The Ambiguous Case for the Law of Sines

Name _____

Date _____ Period _____

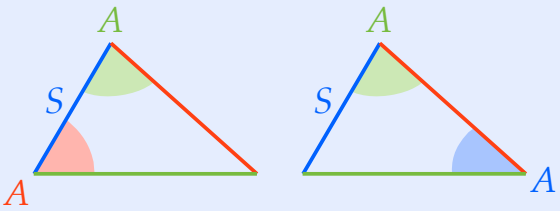
To solve a triangle:

Determine the length of all three sides and the measure of all three angles.

Need to know the measure of one side and...

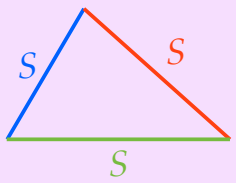
two angles | two sides | one side and one angle

The Law of Sines



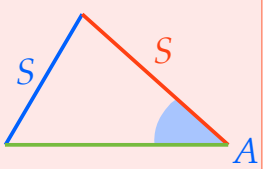
ASA SAA

The Law of Cosines



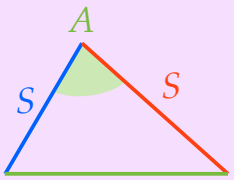
SSS

The Ambiguous Case



SSA

The Law of Cosines



SAS

Given two sides and an angle opposite one side (SSA Triangle)...

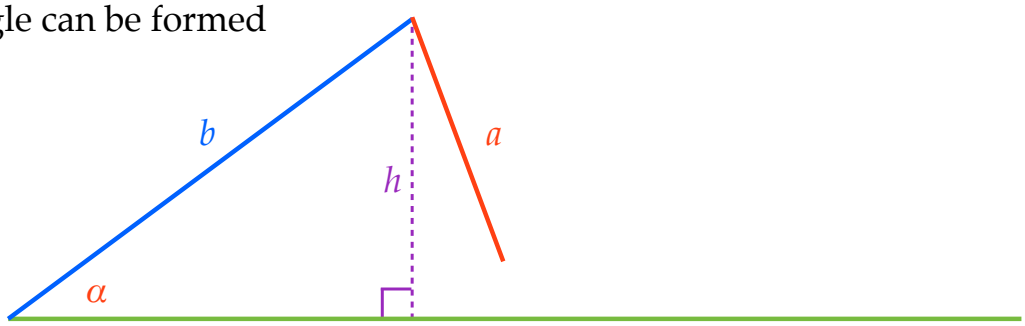
this gives us the ambiguous case for a triangle.

if $a < h$ or $a < b \cdot \sin \alpha$

No triangle can be formed

$\sin \alpha = \frac{h}{b}$

$b \cdot \sin \alpha = h$

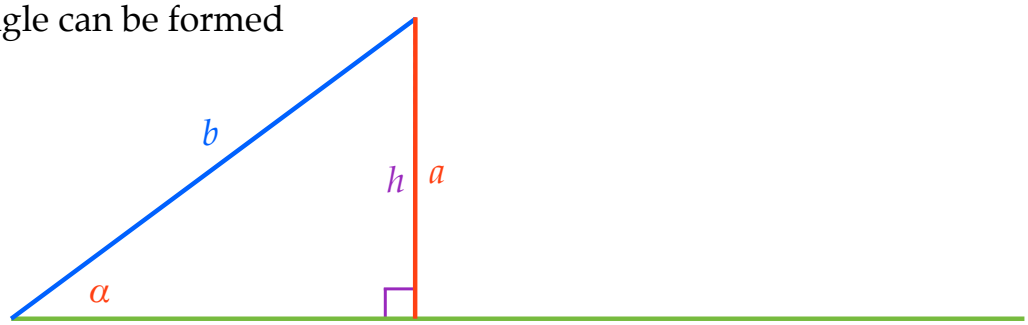


Given two sides and an angle opposite one side (SSA Triangle)...
this gives us the ambiguous case for a triangle.

