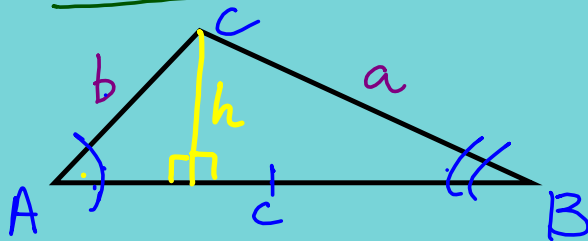


# SOLVING OBLIQUE $\Delta$ 's & VECTORS

Law of Sines



not a right  $\Delta$

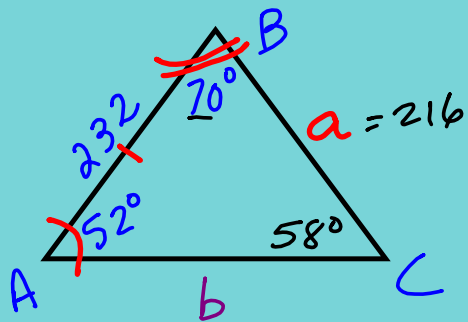
$$\sin A = \frac{h}{b} \quad \sin B = \frac{h}{a}$$

$$b \sin A = h \quad a \sin B = h$$

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

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

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



Find all missing parts.

ASA, AAS

$$C = 180^\circ - 52^\circ - 70^\circ = 58^\circ$$

$$\frac{\cancel{\sin 52^\circ} a}{\cancel{\sin 52^\circ}} = \frac{232 \cdot \sin 52^\circ}{\sin 58^\circ}$$

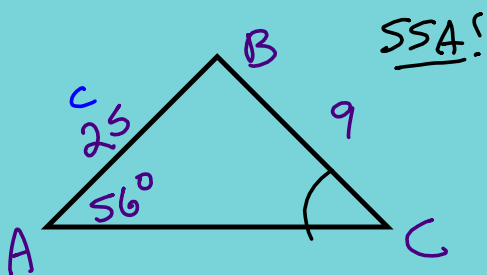
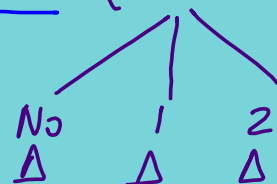
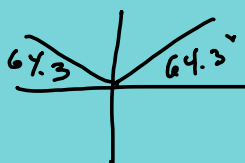
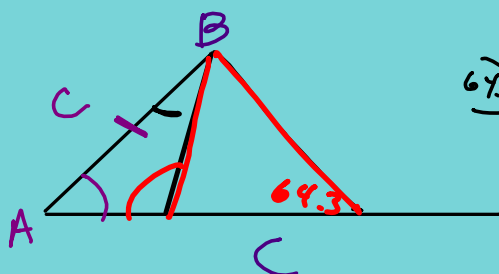
$$a = \boxed{216}$$

$$\frac{b}{\sin 70^\circ} = \frac{232}{\sin 58^\circ}$$

$$\boxed{b = 257}$$

# AMBIGUOUS CASE OF LAW OF SINES (SSA)

unclear, more than 1 possibility

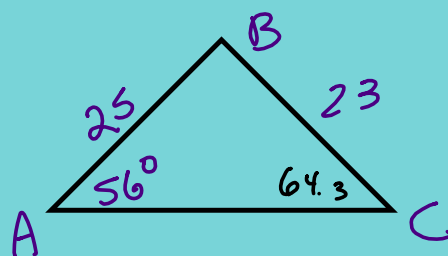


Find B.

$$\frac{\sin C}{25} = \frac{\sin 56^\circ \cdot 25}{9}$$

$$\sin C = 2.3 \quad \uparrow \text{not possible}$$

No A



Find B.

$$\frac{\sin C}{23} = \frac{\sin 56^\circ \cdot 25}{23}$$

$$\sin C = 0.9011$$

$$\sin^{-1}(0.9011) = 64.3^\circ$$



A 1	A 2
$C = 64.3^\circ$	$C' = 115.7^\circ$
$A = 56^\circ$	$A = 56^\circ$
$B = 59.7^\circ$	$B' = 8.3^\circ$

