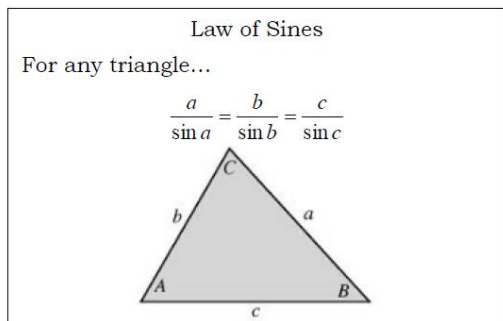


## Algebra 2H

### Ch 13.5 – Apply the Law of Sines



When can we use Law of Sines?

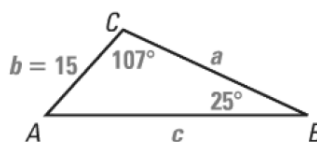
Example 1: Given two angles and a side (AAS)...

Solve  $\triangle ABC$  with  $C=107^\circ$ ,  $B=25^\circ$ , and  $b=15$

Find third angle first (sum of angles =  $180^\circ$ )

\_\_\_\_\_

Find sides using Law of Sines:

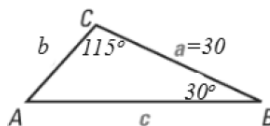


Example 2: Given two angles and an included side (ASA)...

Solve  $\triangle ABC$  with  $C = 115^\circ$ ,  $B=30^\circ$ , and  $a=30$  cm

Find third angle first \_\_\_\_\_

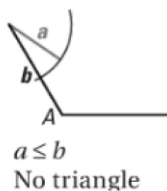
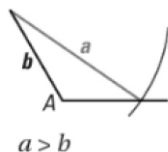
Find sides using Law of Sines:



Law of Sines: **Ambiguous Case (SSA)**

o Possible Triangles in SSA Case:

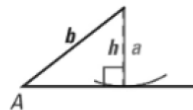
- Let A be the angle and a and b the sides we know...
- If A is OBTUSE there are TWO possibilities...



If  $a > b$  then **ONE** triangle is formed

If  $a \leq b$  then **NO** triangle is formed

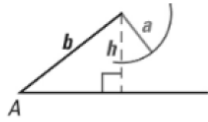
- If A is ACUTE there are FOUR possibilities...
- Let h be the altitude of the triangle



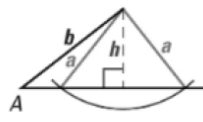
$$h = a$$

If  $h < b < a$  then **ONE** triangle is formed

If  $a = h$  we have a right triangle situation, so **ONE** triangle formed



$h > a$   
No triangle



$h < a < b$   
Two triangles

If  $a < h$ , then **NO** triangle is formed

If  $h < a < b$  then **TWO** triangles exist! Solve for both of them

- Compare a and b (and h for acute triangles) and determine number of triangles formed

**ALWAYS DRAW A PICTURE!**

Example 3: Solve  $\triangle ABC$  with  $A=115^\circ$ ,  $a=20$ , and  $b=11$

Example 4: Solve  $\triangle ABC$  with  $A=51^\circ$ ,  $a=3.5$ , and  $b=5$