if $a = h$ or $a = b \cdot \sin \alpha$
One right triangle can be formed

$\sin \alpha = \frac{h}{b}$

$b \cdot \sin \alpha = h$

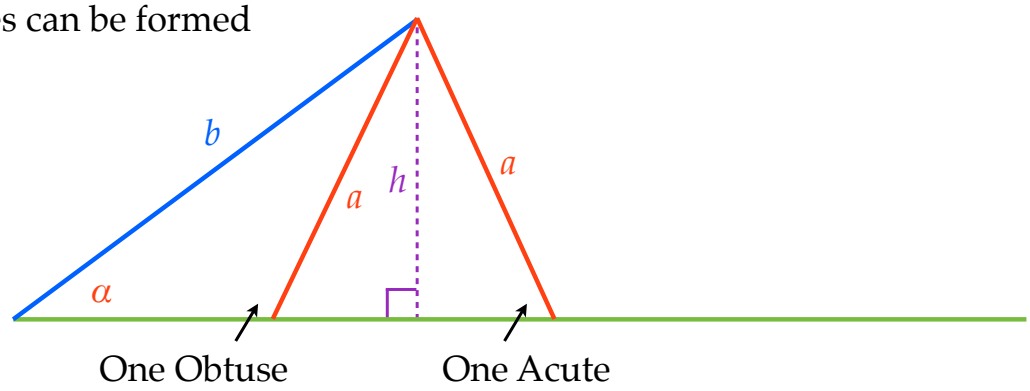


Given two sides and an angle opposite one side (SSA Triangle)...
this gives us the ambiguous case for a triangle.

if $a > h$ or $a > b \cdot \sin \alpha$, and $a < b$,
Two triangles can be formed

$\sin \alpha = \frac{h}{b}$

$b \cdot \sin \alpha = h$

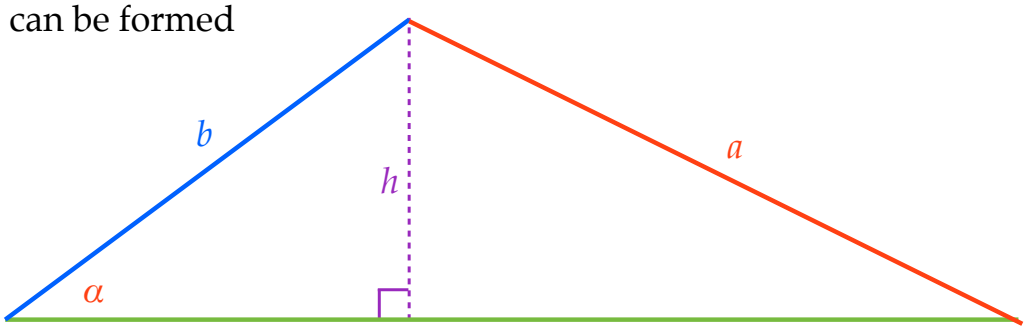


Given two sides and an angle opposite one side (SSA Triangle)...
this gives us the ambiguous case for a triangle.

if $a > h$ or $a > b \cdot \sin \alpha$, and $a > b$,
One triangle can be formed

$$\sin \alpha = \frac{h}{b}$$

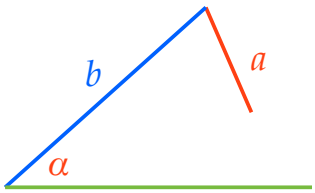
$$b \cdot \sin \alpha = h$$



Given two sides and an angle opposite one side (SSA Triangle)...
this gives us the ambiguous case for a triangle.

