

### 4.3 Ambiguous Case of the Sine Law

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The ambiguous case of the sine law may occur when:

- given 2 side lengths
- and the measure of an angle that is opposite one of these 2 sides (SSA)

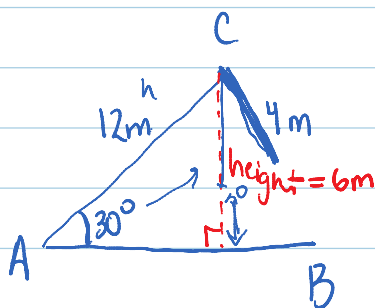
Depending on the measure of the given angle and the lengths of the given sides, you may need to construct and solve zero, 1 or 2 triangles



Ex. #1

Given each side-side-angle (SSA) situation for  $\triangle ABC$ , determine how many angles are possible to create.

(a)  $\angle A = 30^\circ$   
 $a = 4\text{m}$   
 $b = 12\text{m}$



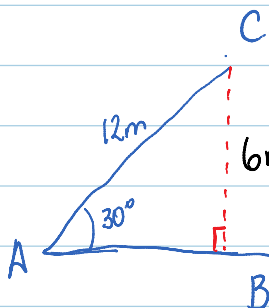
SOH CAH TOA

$$\frac{\sin 30^\circ}{1} = \frac{h}{12}$$

$$h = 12 \cdot \sin 30^\circ = 6\text{m}$$

0 triangles because the height is 6m and that is the smallest value that side a could be

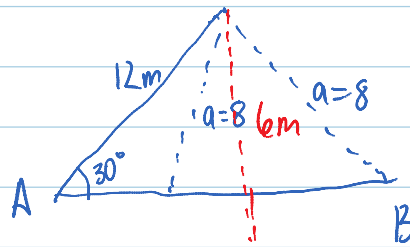
(b)  $\angle A = 30^\circ$   
 $a = 6\text{m}$   
 $b = 12\text{m}$



we already calculated the height in part (a) and it is 6m

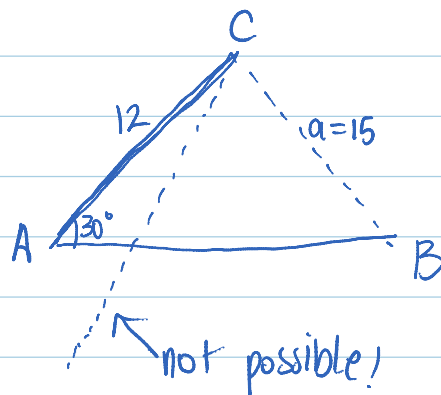
1 triangle because its the same measure as the height so it would be a right triangle

(c)  $\angle A = 30^\circ$   
 $a = 8$   
 $b = 12$



2 triangles are possible

(d)  $\angle A = 30^\circ$   
 $a = 15$   
 $b = 12$



1 triangle because its greater than side  $b = 12m$

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