

## Guidance for tutors

Outcome	SPT7	Student can consistently:	Use the formulae $\frac{1}{2}ab\sin C$ to find the area of a triangle.
How the topic is examined	<ul style="list-style-type: none"> <li>Examinated through test paper questions.</li> <li>It is most likely that these questions will appear on calculator papers.</li> <li>Sometimes students can be asked to find an area of a triangle on a non-calculator paper. In this instance students will be given the value of the specific ratio or they could be one of the ratios that students are expected to know off by heart.</li> <li>Students are likely to be provided with a diagram, but students may be expected to draw a diagram for a given question. It is important that students meet questions like this.</li> </ul>		
Prior knowledge	<ul style="list-style-type: none"> <li>Students should be confident: <ul style="list-style-type: none"> <li>Solving basic equations (AEq1)</li> <li>Rearranging simple formulae (AEx8)</li> <li>Trigonometry (SPT2 and SPT3)</li> <li>Sine and cosine rules (SPT5 and SPT6)</li> </ul> </li> <li>In addition questions on this topic can have links to: <ul style="list-style-type: none"> <li>Circles (SLAV2)</li> <li>Area of sectors (SLAV6)</li> </ul> </li> </ul>		
Suggested tuition approaches	<ul style="list-style-type: none"> <li>The formula <math>\text{Area} = \frac{1}{2} \times a \times b \times \sin C</math> is used to find the area of a triangle when you have an angle and cannot use the standard <math>\frac{1}{2} \times \text{base} \times \text{height}</math> formula.</li> <li>To be able to use the area of a triangle formula you don't know an angle opposite a side. You need to know the other two sides and the angle between them.</li> <li>Like with the sine and cosine rule sides are labelled a, b and c and opposite angles are labelled A, B and C respectively. It is possible to use other letters.</li> <li>The steps involved in solving area of a triangle problems are: <ul style="list-style-type: none"> <li>Draw a triangle (if necessary).</li> <li>Label the angle given C and the other sides a and b.</li> <li>Substitute the numbers into the area of a triangle formula.</li> </ul> </li> </ul>		

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	<ul style="list-style-type: none"> <li>○ Either simplify or type the calculation into your calculator and solve.</li> <li>○ Don't forget the units on your final answer.</li> <li>• It is common for students to have to use this formula with the sine and cosine rules together in one question.</li> <li>• Encourage students to show all their working and make sure they do not round answers too prematurely when working with sides and angles as this can lead to accuracy errors later on.</li> <li>• If you are asked to find the area of a segment students should find the area of the sector and subtract the area of the triangle.</li> <li>• In order to find the angle, given the area of the triangle, you would need to rearrange so that <math>\cos C = \frac{2 \times \text{Area}}{a \times b}</math>. Students don't need to remember this they can just rearrange the area of a triangle formula.</li> </ul>
<b>Common errors and misconceptions</b>	<ul style="list-style-type: none"> <li>• Students can round prematurely and they end up getting the wrong answer.</li> <li>• Ask students to double check the calculation they put into their calculator.</li> <li>• Students should check that the calculator they are using is in degrees (deg) mode.</li> </ul>
<b>Suggested resources</b>	<ul style="list-style-type: none"> <li>• Questions <ul style="list-style-type: none"> <li>○ <a href="http://www.cimt.org.uk/mepjamaica/unit35/StudentText.pdf">http://www.cimt.org.uk/mepjamaica/unit35/StudentText.pdf</a></li> <li>○ <a href="https://corbettmaths.files.wordpress.com/2013/02/trig-area-of-a-triangle-exercise-337-pdf.pdf">https://corbettmaths.files.wordpress.com/2013/02/trig-area-of-a-triangle-exercise-337-pdf.pdf</a></li> <li>○ <a href="https://corbettmaths.files.wordpress.com/2013/02/sine-and-cosine-rule-pdf1.pdf">https://corbettmaths.files.wordpress.com/2013/02/sine-and-cosine-rule-pdf1.pdf</a></li> </ul> </li> <li>• Past GCSE Questions <ul style="list-style-type: none"> <li>○ <a href="https://www.examsolutions.net/tutorials/trigonometric-graphs-exam-questions/">https://www.examsolutions.net/tutorials/trigonometric-graphs-exam-questions/</a></li> </ul> </li> <li>• Video tutorial <ul style="list-style-type: none"> <li>○ <a href="http://corbettmaths.com/2013/03/29/proof-of-12absinc/">http://corbettmaths.com/2013/03/29/proof-of-12absinc/</a> (proof)</li> <li>○ <a href="http://corbettmaths.com/2012/08/02/area-of-a-triangle-sinetrigonometry/">http://corbettmaths.com/2012/08/02/area-of-a-triangle-sinetrigonometry/</a></li> </ul> </li> </ul>