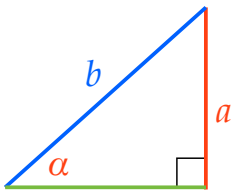
$a < h$ or $a < b \cdot \sin \alpha$

No triangle

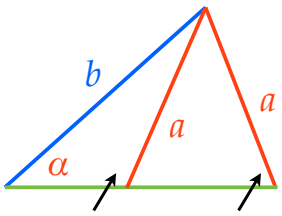


$a = h$ or $a = b \cdot \sin \alpha$

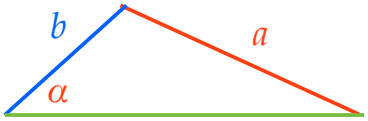
One Right Triangle



$a > h$ or $a > b \cdot \sin \alpha$,
and $a < b$,
Two triangles

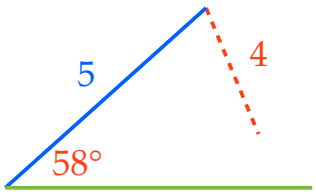


$a > h$ or $a > b \cdot \sin \alpha$,
and $a > b$,
One triangle



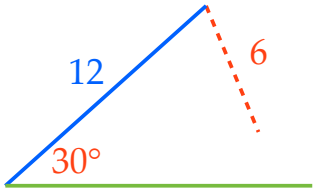
Solve the following triangles

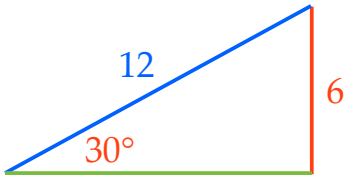
$a = 4, b = 5, \alpha = 58°$



Solve the following triangles

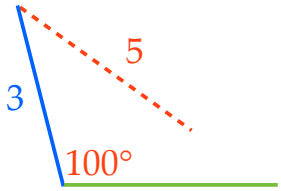
$a = 6, b = 12, \alpha = 30°$

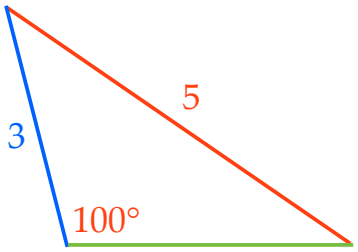




Solve the following triangles

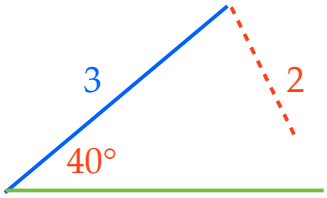
$a = 5, b = 3, \alpha = 100°$

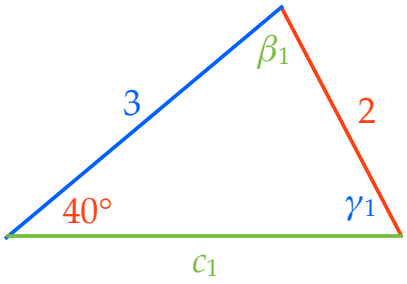




Solve the following triangles

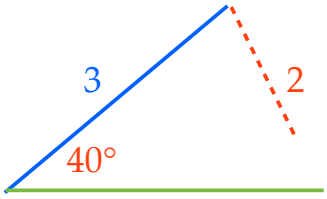
$a = 2, b = 3, \alpha = 40°$

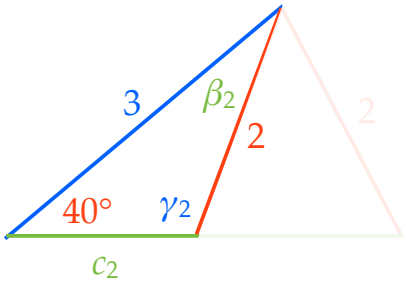




Solve the following triangles

$a = 2, b = 3, \alpha = 40°$





Given two sides and an angle opposite one side (SSA Triangle)...
this gives us the ambiguous case for a triangle.

$a < h$ or $a < b \cdot \sin \alpha$	$a = h$ or $a = b \cdot \sin \alpha$	$a > h$ or $a > b \cdot \sin \alpha$, and $a < b$,	$a > h$ or $a > b \cdot \sin \alpha$, and $a > b$,
No triangle	One Right Triangle	Two triangles	One triangle