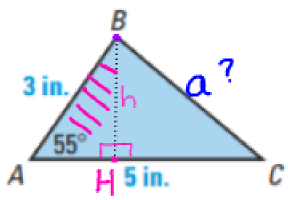
Find the height of the following triangle

Then find the length of side a



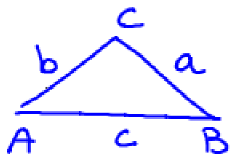
In triangle ABH:

$\sin 55^\circ = \frac{h}{3}$

$h = 3\sin 55^\circ = 2.5$

$a^2 = b^2 + c^2 - 2bc\cos A$

$a \simeq 4.1$

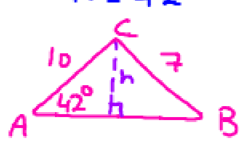


Section 5.5 : The ambiguous case
Day 2 SSA

Law of cos: SSS SAS

Law of sin: AAS ASA SSA?

#13 $A = 42^\circ$ $a = 7$ $b = 10$



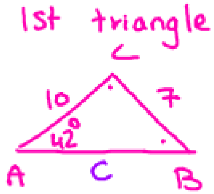
SSA : 2 given sides and 1 given Not included angle.

- if $h > a$ then No triangle exists.
- if $h = a$ then 1 triangle exists
- if $h < a$ then 2 triangles exist

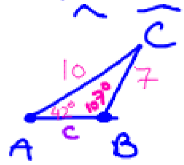
$\sin 42^\circ = \frac{h}{10} \rightarrow h = 10\sin 42^\circ = 6.69$

$6.69 < 7$ 2 triangles exist.

1st triangle



2nd triangle



Sin 107
Sin 73

$$\frac{\sin A}{a} = \frac{\sin B}{b}$$

$$\frac{\sin 42^\circ}{7} = \frac{\sin B}{10}$$

$B \simeq 72.9^\circ$

$B \simeq 73^\circ$

$C \simeq 180 - 42 - 73^\circ$

$C \simeq 65^\circ$

$c^2 = a^2 + b^2 - 2ab\cos C$

$c^2 = 7^2 + 10^2 - 2 \cdot 7 \cdot 10 \cos 65^\circ$

$\boxed{c = 9.5}$

obtuse angle B:

$180^\circ -$ acute B

$B \simeq 180 - 73^\circ$

$B \simeq 107^\circ$

The sin of an obtuse angle is the sin of its supplement.

$C \simeq 31^\circ$

$c^2 = a^2 + b^2 - 2ab\cos C$

$c^2 = 7^2 + 10^2 - 2 \cdot 7 \cdot 10 \cos 31^\circ$

$c \simeq 5.4$

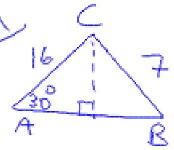
How many distinct triangles can be drawn with the following measurement?

Ex 1: $\angle A = 30^\circ$ $a = 7$ $b = 16$.

Ex 2: $\angle A = 30^\circ$ $a = 10$ $b = 16$.

Review problems p 451 : 39-44 (5.4 solve), 51-55 (5.5, 5.6 law of sin/cos)

Ex1



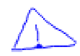
$h = 16 \sin 30° = 8$

$h > a$ No triangle

SSA

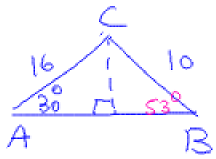
$$\frac{\sin A}{a} = \frac{\sin B}{b}$$

$$\frac{\sin 30°}{7} = \frac{\sin B}{16}$$



Ex2

Scenario 1



$h = 8$

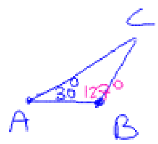
$53° + 30 = 83°$

$97°$

$h < a$ 2 triangle

$$\frac{\sin 30°}{10} = \frac{\sin B}{16}$$

$B \simeq 53°$.



$180 - 53° = 127°$

$B = 127°$

$C \simeq 23°$