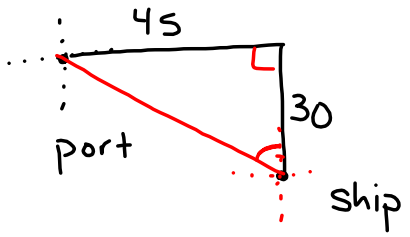
37)

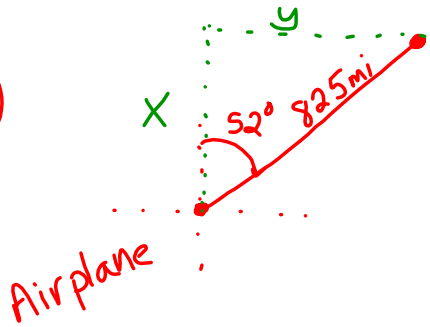
N56.31° W



$\tan^{-1}(45/30)$

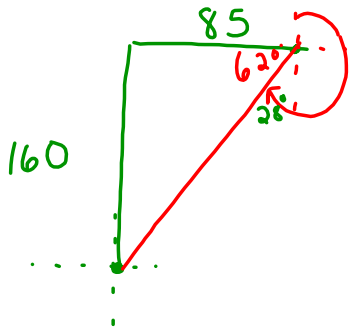
56.3099°

33)



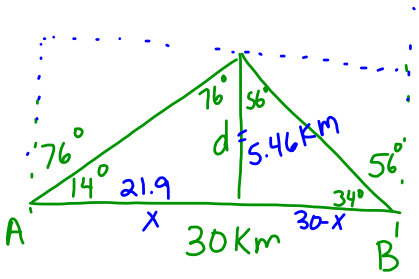
Bearing 52°

38)



Bearing 208°

40)



$\tan 14° = \frac{d}{x}$ $\tan 34° = \frac{d}{30-x}$

$x \tan 14° = d$ $(30-x)\tan 34° = d$

$x \tan 14° = (30-x)\tan 34°$

$x \tan 14° = 30 \tan 34° - x \tan 34°$

$x \tan 14° + x \tan 34° = 30 \tan 34°$

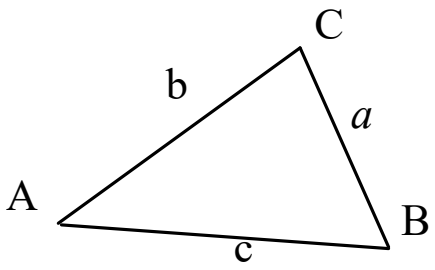
$.2493x + .6745x = 20.2353$

$.9238x = 20.2353$

$x = 21.9$

Unit 6.1 Law of sines

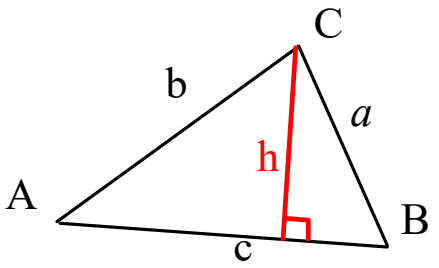
Law of Sines



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

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

Derived from using right triangles



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

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

$b\sin A = a\sin B$

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

☆

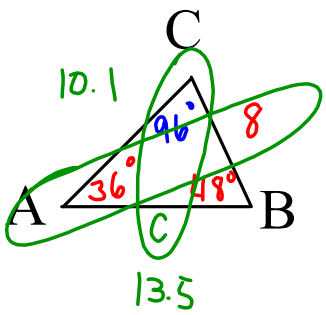
Law of sines works when you have AAS, ASA, and SSA patterns

In the law of sines if you are given a choice, try to solve for the smallest angle you can first

How do you know how to label the sides?

smallest side matches up with the smallest angle

Solve Δ ABC, given that $a = 8$, $\angle B = 48°$, $\angle A = 36°$

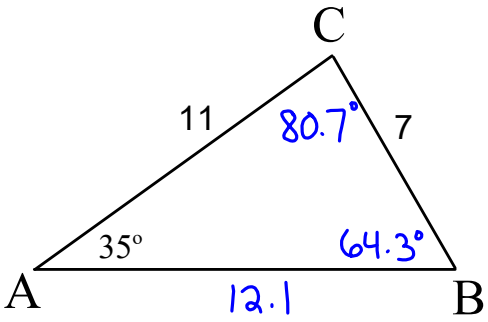


$$\frac{c}{\sin 96^\circ} = \frac{8}{\sin 36^\circ} \qquad c = \frac{8\sin 96^\circ}{\sin 36^\circ} = 13.5$$

$$\frac{b}{\sin 48^\circ} = \frac{8}{\sin 36^\circ} \qquad b = \frac{8\sin 48^\circ}{\sin 36^\circ} = 10.1$$

Solve the triangle.

