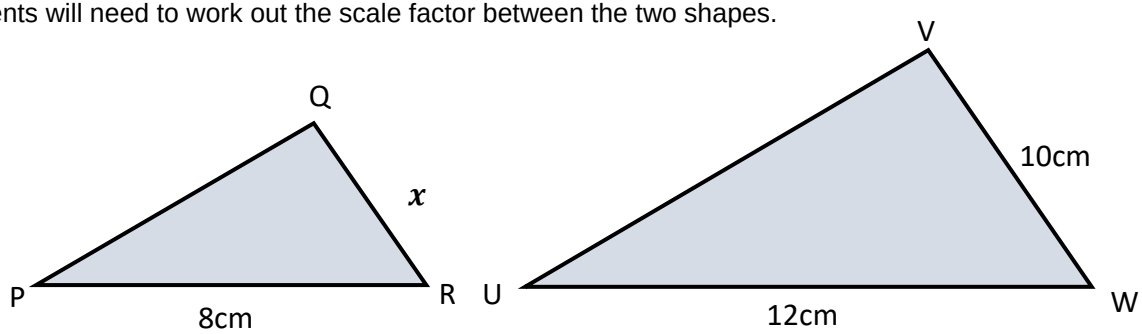
Guidance for tutors

Outcome	SLAV7	**Student can consistently:**	Find missing lengths, areas and volumes in similar shapes.
How the topic is examined	• Examined through test paper questions. • Questions are equally likely to appear on calculator and non-calculator papers. • Most questions involve finding a missing length in similar triangles.		

Prior knowledge	• Students should be confident with:
	  ○ Four rules with fractions (NF1)
	  ○ Ratio and proportion (NR1-NR2)
	  ○ Solving basic equations (AEq1)
	• In addition questions involving this topic can have links to:
	  ○ Similar area and volume problems (SLAV9)		

Suggested tuition approaches	• Two shapes are similar if their corresponding sides are in the same ratio/proportion. • Students will need to work out the scale factor between the two shapes.  • In this diagram the scale factor to move from the small to the large triangle is $\frac{12}{8} = 1.5$		

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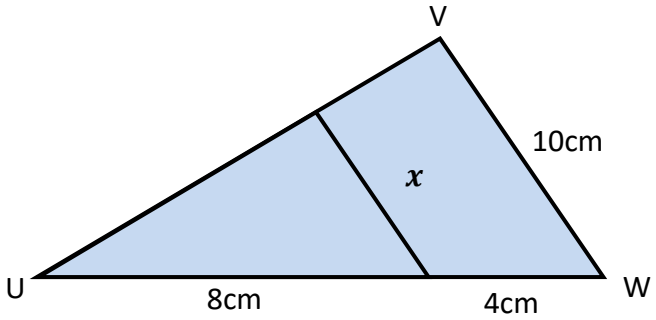
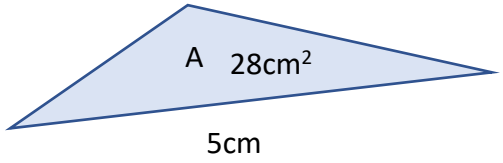
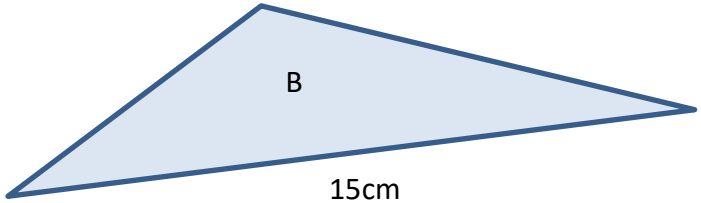
- To find a length on the large triangle given a small triangle you would multiply by 1.5. To find a length on the small triangle you would divide by 1.5. (So $x = \frac{10}{1.5} = 6\frac{2}{3}$)

- Sometimes the two triangles may be combined together. Below is a typical diagram. It is made up of the two triangles above.



- Encourage students to draw out the two triangles first before they work out the scale factor. For example many students here would do 8 ÷ 2 = 4 as the scale factor, when in fact the length of the largest triangle is 12cm.
- Encourage students to show all their steps in their working.
- Sometimes students may need to find a total length of a side and then subtract the part that they know. In other examples students might have to form an equation to solve. The following link provides two worked examples of the above types http://www.mathsteacher.com.au/year9/ch13_geometry/08_similar/similar.htm
- Students should understand that if the scale factor between two lengths is a then the scale factor for area is a^2
- Similarly if the scale factor between two lengths is a then the scale factor for volume is a^3
(e.g. The two triangles are similar. Find the area of B?





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	The length scale factor is 3 (as the larger triangle's length is 3 times as big) The scale factor for area is therefore $3^2 = 9$. So the area of B is 9 times as big as the area of A Area of B = 9 x 28 = 252 cm^2
Common errors and misconceptions	• Students don't divide correctly, particularly on a non-calculator paper. Encourage students to work with fractions as much as possible. • When two shapes are drawn combined together ensure that students draw out the small and large triangles. If this is not done there tends to be significant more mistakes made. • Check that the same units are used on each of the sides. If not you will need to convert one to the other. • When finding a part length students forget to subtract the part that has already been given. • Include the correct units in a student's answer. • Students forget to square the scale factor for similar area problems and cube the scale factor for similar volume problems. • Weight is classed as a volume.
Suggested resources	• Questions ○ http://www.cimt.org.uk/projects/mepres/book8/bk8i19/bk8_19i2.htm ○ https://corbettmaths.files.wordpress.com/2013/02/similar-shapes-pdf.pdf (sides) ○ https://corbettmaths.files.wordpress.com/2013/02/similar-shapes-area-volume-pdf.pdf (area/volume) • Past GCSE Questions ○ https://keshgcsemaths.files.wordpress.com/2013/11/74_similar-shapes.pdf • Video tutorial ○ http://corbettmaths.com/2013/11/16/similarshapes/ (sides) ○ http://corbettmaths.com/2013/11/16/similar-shapes-areas/ (area) ○ http://corbettmaths.com/2013/11/17/similar-shape-volumes/ (volume)