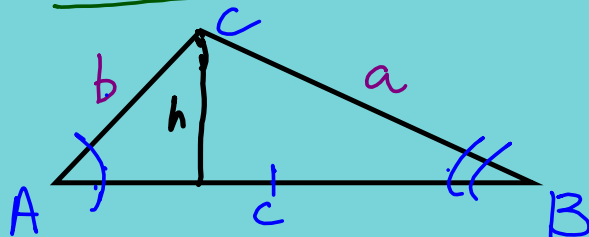


SOLVING OBLIQUE Δ 'S & VECTORS

Law of Sines



not a right Δ

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

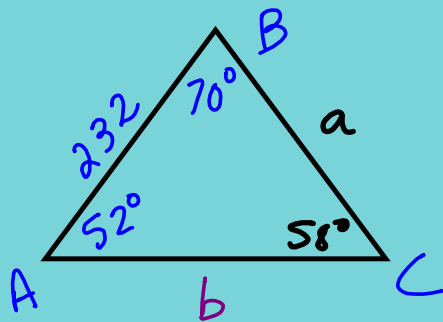
$$\sin A = \frac{h}{b} \quad \sin B = \frac{h}{a}$$

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

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

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

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



Law of Sines = ASA, AAS,

$$\begin{array}{r} 180^\circ \\ - 122^\circ \\ \hline 58^\circ \end{array}$$

Find all missing parts.

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

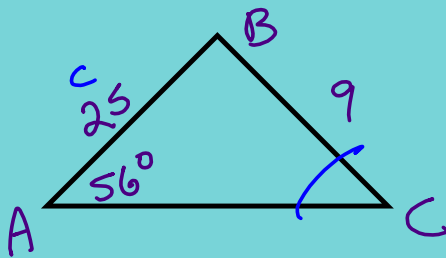
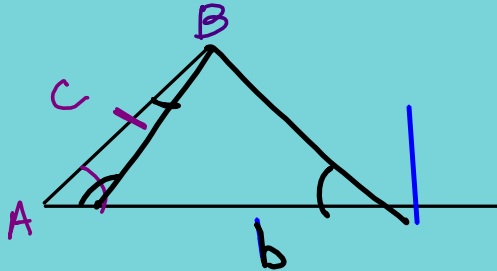
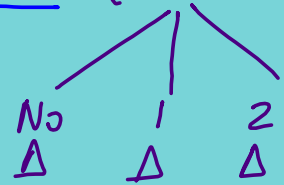
$$a = 216$$

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

$$b = 257$$

AMBIGUOUS CASE OF LAW OF SINES (SSA)

unclear, more than 1 possibility



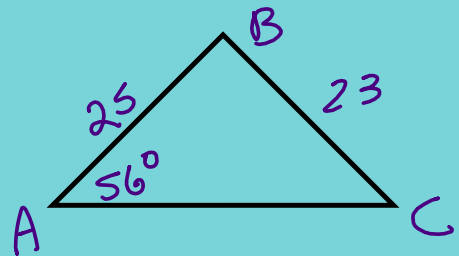
Find B.

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

$$\sin C = \cancel{2.30}$$

$$\sin^{-1}(2.30)$$

No Δ



Find B.

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


$$\sin C = 0.9011$$

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



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

To check for 2nd Δ
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 Δ 's
 $A_2 + \text{Given angle} \geq 180^\circ$, then no 2nd Δ

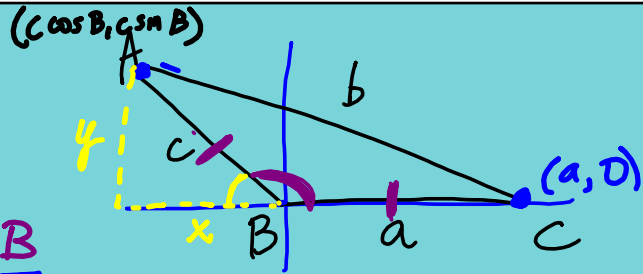
Law of Cosines

SAS, SSS

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

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

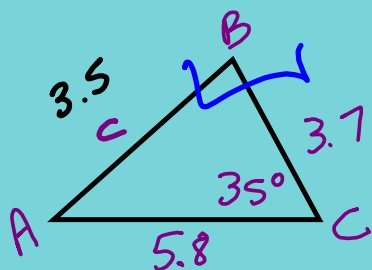
$$a^2 = b^2 + c^2 - 2bc \cos A$$



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

$$x = r \cos \theta = c \cos B$$

$$y = r \sin \theta = c \sin B$$



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

Find B.

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

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

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

$$c = 3.5$$

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

$$\sin B = 0.95$$

$$\sin^{-1}(0.95) = 72^\circ$$

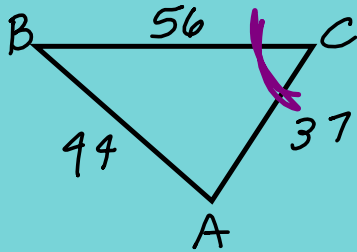
$$B = 72^\circ$$

$$A = 180^\circ - 35^\circ - 72^\circ = 73^\circ$$

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

$$A = 37^\circ$$

$$B = 108^\circ$$



Find C.

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

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

$$0.6179 = \cos C$$

$$51.7^\circ = C$$