Given Δ ABC, $a = 7$, b = 11 and angle A = 35°

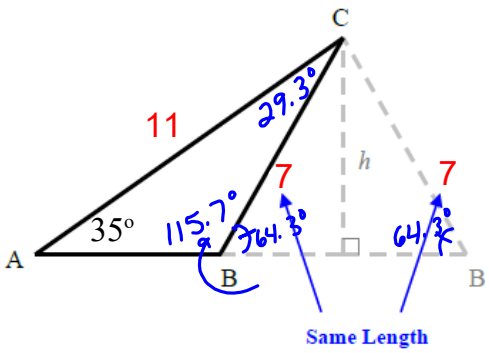


$$\frac{\sin B}{11} = \frac{\sin 35}{7}$$

$$\sin B = \frac{11\sin 35}{7}$$

$$\sin^{-1}\left(\frac{11\sin 35}{7}\right)$$

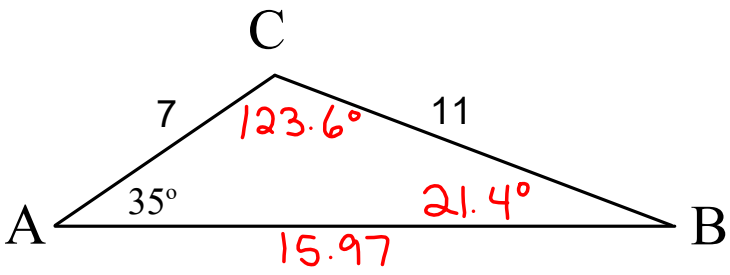
$$\frac{c}{\sin 80.7^\circ} = \frac{7}{\sin 35^\circ}$$



$$\frac{c}{\sin 29.3^\circ} = \frac{7}{\sin 35^\circ}$$

$$c = 5.97$$

Given Δ ABC, a = 11, b = 7 and angle A = 35º *SSA pattern



$\frac{\sin B}{7} = \frac{\sin 35^\circ}{11}$

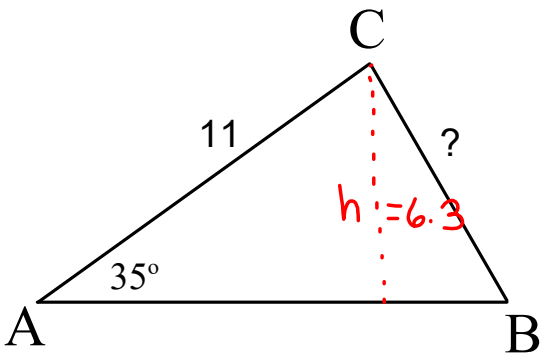
$\sin^{-1}\left(\frac{7\sin 35^\circ}{11}\right) = \angle B$

$\angle B = 21.4^\circ$

$\frac{c}{\sin 123.6^\circ} = \frac{11}{\sin 35^\circ}$

$c = 15.97$

Given Δ ABC, a = ?, b = 11 and angle A = 35º



Possible values for side "a" so that a triangle is not possible?

less than "h"

$\sin 35^\circ = \frac{h}{11}$

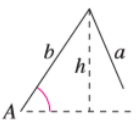
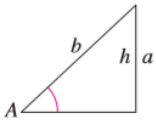
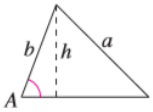
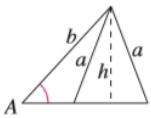
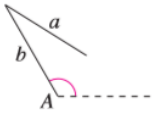
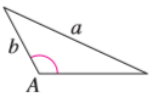
$11\sin 35^\circ = h$

Pull

SSA Pattern could have 0, 1, or 2 solutions

The Ambiguous Case (SSA)

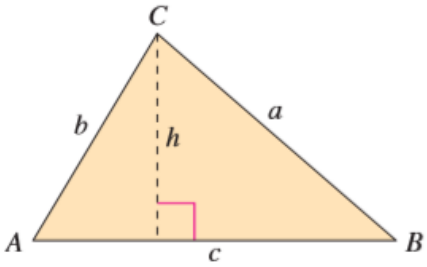
Consider a triangle in which you are given a, b, and A. $(h = b \sin A)$