Given  $\rightarrow$

To check for 2nd  $\Delta$   
When SSA

1) Solve Law of Sines to get first angle ( $A_1$ )

2)  $A_2 = 180^\circ - A_1$



3)  $A_2 + \text{Given angle} < 180^\circ$ , then 2  $\Delta$ 's

$A_2 + \text{Given angle} \geq 180^\circ$ , then no 2nd  $\Delta$

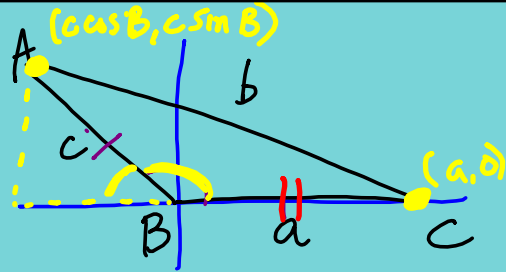
## Law of Cosines

SAS, SSS

$$b^2 = a^2 + c^2 - 2ac \cos B$$

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

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

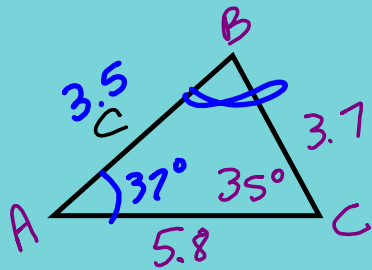


$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

$$x = r \cos \theta$$

$$y = r \sin \theta$$

$$b = \sqrt{a^2 + c^2 - 2ac \cos B}$$



SAS

After Law of Cos,  
must find the  
smallest remaining  
angle next.

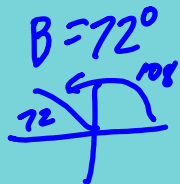
Find B.

$$C^2 = 5.8^2 + 3.7^2 - 2(5.8)(3.7) \cos 35^\circ$$

$$\sqrt{C^2} = \sqrt{12.17}$$

$$C = 3.5$$

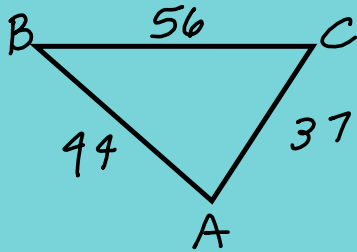
$$\frac{\sin B}{5.8} = \frac{\sin 35^\circ}{3.5}$$



$$\frac{\sin A}{3.7} = \frac{\sin 35^\circ}{3.5}$$

$$A = 37^\circ$$

$$B = 108^\circ$$



Find C.

$$44^2 = 56^2 + 37^2 - 2(56)(37)\cos C$$

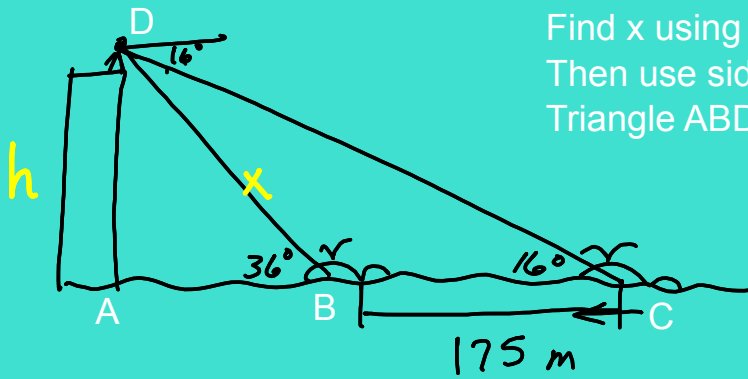
$$\frac{44^2 - 56^2 - 37^2}{-2(56)(37)} = \cos C$$

$$0.6199 = \cos C$$

$$\cos^{-1}(0.6199) = C$$

$$52^\circ = C$$

12/



Find  $x$  using Triangle BCD.  
Then use side  $x$  to find  $h$  in  
Triangle ABD.