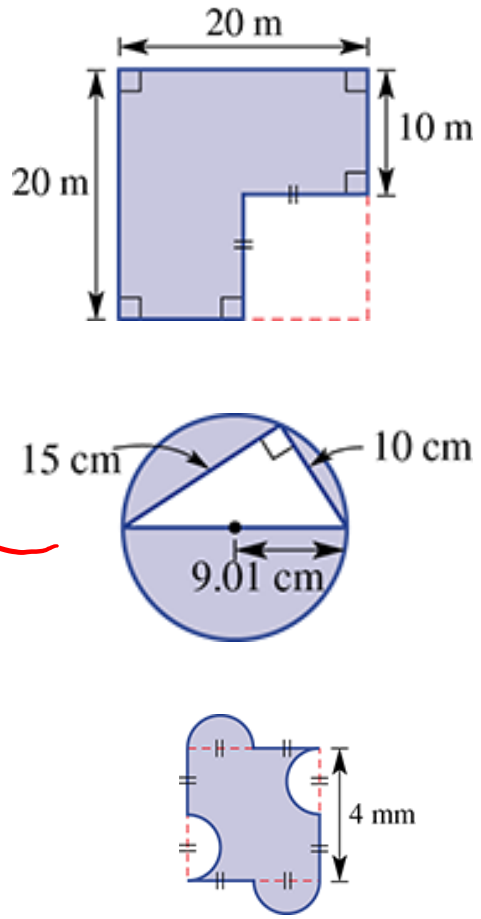

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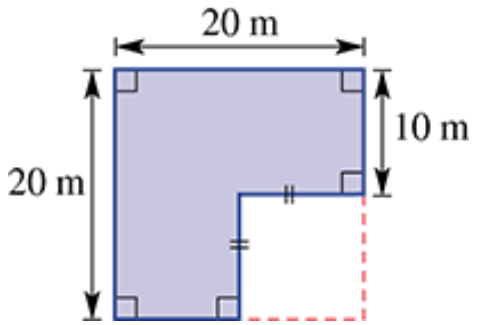

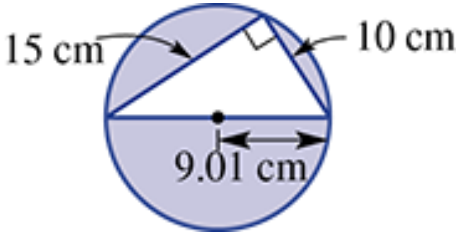

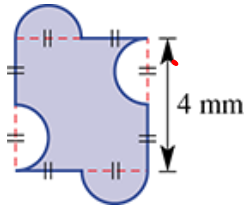

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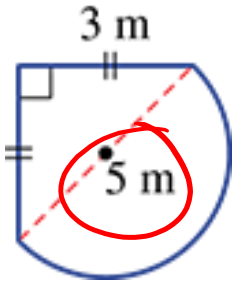
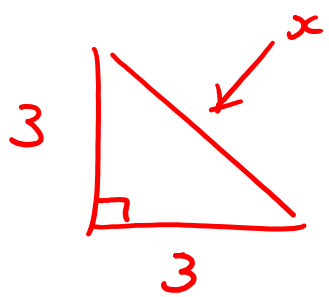
Linking across topics

Mathematics builds on past knowledge.
Those who wish to do Methods must either be able to remember much of the past learning or have a summary book where they can quickly locate past learning and understand how to proceed.



Pythag



$3^2+3^2=x^2$

$9+9=x^2$

$x^2=18$

$x=\sqrt{18}$ $x=5$

Image source: Cambridge Essentials Year 9 Textbook

Questions to complete

Here are the questions I ask that you complete and upload to my OneNote. You are always welcome to do more questions if you feel that would improve your understanding.

If you are unsure, at any time, please email me. You can ask questions in the lessons.

Year 9 textbook
Exercise 5D
Questions: 1b, 2bd, 3abce, 4cef, 5egh, 7, 8cdf, 9b, 12, 13c

Thanks for watching

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