	A is acute.	A is acute.	A is acute.	A is acute.	A is obtuse.	A is obtuse.
Sketch						
Necessary condition	$a < h$	$a = h$	$a \geq b$	$h < a < b$	$a \leq b$	$a > b$
Triangles possible	None	One	One	Two	None	One

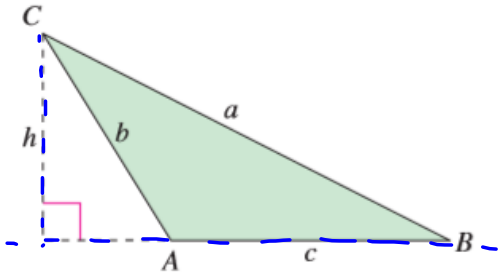
Solve the triangle given:

B = 25°, b = 15, C = 107°

Find the area of a triangle



A is acute.



A is obtuse.

$A = \frac{1}{2}bh$

Area of an Oblique Triangle

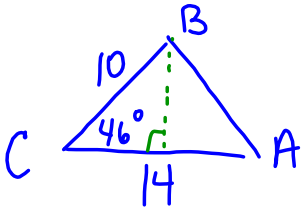
The area of any triangle is one-half the product of the lengths of two sides times the sine of their included angle. That is,

$$\text{Area} = \frac{1}{2}bc \sin A = \frac{1}{2}ab \sin C = \frac{1}{2}ac \sin B.$$

$A = \frac{1}{2}(14)(10)\sin 46°$

Find the area of the given triangle.

$a = 10$, b = 14, C = 46°



$A = \frac{1}{2}bh$

$\sin 46° = \frac{h}{10}$

$10 \sin 46° = h$

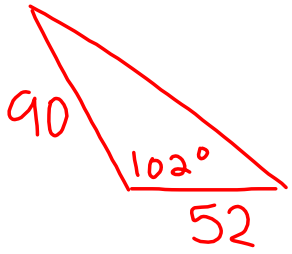
$h = 7.2$

$A = \frac{1}{2}(14)(7.2)$

$A = 50.4 \text{ unit}^2$

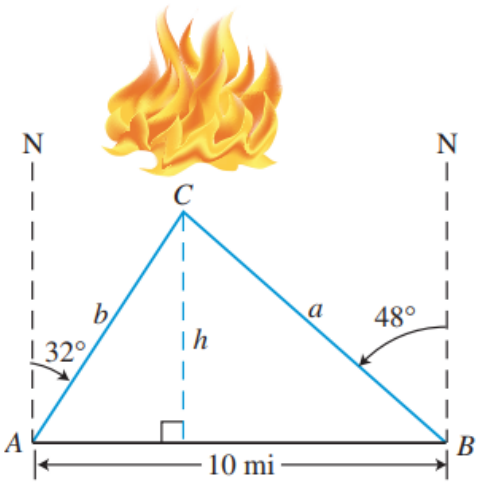
Find the area of a triangular lot having two sides of lengths 90 meters and 52 meters and an included angle of 102°.

Pull



$A = \frac{1}{2}(90)(52)\sin 102°$

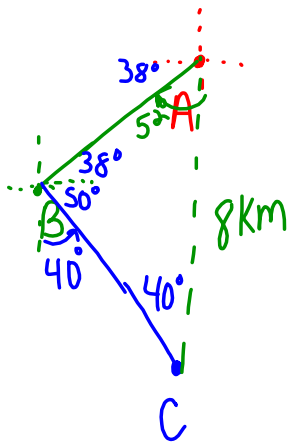
$A = 2288\ m^2$



Forest Ranger Johnson at ranger station A sights a fire in the direction 32° east of north. Ranger Thorpe at ranger station B, 10 miles due east of A sights the same fire on a line 48° west of north. Find the distance from each ranger station to the fire.

The course for a boat race starts at point A and proceeds in the direction S 52° W to point B, then in the direction S 40° E to point C, and finally back to A. Point C lies 8 kilometers directly south of point A. Approximate the total distance of the race course. 19.4 Km

Pull



$\frac{c}{\sin 40^\circ} = \frac{8}{\sin 88^\circ}$ $c = 5.1$

$\frac{a}{\sin 52^\circ} = \frac{8}{\sin 88^\circ}$ $a = 6.3$

Section 6.1 Pgs 406 - 408

#5, 9. 13, 17, 19, 27, 29, 32, 37, 39, 43, 45, 47, 48, 50, 53