Unit 4

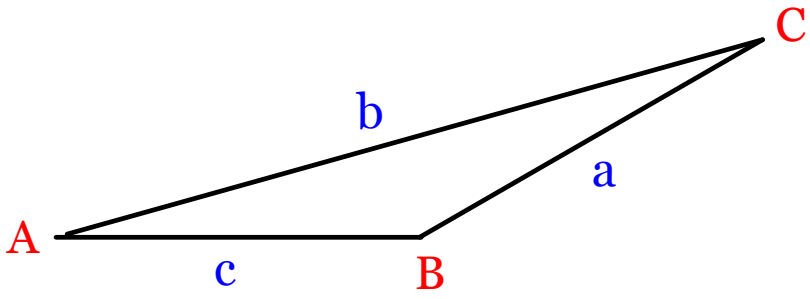
Learning Target 2

I can use the Law of Sines to solve a triangle.

What is an **oblique** triangle?

Law of Sines

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



When to use LAW OF SINES...

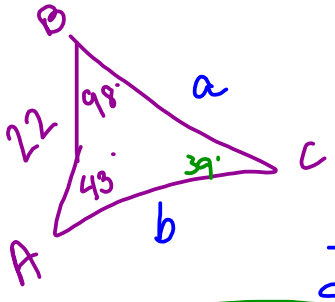
AAS - Two angles and a side

ASA - Two angles and the included side

*SSA - Two sides and an angle

1.) $A = 43^\circ$ $B = 98^\circ$ $c = 22$

$180^\circ - 43^\circ - 98^\circ = 39^\circ$



$\angle C = 39^\circ$

$b = 34.62$

$a = 23.84$

$\frac{a}{\sin 43^\circ} = \frac{22}{\sin 39^\circ}$

$a \sin 39^\circ = 22 \sin 43^\circ$

$a = 23.84$

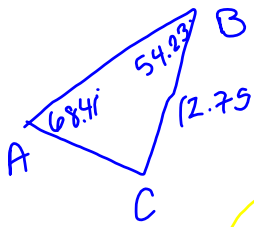
$\frac{a}{\sin 43^\circ} = \frac{b}{\sin 98^\circ} = \frac{22}{\sin 39^\circ}$

$b \sin 39^\circ = 22 \sin 98^\circ$

$b = 34.62$

Warm Up 1/5/17

$A = 68.41^\circ$ $a = 12.75$ $B = 54.23^\circ$



$\angle C = 57.36^\circ$

$b = 11.13$

$C = 11.55$

$\frac{12.75}{\sin 68.41} = \frac{b}{\sin 54.23}$

$12.75 \sin 54.23 = b \sin 68.41$

$11.13 = b$

$\frac{12.75}{\sin 68.41} = \frac{c}{\sin 57.36}$

$12.75 \sin 57.36 = c \sin 68.41$

$11.55 = c$

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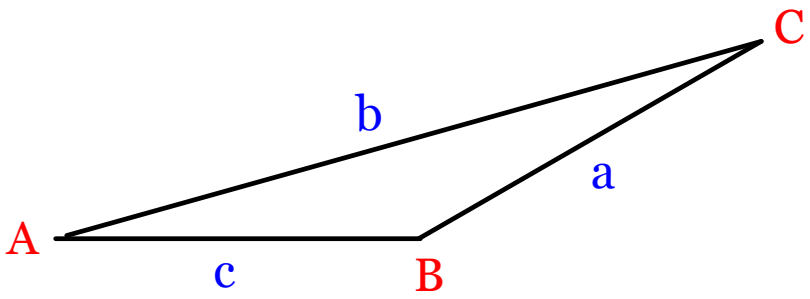
Law of Sines

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



When to use LAW OF SINES...

AAS - Two angles and a side

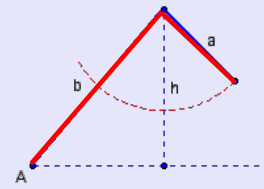
ASA - Two angles and the included side

*SSA - Two sides and an angle

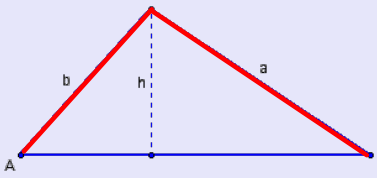
When given SSA there could be . . .

no triangle
one triangle
two triangles

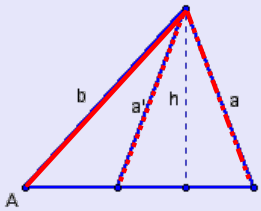
SSA



no triangle possible



One triangle possible



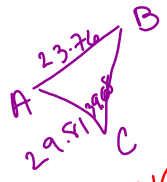
two triangles possible

Ambiguous Case

How To Check For More Than One Triangle

* Solve for the first angle
* Take that angle and subtract it from 180°
* Ask yourself, "Can this angle exist with the angle that was given in the original problem?" (Is their sum more than 180°?)
* If the sum is less than 180°, there are two triangles!

3.) c = 23.76 b = 29.81 C = 39.68°



$\frac{a}{\sin A} = \frac{29.81}{\sin B} = \frac{23.76}{\sin 39.68}$

$\sin^{-1}\left(\frac{29.81 \sin 39.68}{23.76}\right) = \frac{23.76 \sin B}{23.76}$

$53.23° = B$

$\angle B = 53.23°$ $\xrightarrow{180° - B}$ $\angle B_2 = 126.77°$

given $\angle C = 39.68°$ $\xrightarrow{\text{given}}$ $\angle C_2 = 39.68°$

$\angle A = 87.09°$ $\angle A_2 = 13.55°$

$a = 37.16$ $a_2 = 8.72$

$\frac{a}{\sin 87.09°} = \frac{23.76}{\sin 39.68}$ $\frac{a}{\sin 13.55°} = \frac{23.76}{\sin 39.68}$

$\frac{a \sin 39.68}{\sin 39.68} = \frac{23.76 \sin 87.09}{\sin 39.68}$ $\frac{a \sin 39.68}{\sin 39.68} = \frac{23.76 \sin 13.55}{\sin 39.68}$

$a = 37.16$ $a = 8.72$