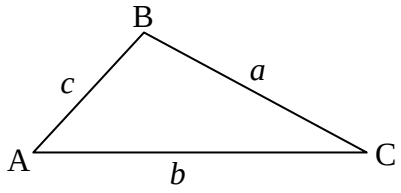
Trigonometry
Solving Triangles, The Law of Sines: The Ambiguous Case

The following is a summary of the different possible situations that can occur in a triangle given two sides and an angle not included between them.

The angles and sides of the triangle are labeled as in the diagram below. The diagram is not drawn to scale.



<table>
<tr><th colspan="2">Given A, a and b (SSA)</th></tr>
<tr><td rowspan="2">If angle A is obtuse,
(then angles B & C acute)</td><td>If $a < b$ → no solution</td></tr>
<tr><td>If $a > b$ → one solution</td></tr>
<tr><td rowspan="4">If angle A is acute
then find the height,

$h=b*\sin A$

Note: h will always be < b.</td><td>If $a < h$ → no solution</td></tr>
<tr><td>If $a = h$ → 1 solution
Angle B = 90°.</td></tr>
<tr><td>If $h < a < b$ → 2 solutions
one with angle B acute,
one with angle B obtuse</td></tr>
<tr><td>If $a > b$ → 1 solution
Angle B is acute.</td></tr>
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