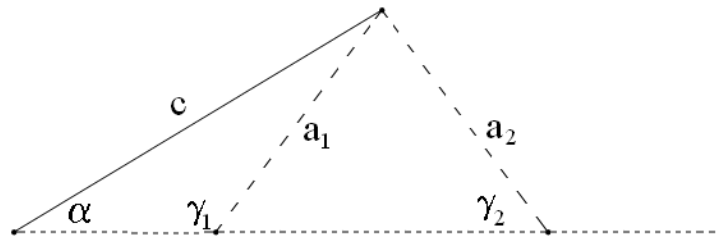


The Ambiguous Case of the Law of Sines (SSA)

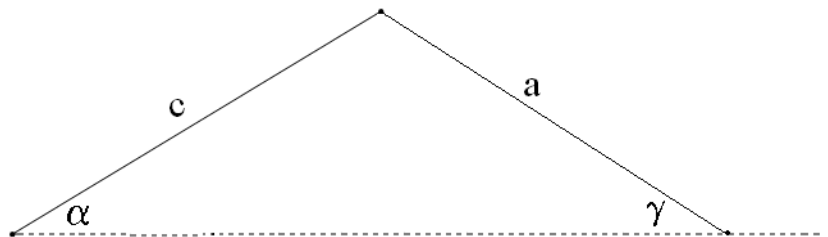
[1] First possible outcome: Two Solutions

Given: $\alpha = 31^\circ$, $c = 84$, and $a = 54$. Show that there are two possible values for γ , the angle opposite side c .



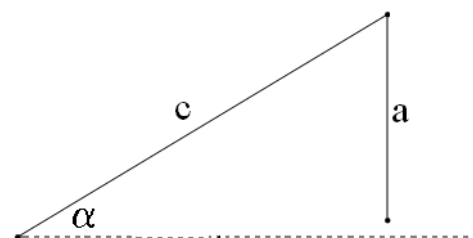
[2] Second possible outcome: One Solution

Given: $\alpha = 31^\circ$, $c = 84$, and $a = 85$. Show that there is only one possible value for γ . How can you tell from the length of a , the side opposite the only given angle, that only one triangle is possible?



[3] Third possible outcome: No Solution

Given: $\alpha = 31^\circ$, $c = 84$, and $a = 40$. Show that there is no possible value for γ .



Steps in Solving the Ambiguous Case

- [1] You know the angle opposite one of the sides. Use the Law of Sines to find the angle opposite the other side.
- [2] If the sine of this angle is greater than 1, no triangle is possible and you're done.
- [3] If the angle in step [1] exists, find its supplement. Add this supplement to the angle that was given in the problem.
- [4] If the sum is 180° or more, reject the supplement as a possible value for the angle. There is exactly one solution. Find the missing angle and missing side of the triangle and you're done.
- [5] If the sum in step [3] is less than 180° , then there are two solutions. Find the missing angle and side in both triangles.