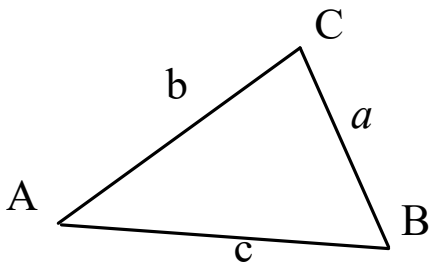
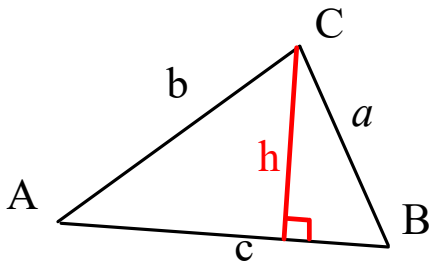
Unit 6.1 Law of sines

Derived from using right triangles

Law of Sines





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

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

☆

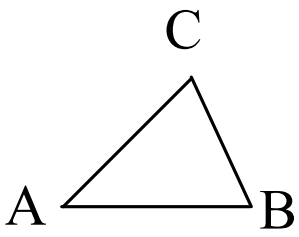
Law of sines works when you have AAS, ASA, and SSA patterns

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?

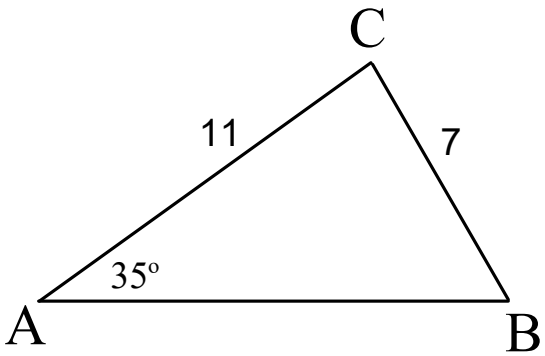
smallest side matches up with the smallest angle

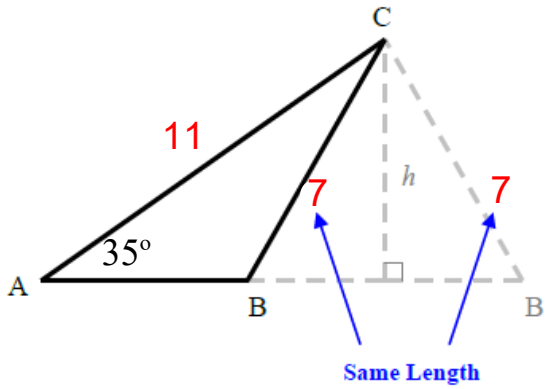
Solve Δ ABC, given that $a = 8$, ∠B = 48°, ∠A = 36°



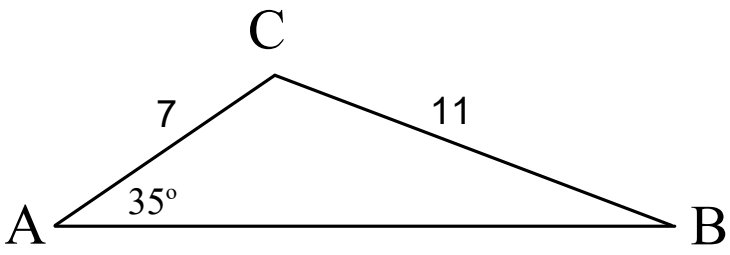
Solve the triangle.

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

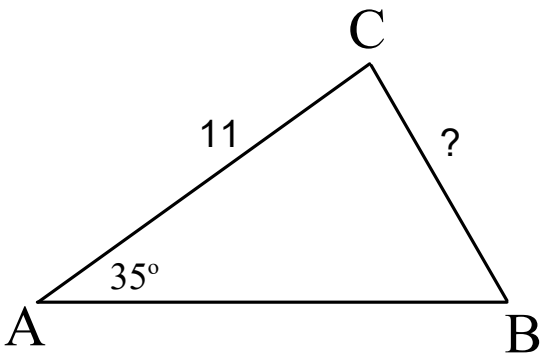




Given Δ ABC, a = 11, b = 7 and angle A = 35º *SSA pattern



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



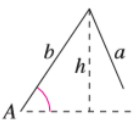
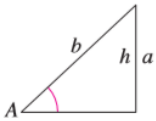
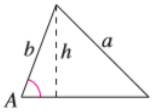
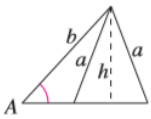
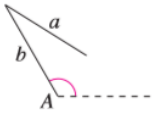
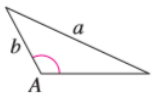
Possible values for side "a" so that a triangle is not possible?

Pull

SSA Pattern could have 0, 1, or 2 solutions

The Ambiguous Case (SSA)

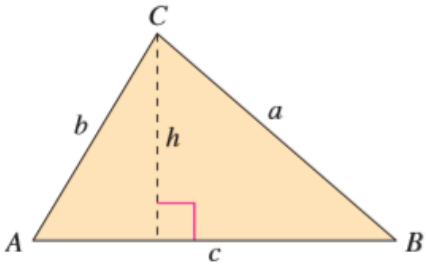
Consider a triangle in which you are given a, b, and A. $(h = b \sin A)$

	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

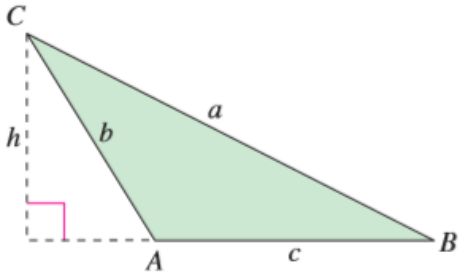
Solve the triangle given:

B = 25°, b = 15, C = 107°

Find the area of a triangle



A is acute.



A is obtuse.

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,

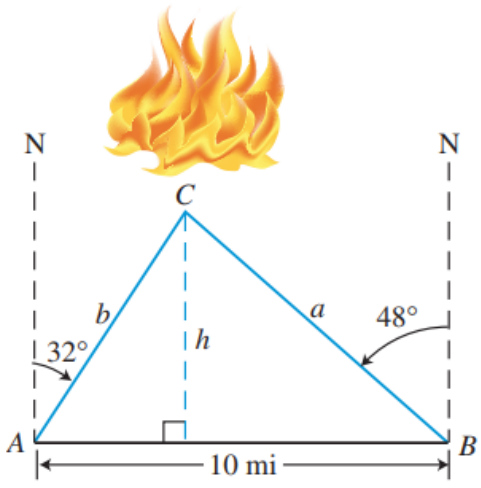
$$\text{Area} = \frac{1}{2}bc \sin A = \frac{1}{2}ab \sin C = \frac{1}{2}ac \sin B.$$

Find the area of the given triangle.

$a = 10$, b = 14, C = 46°

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

Pull



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 52º W to point B, then in the direction S 40º 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.

Pull

Section 6.1 Pgs 406 - 408

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